Autism and Child Psychopathology Series
Series Editor: Johnny L. Matson

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Handbook of Clinical Child Psychology

Integrating Theory and Research into Practice

Springer

Autism and Child Psychopathology Series

Series Editor

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Brief Overview

The purpose of this series is to advance knowledge in the broad multidisciplinary fields of autism and various forms of psychopathology (e.g., anxiety and depression). Volumes synthesize research on a range of rapidly expanding topics on assessment, treatment, and etiology.

Description

The **Autism and Child Psychopathology Series** explores a wide range of research and professional methods, procedures, and theories used to enhance positive development and outcomes across the lifespan. Developments in education, medicine, psychology, and applied behavior analysis as well as child and adolescent development across home, school, hospital, and community settings are the focus of this series. Series volumes are both authored and edited, and they provide critical reviews of evidence-based methods. As such, these books serve as a critical reference source for researchers and professionals who deal with developmental disorders and disabilities, most notably autism, intellectual disabilities, challenging behaviors, anxiety, depression, ADHD, developmental coordination disorder, communication disorders, and other common childhood problems. The series addresses important mental health and development difficulties that children and youth, their caregivers, and the professionals who treat them must face. Each volume in the series provides an analysis of methods and procedures that may assist in effectively treating these developmental problems.

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Preface

This book will be a comprehensive reference for practitioners and practitioners-in-training in the field of child health and mental health. One other, much less comprehensive, volume on the topic was published by Walker and Roberts in 2001. Thus, the present volume is an up-to-date and expanded version of a much earlier text. Topics covered are history, theories, ethics, and diagnostic systems such as the new RDoC criteria. A series of chapters will cover risk factors such as parental stress, divorce, and parental depression. Up-to-date reviews of cognitive variables such as theories of memory, executive function, theories of intelligence, theory of mind, and cognitive tempo will also be discussed. A substantial portion of the book will also cover methods of assessment such as checklist and interviews and methods of treatment such as cognitive behavior therapy, mindfulness, and family therapy. Also, a number of chapters will be devoted to the assessment of specific diagnostic categories such as depression, anxiety, elective mutism, and ADHD. Pediatric issues such as chronic pain, childhood cancer, childhood obesity, and toilet training will be extensively addressed as well. Finally, trending issues will be addressed such as gender diversity, social justice, bullying, internet gaming disorder, and the impact of COVID-19.

Baton Rouge, LA, USA Johnny L. Matson

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Part I

Foundations of Clinical Child Psychology

1

History of Clinical Child Psychology

Michaela Brown, Johnny L. Matson,
and Celeste Tevis

Clinical psychology can be defined as the "psychological specialty that provides continuing comprehensive mental and behavioral health care for individuals and families", and it is marked by its comprehensiveness and integration of knowledge from a wide array of disciplines as well as populations served ("Clinical Psychology", 2008). Child clinical psychology uses this comprehensiveness and integration of knowledge and applies it to the delivery of services to children, understanding the social contexts, social-emotional development, overall developmental process, possible psychopathologies as well as behavioral concerns ("Clinical Child", 2005).

Clinical psychology itself included the study of the development, atypical and typical, of children throughout its history. Eventually, child clinical psychology became its own branch of psychology in 1962. At this time, the sections of Division 12, the Society of Clinical Psychology, began to form, with child clinical psychology as Section 1 (Routh, 1994). The study of children has been a critical part of clinical psychology since its beginnings, starting with the turn of the twentieth century.

Though the science of psychology has been in practice since the early 1900s, the term "Clinical psychology" was not commonly used until 1907. Lightner Witmer first introduced the term in the journal entitled *The Psychological Clinic*, with its first issue as "Clinical Psychology", in which he described an interdisciplinary approach of both assessment and treatment, which, in his case, began with the assessment of children (Benjamin, 2005). Witmer founded a psychological clinic at the University of Pennsylvania in 1896, with his first case reportedly being a child with reading difficulties (Routh, 1994).

History

Children played a critical role in the creation of clinical psychology with the advent of intelligence testing. In 1904, Alfred Binet began assessing children with poor academic performance in school using what would become the first metric scale of intelligence (Carson, 2014). The Minister of Public Instruction in Paris wanted children of lower intelligence to also receive an education, placing these children in special classes and removing them from ordinary schooling (Reisman, 1991). In order to

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accomplish this, a subjective examination process needed to be developed to assess the intelligence of children.

This subjective process ultimately became the 1905 Binet-Simon scale, a scale composed of 30 items arranged according to increasing difficulty (Reisman, 1991). However, the authors of this initial scale admitted that the 30 items did not effectively assess intelligence, and as such, it was adapted to the more sophisticated 1908 Binet-Simon scale. This scale included 59 tests grouped by age levels, from 3 years of age to 13 years of age (Reisman, 1991). The 1908 scale also introduced the concept of "mental age", which was defined as "the highest age level at which the child completed most tests successfully" (Boake, 2002, p. 386); however, Binet expressed concerns about this concept, for he felt it measured a child's intelligence based on the knowledge gained in schooling, not intelligence overall (Reisman, 1991). Despite these concerns, the Binet-Simon scale became the most widely used scale of intelligence in Europe, with American psychologist Henry Goddard translating it for use in America (Boake, 2002).

However, the criticisms of the Binet-Simon scale led to further improvements and research. Augusta Bronner, who had previously worked in Dr. William Healy's child guidance clinic, discussed later in the current chapter, found that test-taking attitudes could significantly impact scores. She also argued that if a child has certain disabilities, such as the inability to read, the intelligence scale would find an invalid score of intelligence (Reisman, 1991). This, and Bridges and Coler's (1917) findings, led to the question of whether intelligence is primarily affected by hereditary factors or one's environment. This question then led to more variations of the intelligence test, accounting for a variety of ages and abilities (Reisman, 1991).

Soon after Binet's work with intelligence came another era in child clinical psychology; the child guidance movement. This movement started with the idea that antisocial behavior can be treated with psychiatric means, including an emphasis on possible pathology (Watson, 1953). Dr. Healy, a psychiatrist and criminologist, helped to establish the first child guidance clinic in the United States in 1909, called the Juvenile Psychopathic Institute, in which clinicians investigated the causes of delinquency in children (Patrick, 1915). Children with mental health concerns were referred to the clinic for scientific study, and information such as their medical examinations, social histories, and recommendations for treatment was collected and presented for the court (Snodgrass, 1984). Within these clinics, the model of mental health emerged, with the disciplines of psychology, psychiatry, and social work intertwined.

Healy went on to publish *The Individual Delinquent*, in which he found no direct cause for delinquency and no clear-cut psychopathology (1915). He also included intelligence tests, possible trauma, and medical infections as evidence for his theory (Levy, 1968). Using this evidence, he argued that emotional disturbances were causing delinquency in children and treatment was needed in an attempt to eliminate these disturbances (Reisman, 1991). Though this book led to some controversy, the theories discussed brought upon change, leading some legal authorities to favor environmental and psychological explanations for delinquency as opposed to organic and hereditary explanations (Reisman, 1991). Healy and Bronner went on to create the Judge Baker Guidance Center in Boston, Massachusetts, eventually becoming the largest child guidance clinic (Routh, 1994). Child guidance clinics were created to promote mental health by preventing mental illness and focused on the issues children were struggling with, including disobedience, sleep disturbances, and overall problematic behavior (Bakker, 2020).

During this time, child guidance clinics were also forming in Europe, with Alfred Adler organizing the first clinic in Vienna (Reisman, 1991). Adler believed similarly to Healy, for he felt that child guidance emphasized the idea that children with behavioral difficulties were often struggling internally (Adler, 1947). Adler studied the differences between children from varied socioeconomic backgrounds as well as those with disabilities and disorders. He was also interested in topics such as birth order and a comparison between "neurotics" and "the criminal child", for he reported that both demonstrate a lack of social interest as well as an increased concern for their own welfare (Adler, 1947). Adler used these theories to guide his work in his child guidance clinics, which were created along the lines of individual psychology (Seidler & Zilah, 1930). Adler's theory of individual psychology emphasized that neurosis does not originate from a defective body part, but rather from the individual's subjective feelings of inferiority (Reisman, 1991).

Introduction of Clinical Psychology

As discussed in the introduction of this chapter, clinical child psychology became the first section of Division 12, The Society of Clinical Psychology, in 1962 (Routh, 1994). After the development of Section 1, a journal was created to represent the section. The first issue of the *Journal of Clinical Child Psychology* was published in 1971, with an emphasis on child advocacy (Routh, 1994).

However, the first clinical psychologist of note was published much before the advent of the journal. C.M. Louitt wrote *Clinical Psychology: A Handbook of Children's Behavior Problems* (1936), in which he discussed diagnostic methods, mental deficiency concerns, and behavior problems. Louitt attempted to use the child's history as well as other psychological factors to understand behavioral problems, breaking down the section into chapters examining topics such as conduct problems, juvenile delinquency, speech defects, and behavior problems correlated with disabilities (Olson, 1937).

The idea of clinical child psychology continued to make itself known in the psychology world following this publication. In 1941, Charlotte Buhler, a psychologist originally from the University of Vienna, began a class on clinical child psychology at Clark University in Massachusetts (Routh, 1994). Bruno Bettelheim worked with children with autism and psychosis at the clinic he founded, the Sonia Orthogenic School. Here he used milieu therapy, a treatment that included the entire staff for therapeutic interactions at all times during the day, instead of the child receiving treatment over the course of a couple of hours (Marcus, 1999). Milieu therapy consisted of thoughtfully arranged supports, personnel, and general procedures according to the patient's overall mental health and needs (Reisman, 1991). The aim of this therapeutic method was to have every interaction and activity therapeutic by providing learning situations in which the child is taught social skills, daily living skills, and appropriate behaviors, among others (Wolf, 1977). Bettelheim felt that this method supported the child's development by increasing mastery in a variety of skills as well as emphasizing interpersonal relationships (Bettelheim & Sylvester, 1948).

Also, the nature versus nurture debate originated around this time, for which children were used as evidence for each side. Due to the increased use of intelligence measures and a resulting increased debate on what a subjective estimate of intelligence is, schools of thought began to develop between the "nature-heredity-organicists" and the "nurture-stressing environmentalists" (Reisman, 1991, p. 189). Beth L. Wellman (1934) conducted research in support of the nurture position, finding that children who attended preschool demonstrated a significant increase in IQ compared to those who did not. She also discussed the idea that environment can play a role in functioning, lower IQs could come out of more impoverished environments, while higher IQs were seen in those who came from more enriched environments (Reisman, 1991).

On the nature side of the debate, British psychiatrist Lionel Penrose (1935) found two cases of intellectual disability. At the time, this was referred to as "mental retardation", which was thought to be produced by a deficiency of a specific enzyme, leading to difficulties of oxidation for specific amino acids. The nature side found scientific evidence for potential causes of intellectual disabilities, whereas the nature side could not explain all of the cases of disability (Reisman, 1991).

Intellectual functioning continued to be a debate through the mid 1900s. During the civil rights movement in the 1960s, poverty was an important topic. In an attempt to break the cycle, early childhood education was emphasized, with attention placed on children at the preschool age (Reisman, 1991). Additional testing measures were created to assess the intellectual functioning of the age group, such as the Wechsler Preschool and Primary Scale of Intelligence (WPPSI: Wechsler, 1967) and the Bayley Scales of Infant Development (BSID: Bayley, 1969).

Following the increased use of these measures came increased questioning as to why children were not performing well academically. Schools found that children were specifically having difficulties with areas such as arithmetic and reading, and instead of being diagnosed as emotionally disturbed or an underachiever, these children were receiving diagnoses such as brain damage or a perceptual handicap (Reisman, 1991). Eventually the term "learning disability" came into use, becoming a central theme for parents and advocates to gain services for children with learning disabilities (Mercer & Hallahan, 2002).

As time went on, more etiologies of disorders were reexamined. Before the 1980s, psychological disorders, such as schizophrenia and autism, were believed to be genetically determined (Reisman, 1991). However, by 1989, schizophrenia was deemed a disease, with researchers advocating to psychologists to change the classification and overall understanding of this disorder. A similar process occurred with autism, a disorder initially termed as childhood schizophrenia (Rutter & Schopler, 1987). Bettelheim, the psychologist responsible for the previously discussed milieu therapy, also conducted research on autism and publishing several books and articles about his work (Bettelheim, 1959, 1967, 1974). Initially, Bettelheim proposed a psychodynamic explanation for the disorder, stating that autism occurs due to the child's inability to develop his or her ego as well as his object relations, or interpersonal relationships (Helm, 1976). He also went as far as to compare autistic children to feral children, concluding that the behavior of both feral and autistic children is largely due to extreme emotional isolation as well as perceived threatening experiences (Bettelheim, 1959). Leo Kanner, one of the first psychiatrists to publish about autism (Kanner, 1943), shared a similar sentiment, arguing that autistic children were reared in emotional refrigerators by refrigerator mothers, attributing the disorder to a lack of parental warmth (Cohmer, 2014)

However, by the 1980s, few psychologists believed his theory, as demonstrated in the DSM-III's classification of autism as a pervasive developmental disorder, instead saying that autism interfered with the infant's early growth (Reisman, 1991). Rutter and Schopler (1987) took the definition of autism a step further, suggesting that it could be considered a syndrome, similar to cerebral palsy or intellectual disability. However, autism does not present with brain structure abnormalities like these two diagnoses.

Along with these clarifications in diagnoses, the field of clinical psychology continued to see significant changes within the population served and society overall. In his Presidential Address at the Clinical Child Psychology Section's Executive Committee Meeting, Jan. L Culbertson discussed the new trends that the field must face, such as a changing ethnic mix in the U.S. population as well as increased immigration rates (1993). Culbertson (1993) recommended a more comprehensive network of services to meet the children's mental, physical, and social needs, a distribution of these services to areas with less access to mental health services, as well as coordination with the various services involved in child mental health, such as health care, education systems, child welfare, and justice systems. Several models were discussed and suggested, such as "Project Wraparound" (Burchard, 1988), a program in which services were "wrapped" around children with emotional disturbances and were used to support their adjustment to mainstream school. These services consisted of school-based interventions, in which a specialist helps develop and implement the child's individualized educational plan (IEP), and of home-based interventions, in which a specialist develops a support plan with and for the family (Culbertson, 1993). Multisystemic treatment approaches, such as this one, continued to develop, addressing both systemic and individual problems with interventions focusing on communities, schools, and homes (Henggeler & Borduin, 1990; Melton & Abramcyzk, 1989).

Professional Development

In 1892, the American Psychological Association was founded at Clark University by G. Stanley Hall and seven other council members, ranging from psychologists to educators and physicians (Reisman, 1991). Hall, a student of William James, founded one of the first psychological laboratories in the United States at John Hopkins University as well as the first American psychology journal, *the American Journal of Psychology*. Hall founded the APA with the ideas of advancement of psychology as a science as well as an association used to promote relations with other professional organizations (Greenwood, 2017). Within the first decade of formation, the APA grew to about 100 members and worked to make gains in the psychological field, especially within the field of diagnostic testing (Reisman, 1991).

Witmer (1907), the psychologist credited with introducing the term “clinical psychology”, used the term clinical to refer to his teaching method, in which instructors, students, and individuals gathered to study, research, and treat mental disabilities and disorders. He believed the clinical psychologist’s role was not composed solely of clinical examinations of individuals in need, but also teaching to demonstrate procedures for students as well as scientifically collecting data for research from every case (Reisman, 1991). Witmer persuaded the administration at University of Pennsylvania to offer formal training in clinical psychology, with courses offered in psychiatry and neuropathology. Eventually, more courses were offered, such as abnormal psychology, developmental psychology, and child psychology (Reisman, 1991). Witmer’s clinic out of the University of Pennsylvania assessed several children and staffed several different specialties, such as students, PhDs, and social workers (Fernberger, 1931).

The success of this clinic led to the establishments of other psychological clinics, such as the Iowa Psychological Clinic out of University of Iowa in 1908 and psychological clinics at Clark University, University of Minnesota, and University of Washington, with the latter two also offering courses in clinical psychology (Reisman, 1991).

Despite the increase of psychological clinics, there was a shortage of trained psychologists working in the clinical field, such that in 1917, only 16 of the 307 members of the APA worked in the nonacademic application of psychology (Reisman, 1991). J.E.W. Wallin also observed this problem in the psychological field, noticing a lack of trained psychologists who could administer and interpret the intelligence tests schools were desperately needing (Routh, 1994). The United States began enacting compulsory attendance laws for school-aged children, leaving teachers overwhelmed with a wide diversity of students and no clear direction of how to teach to a wide range of functioning abilities (Ferguson, 2014). With the advent of intelligence testing, schools were able to test and place children according to their IQ, leading to a dramatic increase in special education classrooms. By 1922, at least 130 cities in 23 states were stating enrollments of over 23,000 pupils in special education classes (Scheerenberger, 1983).

With this increase of special education classrooms came an increased demand in intelligence testing and clinicians who were trained to administer the measure. Wallin organized a training school in which teachers were taught to administer the Binet-Simon scale (Reisman, 1991). The University of Pennsylvania also worked to achieve this goal by offering courses on the study of intellectually disabled children and remedial teaching, as well as opening clinics that focused on speech defects (Fernberger, 1931).

With this increase in classes specialized in clinical psychology and psychological clinics also came an increase in institutions, such as Boston Psychopathic Hospital, McLean Hospital, and New York Institute for Child Guidance, offering clinical psychology internships (Reisman, 1991). The number of clinical psychologists continued to rise with the opportunities available for them to receive training.

Despite this progress made within special education, the classification system of labeling an individual as intellectually disabled was heavily debated. Wallin helped to create a law in which children had to be assessed individually using a standardized test of intelligence before they were assigned to a school for the “mentally defective”, or “intellectually disabled” in today’s terminology (American Psychiatric Association, 2013). Legislation was also introduced that required a psychologist to be included on the panel of experts that determines whether an individual is mentally ill and should be committed to an institution. However, the psychiatric and medical communities were not in agreement as to whether or not a psychologist could be considered an expert on this issue (Reisman, 1991).

This disagreement led to a split within the psychological community. Those psychologists who believed the APA was not representing them well left to form an independent organization, the American Association of Clinical Psychologists (AACP). Its main focus was to raise professional standards of clinical psychologists and encourage research (Routh, 1994). However, the AACP only lasted 2 years, dissolving in 1919. This dissolution was due to psychologists’ opposition of splinter groups within the psychological community, which appeared to weaken their strength, especially following World War I (Reisman, 1991).

Along with the increase in testing came an increase in improvements in the mental hygiene movement. Psychologists worked to prevent mental illness and support those who suffered from it instead of focusing the majority of resources and training on patients requiring hospitalization (Reisman, 1991). Clinical psychology also broadened its horizons to include a wider range of disciplines, such as medical criminology, disciplinary psychiatry, and a discipline called orthopsychics, which placed emphasis not just on delinquent and intellectual disabled individuals but also on the parent-child relationships of these individuals (Lowrey, 1948). In 1924, the American Orthopsychiatric Association was formed (Reisman, 1991), with orthopsychiatry defined as “an interdisciplinary approach to mental health in which psychiatrists, psychologists, social workers, pediatricians, sociologists, nurses and educators collaborate on the early treatment of mental disorders, with an emphasis on prevention” (American Psychological Association, 2020).

Despite the progress psychology made in the public, during the 1920s and 1930s psychiatrists still continued to oppose clinical psychologists, arguing that intellectual disability was solely a medical diagnosis made by medical personnel, not by psychologists (Reisman, 1991). Shepherd Franz (1906), a psychologist and editor of several psychological journals, attempted to bridge the gap, stating that psychiatrists often need psychologists, for psychologists can determine what symptoms and changes in mental states are of clinical importance. On the opposing side, psychiatrists felt that psychologists should not be involved in either diagnosis or treatment, for leaders in the field such as psychiatrist Abraham Arden Brill published articles stating that psychoanalysis should only be performed by physicians (Alexander et al., 1995). The New York legislature agreed with Brill, passing a bill declaring analysis done by any profession other than psychiatry illegal (Reisman, 1991). However, as time went by, psychology came to be considered a science. Clark L. Hull, the president of the APA in 1937, proposed a model designed to build psychological theories by using operationally defined terms and theorems as well as a theoretical system in which to test hypotheses (Reisman, 1991; Paterson, 1937).

With the debate as to what psychologists were effectively trained to do, clinical psychology continued to grow and develop. In 1924, the Section of Clinical Psychology set standards for clinical psychologists moving forward, stating that clinical psychologists should receive a PhD from an approved graduate school and receive 4 years of clinical training, with at least one of those years focusing on diagnosis (Reisman, 1991; Routh, 2000). More journals in the psychological field began to adapt and come out, such as the *Journal of Abnormal and Social Psychology*, originally the *Journal of Abnormal Psychology*. This journal introduced social psychology as a valid branch of psychology and was eventually gifted to the APA in 1926 (Reisman, 1991).

With this growth in clinical psychology came an increased number of clinical psychologists and their overall dissatisfaction with the APA and current clinical guidelines. The APA considered psychologists to be creators and interpreters of tests, but clinicians wanted more freedom within their roles, for clinical psychologists desired to move onto the treatment of behaviors and personality problems, not just the administration of tests (Tulchin, 1930). In an attempt to resolve this, the Section of Clinical Psychology of the APA established a training program in clinical psychology, forming the Committee on Standards of Training for Clinical Psychologists in 1935 (Reisman, 1991). The committee defined clinical psychology as the art and technology that deals with adjusting problems of human beings and laid out training recommendations for clinical psychologists (Report of Committee, 1935). Though these training recommendations were implemented across graduate programs, clinical psychologists were still unhappy with their limitations within the APA, and the Clinical section of the APA disbanded in 1937, forming the American Association of Applied Psychology (AAAP) (Routh, 1994). The AAAP took over the American Association of Consulting Psychology and organized itself into four sections; consulting psychology, clinical psychology, educational psychology, and business and industrial psychology (Reisman, 1991). Despite its initial success, which included 615 members by 1941, the AAAP still looked to the APA for guidance and leadership (Reisman, 1991). In 1942, the AAAP was incorporated into the APA, creating a more federal association with 18 new divisions, each representing a special interest group (Routh, 1994).

Following World War II, psychology grew in popularity and prestige, with a significant increase in college students studying psychology (Fischer & Hinshaw, 1946). Clinical psychology also became more popular within the APA, with 53% of those affiliated with the association expressing an interest in the clinical field (Hilgard, 1945). The APA Committee on Training in Clinical Psychology (1947) detailed classes required for graduate programs, such as statistics, diagnostic methods, and general psychology.

With the increase of clinical psychology graduate programs came an increase in clinical psychologists in need of legal recognition and certification. Beginning in 1945, states began enacting general certification laws for psychologists (Reisman, 1991). Also, the importance of internship was becoming emphasized and recognized. Clear guidelines were created for the types of supervision and training clinicians should receive, with internships providing opportunities for clinicians to hone clinical skills as well as become acquainted with raw data in the field in order to complete research later on (Raimy, 1950; Foster et al., 1952).

With the increase of clinical psychology students came the discussion of current training models. The Conference on Graduate Education in Clinical Psychology, which eventually became known as the Boulder Conference, concluded with a detailed training model called the Boulder Model (Routh, 1994). The Boulder Model, or the scientist-practioner model, emphasized diagnosis, therapy, and research within graduate training programs for clinical psychologists (Baker & Benjamin, 2000). The practioner model was later introduced in the 1960s, with less emphasis on research and more on practical courses, like treatment and assessment methods. The student would receive a PsyD instead of a PhD and work in five laboratories related to clinical psychology, when a PhD student was only required to work in two (Reisman, 1991).

By the 1970s, clinical psychology became a more recognized scientific field including medical specialties within its reach, with several divisions created within clinical psychology, such as clinical neurophysiology and pediatric psychology and clinical psychophysiology (Feuerstein & Schwartz, 1977). By the 1980s, clinical psychology was the dominant branch of psychology in the United States, with more PhDs being given in clinical psychology than any other field (Reisman, 1991).

Theories

Clinical child psychology also played a significant role in the development of crucial psychological theories. For example, the fundamentals of behaviorism may have found its footing in clinical child psychology. John B. Watson believed that behaviorism was the most objective branch of psychology, for its theoretical background was the prediction and control of behavior (Watson, 1913). He also emphasized that one's environment and training were the fundamentals of behavior (Watson, 1928). Watson, upon studying infants, found that the only unlearned behaviors are those of simple motor responses and emotional reactions, whereas the more complicated behaviors and responses are learned through conditioning (Reisman, 1991).

Watson assessed his theory of conditioning through an experimental study on Albert, a 9-month-old child who initially did not demonstrate any fear towards live animals, including a rat, but did demonstrate a fear response when a loud sound was made behind his back (Harris, 1979). In order to condition the child to fear the rat, the rat was shown to Albert and was immediately followed by the loud sound. Watson continued to pair the two stimuli for several sessions, testing the fear response days later by presenting the rat along with various other objects. Albert displayed a strong fear response to the rat along with other similarly furry animals, such as a dog and a rabbit (Harris, 1979). Watson concluded that children can demonstrate emotional conditioning towards certain stimuli, leading to conditioned fears (Watson, 1919).

Mary Cover Jones, under the supervision of Watson, was also interested in behavior therapy in the treatment of children's fears (Goodwin, 2010). In her studies, Jones took Watson's work a step further, incorporating methods such as social imitation and modeling, for she found that if a child with an existing fear of a rabbit sees other children playing excitedly with the rabbit, his fear response was quickly reduced, and he was able to interact with the rabbit (Jones, 1924).

Jean Piaget, one of the founders of the Gestalt school of psychology, also used child research as foundations for his theory, as he found that children use two different kinds of speech (Reisman, 1991). Children around the ages of 5 and 6 used egocentric speech, in which the child is unable to differentiate his or her perspective from others (Kohlberg et al., 1968) and the child's speech was characterized by a lack of concern about whether others attended to what the child was saying or what the listener may be thinking (Reisman, 1991). The second kind of speech was socialized speech, in which the speaker used language as an intentional way to communicate with others, considering the reactions and perspectives of the listeners (Reisman, 1991). Piaget's work provided significant evidence for developmental psychology as well as methods for data collection for clinical child psychology, for he demonstrated that observations of children done in natural settings can display interesting findings on human functioning (Reisman, 1991).

Child development, a critical component of clinical child psychology, had also been studied years prior to the creation of Section 1, with several psychologists contributing to the field. Arnold Lucius Gesell analyzed the early motor, cognitive, and emotional development of infants, creating a theory of sequences through which children move through (Dalton, 2005). The Gesell Developmental Schedules were made up of 26 age levels of developmental maturity from birth through the age of 5. Four areas of development were assessed: motor, adaptive, language, and personal-social (Gesell & Doll, 1953). These scales were used by parents to assess their child's developmental milestones (Reisman, 1991) as well as in research (Beckwith et al., 1976; Roe, 1978).

Prominent psychoanalysts also contributed to the field of clinical child psychology. Melanie Klein published *The Psycho-Analysis of Children* (1932), in which she described how children demonstrated their unconscious fantasy life through free, undirected play. She collected evidence for this theory via "play therapy" in which she used Freud's analytic therapy of free association, such that the child was instructed to play with simple toys, and the analyst interpreted the play, developed positive and negative effects, and resolved the issue, all through a type of "transference-neurosis" (Klein, 1933).

Play therapy continued to be researched following Klein's work in the area. Frederick Allen, the director of the Philadelphia Child Guidance Clinic, worked to create significant gains in the therapeutic relationship between the child and therapist (Reisman, 1991). Allen emphasized the importance of accepting the child as he or she was at that moment in time and helping him or her understand and accept who he or she is. He also believed in understanding his own limitations as a therapist and did not want his clients to see him as omnipotent (Allen, 1934).

Play therapy became a popular form of treatment for children, for therapists found it was a method for children to be able to communicate through free play. In the 1930s, therapists believed play served two functions; it was considered to be a natural medium through which children could express fantasies and difficulties, and the therapist could use the play to impress the child and gain his or her confidence (Reisman, 1991). David Levy (1939) used play as the basis for his release therapy, in which children acted out or "played" their anxieties, fears, or undesired behaviors in an attempt to understand their own motivation and express their feelings. Levy (1939) also believed play could be used as a diagnostic tool, in which the therapist would create a situation using the toys at hand and encourage the child to interact and react to the scenario. Over the years, play therapy has become an effective form of treatment, with positive effects observed in areas such as social maladjustment, autism, conduct disorder, and speech or language concerns (Ray & Bratton, 2010).

The stages of development also became a popular and important topic of research, following reports of the aftereffects of children raised in orphanages (Reisman, 1991). Harry F. Harlow and Margaret Kunne Harlow (1962) found that monkeys raised without a mother and any physical contact of peers grew to be socially inept, aggressive, and overall unable to function as expected in their daily lives. The authors compared these results to the observations of children deprived of mothering in orphanages, finding similar symptoms of emotional pathology (Harlow & Harlow, 1962).

Mary Ainsworth and John Bowlby took Harlow's work a step further by examining the relationship between mother and child. Bowlby believed that children required a close and continuous caregiving relationship and did not agree with the current explanation for this relationship offered by the psychoanalytic view, in which motherly love comes from oral gratification, or the social learning theory, in which dependency is considered secondary reinforcement (Bretherton, 1992). Bowlby argued that an infant's clinging to and following around its mother was more important for attachment than other behaviors such as sucking and crying (Bowlby, 1958).

Eventually, Bowlby formulated the attachment theory (Bowlby, 1958, 1959, 1960), with Ainsworth contributing and refining it (Ainsworth 1967; Ainsworth & Bell, 1970). The researchers examined how the relationship between mother and infant, and possible separation between the two, impacted the child's development. Ainsworth observed families of unweaned babies, focusing on the signals and behaviors of the child and whether these signals and behaviors were directed towards the mother. She found that infants who securely attached to their mothers cried less and explored more when near their mothers when compared to insecurely attached infants, who cried often and explored little (Bretherton, 1992). She continued to examine this pattern by means of the Strange Situation, a laboratory procedure in which mother and infant interacted in a playroom for a period of time until an unfamiliar woman entered the room. The stranger interacts with the baby, and the mother leaves the room, only to return shortly. The stranger leaves and the mother leaves next, leaving the child completely alone (Ainsworth & Wittig, 1969). Ainsworth confirmed her results, and she and Bowlby used these behavioral findings to create their attachment theory, in which attachment has its own motivation and is not due to other evolutionary processes, such as mating and feeding (Bretherton, 1992). Instead, the attachment figure (i.e., the caregiver) provides a secure base for the child to explore its environment as well as provides a safe haven to return to for reassurance and comfort (Ainsworth 1967; Schaffer and Emerson, 1964).

Bowlby used the work of Piaget to support his argument. After working with Binet on his IQ measures, Piaget became interested in how the child's mind worked, which resulted in his development of stages of cognitive development (Reisman, 1991). The first stage, the sensorimotor stage, occurs in infancy, in which the infant learns through motor activity, and his or her intelligence is based on interactions and experiences. The child begins to develop object permanence and some language skills (Ojose, 2008). The next stage, the preoperational stage, occurs during toddler and early childhood, in which the children begin to use symbols, language, and imagination (Huitt & Hummel, 2003). The child also begins to assume causality and relationships between events, becoming more aware of people and his and her immediate environment (Reisman, 1991). The next stage, the concrete operational stage, occurs in elementary and early adolescence, in which operational thinking occurs and the child begins to learn and understand more logical concepts such as time, constancy, volume, and mass (Huitt & Hummel, 2003). In the final stage, the formal operational stage, occurring during adolescence and adulthood, the individual is able to apply the logical use of symbols to abstract concepts, predict future events, and consider possible circumstances or consequences (Huitt & Hummel, 2003; Reisman, 1991).

Treatment

Following the development of these theories came the development of effective and evidence-based treatments to support children with commonly occurring disorders, such as the two discussed below.

Advancements in Treatment of Child and Adolescent Anxiety

Anxiety disorders represent the most commonly occurring mental health disorder in children (Cartwright-Hatton et al., 2006) and adolescents (Merikangas et al., 2010). Though it was not officially classified as an illness before the nineteenth century, there is evidence that anxiety has been clearly defined as a negative affect and a separate disorder by Greco-Roman philosophers and physicians (Crocq, 2015). Over the years, various treatments have been created for anxiety disorders in children. Ollendick and King (1998) presented the first review of treatments that used the guidelines set by the American Psychological Association (APA) Task Force on Promotion and Dissemination of Psychological Procedures, in order to assess the efficacy of these treatments. The authors assessed specific psychological procedures, such as systematic desensitization, modeling, self-instruction, and cognitive-behavioral interventions, finding that only cognitive-behavioral interventions with and without family anxiety management were efficacious (Ollendick & King, 1998). A decade later, Silverman et al. (2008) conducted another review on anxiety treatments for children and adolescents, focusing on group design studies and named treatments (e.g., *Coping Cat*; Kendall, 1994). The authors did not find well-established treatments, but did find five treatments that were possibly efficacious, and three deemed experimental (Silverman et al., 2008), according to Chambless and colleague's criteria (Chambless et al., 1996, 1998).

Higa-McMillan et al. (2016) conducted a review of treatment outcome studies from 1967 to mid-2013. Out of the 111 treatment outcome studies testing 204 treatment conditions, six were considered well-established status for treating child and adolescent anxiety, eight were considered probably efficacious, two were possibly efficacious, six were deemed experimental, and eight treatments demonstrated questionable efficacy (Higa-McMillan et al., 2016). Overall, CBT and exposure-based therapies were the most efficacious for children with anxiety. The authors surmised that treatment is most effective when it is based upon the child's unique circumstances, such as family characteristics, where the services take place, and type of treatment (Higa-McMillan et al., 2016).

Advancements in the Treatment of Autism Spectrum Disorder

In 1987, O. Ivar Lovaas wrote about the effectiveness of a behavioral-intervention project working to make behavioral gains in young children with autism (Lovaas, 1987). He found that intensive behavioral treatment significantly treated children with autism, for 47% of the experimental group achieved typical intellectual and educational functioning (Lovaas, 1987). The treatment was based on operant conditioning theory and included methods such as ignoring aggressive and self-stimulatory behavior, shaping more acceptable forms and behavior, building compliance, teaching imitation, and then teaching expressive language and interactive play, among other goals (Lovaas et al., 1980). Studies like these and others (McEachin et al., 1993) demonstrated the plasticity of autism and the possibility of significant gains given appropriate intervention. Rogers and Vismara (2008) conducted a review examining the efficacy of early interventions of autism and found that Lovaas' treatment met well-established criteria, no treatments meeting probable efficacious criteria, and three meeting possibly efficacious criteria.

Loovas went on to develop one of the most evidence-supported and popular treatments for ASD, applied behavior analysis (ABA) (Roane et al., 2016). Initially referred to as early and intensive behavioral intervention (EIBI), ABA is conducted 5–7 days a week up to 40 h a week, using discrete-trial training as its main method, in which skills are taught in a repeated and brief fashion with specific instructions. Data are then collected during these trials to determine the child's progress (Lerman et al., 2011). ABA is one of the most accepted forms of treatment for ASD, for the majority of insurance companies require treatments to incorporate the principles of ABA within its model (Roane et al., 2016).

Conclusion

Clinical child psychology, though not an officially used term at the time, played a significant role in the advancement of psychology as a science. Psychology over the decades broke into several branches, one of which was clinical psychology, a hands-on field that psychologists fought to create in order to use their clinical skills to diagnose and treat individuals (Franz, 1906; Tulchin, 1930; Routh, 1994). Children played a role in the creation of these branches within psychology, for they were used to develop the theory of intelligence (Boake, 2002), and the study of their development played a significant role in psychological theories such as delinquency (Healy 1915) and attachment (Bowlby, 1958, 1959, 1960; Ainsworth, 1967). Advancements in public education also help to progress the field of clinical psychology, for the increase in special education classrooms (Scheerenberger, 1983) and the present movements, such as the civil rights movement, which emphasized early childhood education (Reisman, 1991), led to major breakthroughs and developments in education (Mercer & Hallahan, 2002; Ferguson, 2014).

As time went on, clinical child psychology continued to improve upon psychology overall via several avenues, such as encouraging the creation and implementation of multisystemic interventions of children at risk for emotional or behavioral disturbances (Culbertson, 1993) and playing a significant role in the treatment of commonly occurring disorders that often first manifest systems during childhood (Ollendick & King, 1998; Rogers & Vismara, 2008).

Overall, clinical child psychology has held a significant role in psychology's history starting as early as the 1900s. Since the foundation of psychology, field clinicians have fought to be considered clinical psychologists and be allowed and trained to do the work they felt passionate about. Clinical psychology continues to be a popular and powerful branch of psychology (Reisman, 1991) and its inclusion in the study of children has led to significant improvements in the diagnosis and treatment of disorders (Roane et al., 2016).

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Developmental Psychopathology

2

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Based on considerable research over the past few decades, it is now well understood that the assessment, diagnosis, and treatment of mental health difficulties in children and adolescents should be conducted through a developmental lens. Throughout this process, ongoing or potential avenues for treatment are determined by whether a presenting problem represents atypical development or an exaggeration of a typical developmental process. Fortunately, the discipline of developmental psychopathology provides an ever-growing, empirically based framework for the consideration of these issues and key concepts grounded in empirical evidence. Important factors in a developmentally informed approach to assessment, case conceptualization, and treatment include age of onset of a psychological difficulty or timing of exposure to a significant/traumatic event, severity of the problem, and intensity of the problem (Costello, 2016). Inarguably, a child's psychosocial functioning must be understood within important contexts such as home, school, peer, community, and culture. As described throughout this chapter, the developmental context is also important for conceptualizing and determining intervention options for child and adolescent maladjustment.

A central contribution of research in developmental psychopathology has been to elucidate developmental pathways and progressions involving adaptive and maladaptive functioning in youth. One such example is highlighting the lack of evidence for assuming one cause/precursor for one psychological outcome or one result from one risk factor. That is, the concepts of equifinality and multifinality reflect the complex realities of psychological adjustment throughout development. They describe processes by which one psychological problem may stem from multiple causal pathways (i.e., equifinality) and how one event or risk factor can result in a variety of outcomes (i.e., multifinality; Cicchetti & Rogosch, 1996). Relatedly, the possible presentations of a specific disorder or problem are tremendously heterogeneous based, in part, on these diverse developmental pathways.

Another cornerstone of developmental psychopathology involves accounting for multisystemic or multilevel variables as possible risk or protective factors during youth and adulthood. Such factors may include identity variables such as race (Anderson & Mayes, 2010; Gutman, 2019) or gender (see Rutter & Srouffe, 2000); supportive or non-supportive systems (e.g., family, Simpson et al., 2018; Womack et al., 2019; school; Fite et al., 2014, Vancraeyveldt et al., 2015; neighborhood, Riina et al., 2013); psychopathology related to the development of further difficulties or impairments; and contex-

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tual factors, including socioeconomic status as well as community health and safety (Cui et al., 2018; Jeon et al., 2020; Neal & Neal, 2013; Smokowski et al., 2014). Multilevel conceptualizations are necessarily more complex and nuanced but also more comprehensive for understanding youth adjustment at the individual and population levels. Continued efforts to incorporate these factors into understanding the phenomenology of psychological constructs during childhood and adolescence will also result in more accurate and generalizable information on developmental norms.

Data on developmental norms are critical in developmental psychopathology and allied disciplines. Vast research on normative development guides clinical assessment, diagnosis, and treatment within a developmental psychopathology framework. That is, psychological problems across the lifespan can and should be understood from what is known regarding typical development. For example, hyperactivity is often not a focus of diagnostic assessments or intervention efforts in the preschool years because behavior dysregulation in the form of running around, restlessness, and difficulty remaining seated is considered quite common during that time.

Developmental research underscores the need to make norm-referenced comparisons in childhood based on relatively short periods given the substantial amount of psychosocial development that takes place during each timeframe (Frick et al., 2020). However, this need for a short window of time diminishes as development starts to slow. To illustrate, comparing an adult to other individuals who are 10 years older would not be fraught with nearly as many problems as would comparing a child with other youth who are 10 years their senior.

A further consideration is that when a problem is impairing or at an atypical severity or frequency, that presentation may be qualitatively different than what may be expected at an individual's age or developmental stage. Alternatively, the problem may simply represent an exaggeration in severity or frequency of a typical developmental process. The former is represented by a young child demonstrating symptoms of depression. The latter process is exemplified by adolescent-onset conduct problems, as some degree of rule-breaking or illegal behavior is normative during this period when youth typically attempt to assert their autonomy and commonly experience less parental monitoring as well as more peer engagement (Loeber et al., 2009). Intrafamilial factors, however, may help further explain relative fluctuations in delinquency during adolescence, with greater disclosure between adolescents and parents predicting lower levels of delinquency (Keijsers, 2016).

A clinician must, therefore, have good knowledge not only of developmental norms but also of common developmental processes and tasks throughout childhood and adolescence. To that end, decades of research on developmental psychopathology inform clinical work with children and adolescents through several guiding principles. First, there is *tremendous heterogeneity within diagnostic categories* (e.g., Klein et al., 2005; Masi et al., 2017). Within the *DSM* diagnostic framework, an individual can meet the criteria for a diagnosis through a variety of symptom presentations, expanding the varied ways in which a disorder may present itself. However, perhaps more importantly, there are clear individual differences in how psychopathology is expressed, differential influences of important contexts, and as discussed below, developmental influences on the manifestation of clinical difficulties. Another factor in the heterogeneity of clinical presentations that has been discussed in the context of autism spectrum disorder is *chronogeneity* (Georgiades et al, 2017), which reflects the varied paces at which developmental gains are made within and across individuals, further adding to the complex and heterogeneous forms with which clinical problems present themselves in childhood and adolescence.

Second, *in clinical settings, comorbidity is typical for children and adolescents* (see Drabick & Kendall, 2010; Mash & Hunsley, 2005). More specifically, youth with difficulties in one area of functioning (e.g., ADHD) tend to experience problems in other areas (e.g., learning problems, conduct problems). That is not to say that children and adolescents should routinely receive multiple diagnoses, especially if some areas of concern are thought to be secondary to a primary diagnosis. Instead, clinical assessments and intervention recommendations should encompass a variety of areas of functioning to reflect the reality that youth may struggle across domains. Third, *youth who experience subclinical difficulties in psychosocial functioning can still benefit from targeted interventions* on the construct(s) connected to the most impairment or distress for them (e.g., Jaycox et al., 1994). This conclusion may be especially true for youth who experience subclinical learning or attention problems within school, but may not meet other criteria necessary to receive a clinical diagnosis. For example, reading difficulties are a prevalent concern in young children that teachers are often able to assess (Virinkoski et al., 2018). School-based identification programs may also be of use for intervention of youth and adolescents who are experiencing subclinical academic or mental health difficulties that may have otherwise been missed (Anderson et al., 2019).

Fourth, *in the general population, the distribution of clinical constructs is positively skewed* (Frick et al., 2020). That is, most youth tend to experience relatively low levels of concerns in emotional or behavioral domains. Conversely, the distributions of age-appropriate adaptive skills are negatively skewed (Sparrow et al., 2016), with most youth demonstrating increasingly complex adaptive skills as they get older. Fifth, *the psychological functioning of children and adolescents is heavily influenced by context, and children's behaviors also influence their surroundings* (Frick et al., 2020). Thus, an assessment of the factors that exacerbate or mitigate a child's difficulties should be a focus of assessment and intervention efforts. Lastly, *most developmental processes tend to be continuous rather than discontinuous, with developmental transitions marking the most likely time of discontinuity in functioning* (Cicchetti & Rogosch, 2002). Thus, understanding the trajectory of normative continual changes is important for explaining apparent disconnects. Discontinuity in a child's functioning may point to significant events or risk factors that exacerbate problems or to the implementation of valuable supports.

This chapter will discuss current knowledge and examples concerning the relevance of age of onset, developmental course, and influence of developmental context on the manifestation of child and adolescent psychopathology. As part of this review, we will note important developmental tasks that may also influence conceptualization of typical vs. atypical development for youth, adjustments that often occur at different stages of childhood, and the influence of development on assessment data itself (e.g., early recognition of hyperactivity relative to inattention). The utility of empirical findings from developmental psychopathology will be emphasized as foundational for the assessment, diagnosis, and treatment of children and adolescents. We begin with age of onset as it relates to the conceptualization and potential outcomes of youth psychological problems.

Age of Onset

Substance abuse is perhaps the most striking example of the importance of age of onset for conceptualizing psychological problems in youth. More specifically, a preadolescent or early adolescent onset of substance use is much more unusual, and therefore deviant, than a later adolescent-onset of such behavior. Furthermore, an early onset of substance use and other conduct problems is associated with a more severe and persistent pattern of externalizing behaviors (Moffitt, 1993; Odgers et al., 2008). In contrast, conduct problems that emerge during adolescence are more common and appear to represent a relatively temporary and less severe form of exploration, as the adolescent gains more autonomy, spends more time with peers, and experiences a likely developmental peak of risk-taking (Gardner & Steinberg, 2005; Moffitt, 1993; Monahan et al., 2013; Steinberg, 2010). Simply put, the same problem behavior is viewed quite differently based on the timing of its onset.

Developmental norms also provide insight as to the typical onset of a particular problem. As infants begin to demonstrate age-appropriate motor, cognitive, language, and even social skills, a general developmental surveillance, such as that conducted by a pediatrician, can begin to detect potential delays. To that end, more severe cases of some disorders (e.g., autism spectrum disorder (ASD), Shattuck et al., 2009; intellectual disability, see Patel et al., 2020) are typically detected and diagnosed relatively earlier than less severe presentations. For instance, a young child who does not exhibit age-appropriate expressive language may be evaluated for possible ASD or other developmental concerns earlier than a child whose language skills appear to be normative (Goodwin et al., 2017). It may not be until later that subtle signs of repetitive behaviors or poor social reciprocity are detected in the child with age-appropriate expressive language. As another example, the relative typicality of separation anxiety in early childhood (e.g., Calkins et al., 2015) provides an impetus for parents and others who work with young children (e.g., daycare workers) to develop strategies for dealing with the outbursts and escape/avoidance behaviors that may be present. Those who work with adolescents presumably understand the importance of monitoring for mood symptoms given the increase in depressive episodes during that period of development (Avenevoli et al., 2015).

Importantly, across childhood and adolescence, relatively early onset is associated with a worse prognosis for conduct problems (Silberg et al., 2015), anxiety disorders (Lim et al., 2013; Ramsawh et al., 2011; Rosellini et al., 2013), depression (Hammen et al., 2008), bipolar disorder (Propper et al., 2015), and psychosis (Veru et al., 2016). This general pattern applies to recurrence of symptoms, later adjustment, and the development of more varied, or comorbid, clinical difficulties. Furthermore, age of onset may provide clues as to the underpinnings of behavioral or emotional maladjustment for children and adolescents. More specifically, early onset may point to temperamental or neurobiological factors for constructs such as social anxiety and conduct problems, whereas later onset may be suggestive of critical social context factors or acute events (see McLaughlin & Hatzenbuehler, 2009; Rosellini et al., 2013) that are not stable in comparison to dispositional factors. Although early identification presents an opportunity for early intervention to deviate from a prolonged and severe course, the factors involved in a late onset may be more easily targeted for intervention. Said differently, adolescent psychopathology that is influenced by context may be ameliorated when relevant situational factors are altered or removed.

Within early and late onset trajectories, the developmental course of a problem is influential in a child's functioning. That is, age of onset is but one important factor in the understanding of developmental psychopathology. The developmental course of the child's difficulties has implications for prognosis and response to treatment. Aside from individual differences in the developmental course of psychological difficulties, the typical course may also be tied to the construct itself.

Developmental Course

The apparent trajectory of a psychological difficulty is an important component for case conceptualization and treatment. Here again, differentiating between normal developmental changes in childhood and adolescence and those that may signal meaningful shifts in functioning is crucial. The differential influence of important contexts such as familial and peer influences on the course of a problem must also be incorporated into assessment designs and case conceptualizations. Moreover, as discussed below, there are developmental changes in how some constructs, such as anxiety or depression, present through childhood and adolescence. These different trajectories add complexity to the assessment process, but knowledge of potential developmental changes in the course of psychological difficulties can assist in assessment of key features of a construct, as well as the recommendation and implementation of developmentally appropriate treatment strategies.

Guided by a wealth of longitudinal research across clinical domains, important areas of psychological functioning can be conceptualized as developmentally stable (e.g., Carballo et al., 2010; Morken et al., 2020), escalating in frequency or severity, declining in frequency or severity (e.g., Lahey et al., 2005), developmentally variable, or cascading into the development of different problems (e.g., Kim & Cicchetti, 2010; Nigg et al., 2020). These trajectories may be particularly associated with certain constructs, the onset of the problem (with earlier onset predicting a more stable course as described above), and even factors like child gender (e.g., Dekker et al., 2007; Moffitt, 2018; Yaroslavsky et al., 2013). There may also be important developmental underpinnings, such as early temperament or early important contextual experiences, for these trajectories. For example, temperamental factors may predict the early emergence and escalation of depressive and anxiety symptoms (Côté et al., 2009).

Stable Course Some emotional and behavioral difficulties may run a stable course in childhood. Of course, the term "stable" is considered in relative terms, as child and adolescent functioning can be expected to fluctuate tremendously based on situational or contextual factors. In general, childhood internalizing problems are less stable than many types of externalizing problems (e.g., Van Oort et al., 2009). More specifically, anxiety and depressive symptoms may fluctuate based on contextual or acute situational factors such as the presence of relational problems or stressful events (Jenness et al., 2019; McLaughlin & Hatzenbuehler, 2009), whereas youth who exhibit impulsivity and oppositionality from an early age may be more likely to persist with such behaviors throughout childhood than their same-aged peers (Olson et al., 1999). This pattern is particularly descriptive of youth whose behavioral dysregulation is rooted in genetic or neurobiological factors (Niv et al., 2012). It is important to note, however, that although relative stability may characterize externalizing behaviors, an individual's absolute level of behavior dysregulation tends to decline with age (see below).

Researchers highlight factors that may predict stable courses for internalizing problems in youth. The stability of depression may depend on the accumulated stress experienced during childhood and adolescence; that is, for youth predisposed to negative affect or depressive symptoms, accumulated stress may serve to maintain these difficulties (Whalen et al., 2016). Based on longitudinal research with twins, the stability of trait anxiety appears to be most closely influenced by genetic factors, with the influence of shared environment diminishing across adolescence and into adulthood (Garcia et al., 2013). Similarly, continuous/persistent anxiety during middle childhood is largely related to genetic factors and manifests as social anxiety, separation anxiety, or panic disorders (Trzaskowski et al., 2012).

Lastly, as described in the previous section, children who experience an earlier onset of psychological difficulties, such as conduct problems, tend to exhibit relative stability of such problems across childhood. In this way, a given individual's developmental history, rather than the construct per se, may also lend further insight into their prognosis. Certainly, without early intervention, children with any type of emotional or behavioral difficulties are at risk for increasing problems, particularly in terms of severity, and a worse long-term prognosis.

Increasing Course A common developmental trajectory for psychological difficulties is for them to escalate in severity through adolescence and adulthood. For example, this course often applies to early onset conduct problems (Lahey & Loeber, 1994). For a child with a history of behavioral problems, adolescence brings further opportunities for conduct problems such as substance use or property offenses. That is, such a child may escalate into additional forms of antisocial behavior given the greater opportunities to do so with the increased autonomy of adolescence. Depressive symptoms also appear to markedly increase in adolescence relative to childhood, particularly among females (Silberg et al., 1999).

Moreover, the presence of psychological difficulties early in childhood may set the stage for the emergence of more severe and varied problems. For example, in boys and girls, higher levels of ADHD symptoms at ages 6–12 are related to greater risk for suicidality at ages 13, 15, and 17 (Forte et al., 2020). Callous-unemotional (CU) traits (e.g., lack of empathy, lack of remorse/guilt) serve as such a marker for youth with conduct problems (see Frick & Kemp, 2020). The cooccurrence of anxiety, oppositionality, and CU traits early in childhood is associated with aggression and impairments in executive functioning and social cognition later in childhood (Ezpeleta et al., 2017). In addition, early externalizing problems are predictive of later substance use (Sitnick et al., 2014) and internalizing problems (Moilanen et al., 2010). Such evidence underscores the importance of early identification of psychopathology and the ongoing assessment of a variety of potential cooccurring symptoms.

An important challenge in the assessment of constructs that become more normative or typical in adolescence is determining when the problems become severe or pervasive enough to warrant intervention and/or diagnosis. This issue is central to the field of developmental psychopathology and involves distinguishing between a temporary increase in maladjustment, which is relatively less severe or pervasive, and an issue that serves as an early indication of an enduring problem. Factors that may assist in appropriate decisions and treatment planning include the age of onset (see above), family psychiatric history, comorbidity, and the social context of the psychological difficulty (Frick et al., 2020). Regarding social context, because adolescence is typically a time of increased peer socialization, a lack of such social contact may be cause for concern for internalizing problems (Rudolph et al., 2008). Perhaps ironically, delinquent peer affiliations are a risk factor for conduct problems (Laird et al., 2005), yet acting out behaviors that occur in the context of peer activities during adolescence might be considered a sign of relatively transient behavioral problems (Hamalainen & Pulkkinen, 1996). Assessment of relevant risk and protective factors in a child's developmental context is critical for attempts to circumvent an escalation of psychological problems throughout youth and into adulthood.

Decreasing Course Numerous areas of maladjustment commonly follow a decreasing course during childhood. In such cases, decreasing frequency or severity of a particular problem may be due to improved emotion and behavior regulation as a child gets older (Perry et al., 2018). More specifically, in early childhood, conduct problems typically involve indications of a difficult temperament and behaviors of dysregulation (e.g., temper outbursts, aggression), with these specific types of difficulties diminishing over time (Loeber, 1990), even if conduct problems take different forms for such children during adolescence. Regulation may develop through natural, seemingly spontaneous, developmental processes such as are often described for nocturnal enuresis (Baird & Atchison, 2021) or through learned experiences and environmental modifications such as may be the case for decreased temper tantrums (McCurdy et al., 2006).

As yet another example, hyperactivity/impulsivity tends to decline with age, as do inattentive symptoms, although this latter decrease tends to be more gradual or steady over time (e.g., Biederman et al., 2010; Leopold et al., 2016). Still, current diagnostic nomenclature allows for some persistence of hyperactivity with overall restlessness being a proxy for symptoms such as "acts as if driven by a motor" for older children (American Psychiatric Association, 2013). In general, youth who experience symptoms of ADHD may expect the severity and frequency to decrease as they approach adulthood (Bramham et al., 2012). However, adults, unlike children, have greater autonomy in selecting activities that may play to their personal strengths while not requiring a level of sustained attention and impulse control that might be difficult for them. In this way, ADHD represents one of many areas, which include adaptive and academic skills, as well as emotion and behavior dysregulation, that may be expected to improve with appropriate interventions as children get older. Proper early assessment of a child's specific strengths and impairments can facilitate this process.

Variable Developmental Course Of course, the trajectory of psychopathology at the individual child level most often should be considered variable, despite the evidence just described. Further, the predominant pattern for some clinical constructs may be a variable developmental course. Early temperamental factors may be predictive of different developmental trajectories of a specific disorder (e.g., Lee et al., 2017). CU traits are an example of such a precursor for conduct problems (e.g., Dadds et al., 2005). However, the degree or specific nature of conduct problems that may develop in the presence of CU traits is quite variable. Therefore, the complexity of psychopathology across developmental contexts is generally consistent with the core concept of multifinality.

Trauma, in addition to being arguably the most clear example of multifinality in developmental psychopathology, typically follows a variable path across and within individuals, partly as a function of development (Contractor et al., 2013; Masten & Narayan, 2012). Adolescents can be expected to exhibit more of the cognitive aspects of posttraumatic stress disorder (PTSD) such as intrusive thoughts and emotion cue reactivity, along with dysphoria, than children. On the other hand, younger children may exhibit relatively more frequent hypervigilance and anxious arousal (Contractor et al., 2013). As with many other psychological difficulties, the variable course may be a function of additional external stressors and the individual child's social and cognitive development.

Peer victimization, as another example of multifinality, can result in varied impairments that follow different courses depending on the nature of the victimization, as well as the victim's gender and age (Kretschmer et al., 2015; Roeder et al., 2014). Gender may also play a role in the variable trajectories of some specific psychological difficulties, such as generalized anxiety, with females increasing in these symptoms during adolescence and males demonstrating the opposite pattern (Hale III et al., 2008). For depression, the gender ratio appears to be roughly equivalent prior to adolescence, with females being more likely than males to be diagnosed with depression beginning in adolescence and continuing into adulthood (Hankin et al., 1998). Females are also more represented among adolescents who exhibit a high and stable profile of depressive symptoms (Yaroslavsky et al., 2013).

Lastly, the developmental course of anxiety may vary depending on the type of anxiety or contextual and intrapersonal factors that influence a young person's experience of distress. Overall anxiety and fears may decrease from childhood to adolescence (McLaughlin & King, 2015), particularly depending on individual differences in anxiety sensitivity (Allan et al., 2014). Some findings indicate that panic symptoms and social anxiety decrease from early to late adolescence (Hale III et al., 2008) perhaps as a function of improved emotion regulation or coping strategies. However, others suggest the opposite pattern with social anxiety and panic symptoms increasing later in adolescence, with factors such as the quality of social experiences moderating this trajectory (Weems, 2008). Relative to other forms of psychopathology, therapeutic approaches for anxiety differ based on the specific manifestation or source of the anxiety. Thus, not only is accurate assessment of symptoms essential, but consideration of case-specific moderating factors that might predict an individual's developmental course of anxiety is necessary.

As noted above, developmental changes are often continuous or gradual, but discontinuity can also be observed. This discontinuity is a primary factor in variable courses of psychopathology and can be represented by trauma (Masten & Osofsky, 2010), upheaval in a child's life (Block et al., 1986), significant illness/injury (Northam, 1997), or cultural discontinuity (Causadias, 2013). A variable developmental course, marked by discontinuity, presents an interesting challenge for assessment. On the one hand, clear changes in a child's functioning may be easy for informants to describe and may point to critical events as potential etiological factors. However, on the other hand, variable presentations of a clinical issue or marked changes in functioning may make it difficult to discern a given child's typical functioning or symptom presentation. Variable functioning also presents issues for predicting how a young person may respond to different approaches to intervention and speak to a need for close consideration of relevant risk and protective factors at the individual level.

Cascading Developmental Course Lastly, cascading developmental trajectories reflect the complexity of adaptive and maladaptive outcomes for many individuals and may also inform pathways that lead to continued problems in adulthood vs. limited impairments. Developmental cascades are based on the cumulative risk and protective factors that a child faces, as well as the more specific transactions between a child and their environment (Masten & Cicchetti, 2010). Further, the notion that well-timed and -targeted treatments may promote a positive trajectory underscores the importance of developmentally informed and comprehensive assessments that result in appropriate intervention recommendations (see Masten & Cicchetti, 2010).

Fully capturing developmental cascades requires assessment of both adverse childhood experiences and factors indicative of resilience. The former involves assessment of the child's history of personal and ecological risk factors that vary considerably in the directness of both their impact on the child and their risk to the child's safety or well-being. Adverse childhood experiences (ACEs) include, but are not limited to, abuse, neglect, poverty, family conflict/dysfunction, underfunded schools or community resources, and discrimination (Felitti et al., 1998). Conversely, assessment of resilience at the individual child level "reflects all the adaptive capacity available at a given time in a given context that can be drawn upon to respond to current or future challenges facing the individual, through many different processes and connections" (Masten & Barnes, 2018, p. 99).

An illustration of such a process is the connection between parental verbal abuse in childhood and internalizing problems in adulthood. Although such adverse experiences predict internalizing problems several years later, this connection is mediated by the youth's development of a self-critical cognitive style (Sachs-Ericsson et al., 2006). That is, children who experience verbal abuse from parents may come to engage in self-criticism, which in turn, would increase the risk for later anxiety or depressive symptoms. Of course, not all adverse experiences translate to negative psychological outcomes for youth, as numerous variables serve as important protective factors. For example, social competence and family cohesion are two potent constructs that have been known to play a role in attenuating depressive and anxiety symptoms in adolescents (Skrove et al., 2013). Perceived control over outcomes (Bolger & Patterson, 2001) and social support (Münzer et al., 2017) also promote resilience from maltreatment and are important constructs for clinical assessment. Such variables illuminate the need for clinicians to focus on familial and social support interventions when considering treatment approaches for children and adolescents.

Developmental Influences on Manifestation of Problems

Another consideration for assessment, diagnosis, and treatment planning is the influence of a child's development in the presentation of a particular psychological concern. In this way, a young person's functioning interfaces with typical developmental demands across different periods of childhood and adolescence. For instance, it is typical for younger children to have more difficulty with emotional and behavioral regulation than adolescents. Thus, as noted above, conduct problems early in development are more likely manifestations of dysregulation (e.g., temper outbursts, impulsive acts) than are those exhibited by adolescents. In contrast, because adolescents typically can be expected to go through a process of separation and individuation from caregivers, they experience less supervision (Luyckx et al., 2011). This more limited parental monitoring provides greater chances to engage in misbehaviors of opportunity (e.g., substance use, theft, property destruction) than are available prior to adolescence (Jackson & Schulenberg, 2013).

Two important principles in this regard are *homotypic continuity* and *heterotypic continuity*. Homotypic continuity is the idea that a symptom or behavior may represent the same underlying impairment across development. As might be evident from the above discussion of age of onset, homotypic continuity is not often observed for concerns like conduct problems. On the other hand, continued lack of expressive language acquisition across time may point to underlying intellectual deficits. Heterotypic continuity involves ways in which the same underlying problem may be exhibited differently across development (Cicchetti & Rogosch, 2002). The following examples show a number of ways in which heterotypic continuity is most commonly observed in developmental psychopathology.

For instance, one general trend is that cognitive aspects of psychopathology tend to increase from childhood to adolescence, as a young person's cognitive style becomes much more self-aware, abstract, and complex. These include the cognitive symptoms of depression (e.g., feelings of worthlessness, difficulty making decisions, negative cognitive style; Alloy et al., 2012; Sonuga-Barke et al., 2016), anxiety (e.g., worry, perfectionism; Tyler et al., 2021), and obsessive-compulsive disorder (e.g., more abstract categories of obsessions, mental rituals; Mancebo et al., 2008). Because of these natural developmental progressions in cognitive functioning, assessment approaches need to be modified to incorporate a young person's perceptions in a more detailed, rich manner. These increasingly cognitive manifestations of clinical concerns also open up a wider array of treatment options that more directly involve the young person, as opposed to a predominant emphasis on parent consultation or parenting strategies for younger children. These approaches may target cognitions that maintain or exacerbate distress and impairment (e.g., Lochman et al., 2008).

Research also reveals some symptom presentations during adolescence that may differ from what is typically observed in adults. For example, in depression, vegetative symptoms (e.g., changes in appetite, insomnia, loss of energy) appear to be more common in adolescents than in adults, whereas anhedonia and difficulty concentrating are relatively more common in adults (Rice et al., 2019). Thus, developmental level may influence the heterogeneity within diagnoses, as well as probabilistic explanations for impaired functioning and the presentation of syndromes or disorders (Mash & Hunsley, 2005; Youngstrom et al., 2017). The developmental psychopathology literature further informs assessment in this manner. That is, the key construct of focus may be primarily determined by the description of referral concerns, but can be further shaped by evidence on the common problems encountered at different periods of childhood and adolescence. For example, anxiety and anxiety-related impairments change in their manifestation from early childhood to adolescence. As described above, more cognitively oriented forms of anxiety may be a central focus of adolescent assessments, but not within the typical scope of anxiety assessments for very young children. Alternatively, separation from caregivers is a common source of anxiety for young children, but is quite rare for adolescents and would not be a frontline emphasis in such evaluations.

Youngstrom (2013) highlights the utility of a probabilistic approach to assessment that should be informed, in part, by different symptom presentations at different developmental stages. This approach is necessarily intertwined with an understanding of relatively likely developmental courses of different forms of psychopathology. Moreover, periods of developmental transition may further shape assessment and conceptualization with a greater expectation of adjustment difficulties during such times (Youngstrom et al., 2017). In short, a probabilistic approach capitalizes on the empirical evidence concerning the prevalence of psychopathology at different developmental levels and the typical courses of difficulties across development. It is also consistent with the ongoing need to be cost-effective in assessment and implementation of intervention.

As is evident, the developmental level of a child/adolescent and related contextual factors are crucial for case conceptualization, diagnostic decisions, and treatment planning. Peer influence represents one clear way in which context informs these aspects of clinical practice. This influence is not static across childhood and adolescence, however. Peers may have a decreasing influence on substance use from early adolescence to late adolescence and aggression from childhood to adolescence (Goldstick et al., 2018), presumably as peer conformity decreases (Steinberg & Monahan, 2007). Parenting practices insofar as they reflect developmentally normative degrees of supervision and approaches to discipline also influence the manifestation and conceptualization of youth psychological problems. To illustrate, lower parental knowledge of adolescents' activities in early adolescence is associated with adolescent substance use, but the strength of this association tends to decrease over time (Mak et al., 2020). That is, as it becomes more normative for parents to have less oversight over their adolescent's whereabouts, the relevance of parental monitoring may decline. However, low parental supervision coupled with antisocial peer behavior may place adolescents at particular risk of problem behaviors (Mak et al., 2020).

Lastly, developmental proximity of a problem to adulthood is predictive of the persistence of that problem into adulthood. For example, although a childhood-onset and adolescent-onset of depression are both related to depression during adulthood, the presence of adolescent depression is more directly connected to such difficulties as an adult (Cicchetti & Rogosch, 2002). That conclusion is not to discount the worse long-term prognosis often observed for early onset of psychopathology but rather to highlight that psychopathology, particularly if untreated, can continue to persist independent of onset. Indeed, adolescent onset cases may have less complex presentations than do many youth with a history of psychopathology during childhood, who by extension, may have a variety of neurobiological, familial, and systemic risk factors (Cicchetti & Rogosch, 2002). Still, proper identification and intervention at any point during youth is important for curtailing persistent impairments and negative long-term outcomes.

Conclusions and Future Directions

The above summary of evidence and examples underscores the essentialness of a developmental perspective in clinical work with children and adolescents. As described two decades ago (Cicchetti & Rogosch, 2002), there are clear benefits to the early identification of psychological problems, prevention of negative outcomes for which a young person may be at risk, and interventions that focus on an individuals' strengths and enhancing developmental adaptations such as coping skills. Generally, this approach is construct-driven and, in particular, considers psychopathology as largely dimensional rather than categorical or taxonomic. In essence, the field has long grown toward a consideration of mental health broadly construed rather than only of mental illness (Sameroff, 2000). A construct-driven, rather than diagnosis-driven approach, has particular benefits for working with children and adolescents in that diagnostic labels may be based on inaccurate professional judgments, pejorative for youth in some settings, and tied to factors that may still be malleable through the developmental period. This approach also takes into account the relative strengths and shortcomings of specific tests, as well as the manner in which certain informants may be more likely to observe some forms of youth psychopathology (e.g., externalizing behaviors) than other forms (e.g., depressive cognitions). In addition, continued movement toward practices and terminology that destigmatize mental health issues in youth is evident in the field and will likely continue to gain prominence (cf., Frick, 2020).

Moreover, greater emphasis on a construct-driven approach will allow for individual differences in the expression of psychological problems, the influence of developmental context on these expressions, and the utility of identifying, and intervening with, subclinical concerns before the progress in severity and pervasiveness. Consideration of constructs and important contextual influences on children's adjustment/maladjustment will involve further identification of moderators that will further inform knowledge of equifinality and multifinality. Importantly, research on resilience or protective factors lags behind our identification and understanding of risk factors and represents an important avenue for further inquiry.

Cicchetti and Toth (2009) discussed the need for an interdisciplinary approach in informing further advances in the field and ultimately improving services to youth and their families. Since that time, models for the integration of services across disciplines for child and adolescent assessment and therapy have been increasingly available (e.g., Buchanan et al., 2020; Shahidullah et al., 2018) with professionals who engage in research and clinical work with children and adolescents often working together in primary care or integrated care settings. Importantly, developmental psychopathology should continue to incorporate knowledge of cultural influences (Cicchetti & Toth, 2009) and the role of systems on psychosocial development. For clinical practice and the research on which it is based, it is crucial to challenge assumptions in the field that may have limited applicability for individuals from diverse backgrounds and that have presented potential barriers to equitable and inclusive access to valuable mental health services.

Finally, as evidence-based approaches to psychological assessment and intervention become more common emphases in training and practice, developmental psychopathology will become an even more crucial centerpiece of this work. The evidence base for assessment methods and therapeutic techniques is necessarily bound to the developmental level of the child. That is, the appropriateness of assessment and therapeutic approaches is partially a function of developmental factors. It is anticipated that important individual, contextual, and systemic variables in this work will be increasingly applied to the conceptualization of child and adolescent psychosocial difficulties and subsequent prevention/intervention efforts.

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Evidence-Based Practice in Clinical Child Psychology

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What is "evidence-based practice (EBP)"? This question has sparked debate and controversy for decades, from difficulties conceptualizing what should define "evidence-based practice" to disagreements over what should constitute "evidence" (e.g., outcomes of randomized clinical trials versus clinical expertise and experience). In this chapter, we will provide a historical overview of EBP, its structure, and the importance of EBP as it relates to clinical child psychology. Then, we will discuss different theories, resources, and methodologies that clinicians and researchers can use to reinforce their understanding and guide their selection of the most effective interventions that have been developed. Finally, we conclude with some reflections on continued controversies in youth mental health care and offer thoughts on future directions for the field.

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Historical Evolution and Controversies

The concept of evidence-based practice originated in medicine as *evidence-based medicine.* Historically, as the scientific literature on new medical treatments and drugs proliferated, physicians searched for answers on how they could leverage the most up-to-date scientific research literature (e.g., results of randomized clinical trials that tested the efficacy of specific interventions) and apply that knowledge to clinical practice. David Sackett is most famously credited with this modern definition of evidence-based medicine, highlighting it as a *process:* "The practice of evidence-based medicine, then, is a process of life-long, self-directed learning in which caring for our own patients creates the need for clinically important information about diagnosis, prognosis, [and] therapy…" (Sackett & Rosenberg, 1995, p. 622). However, inherent to this *process* is the notion that some treatments have higher evidentiary support for their efficacy and effectiveness than others. Thus, the "evidence-based" terminology is often used interchangeably by many to refer to *treatments* with empirical support, which often goes hand in hand with the notion that the application or delivery of these evidence-based treatments should be prioritized.

Although evidence-based medicine sought to improve patients' overall treatment outcomes by integrating scientific research into clinical practice, widespread misconception led to controversy. Critics worried that the medical field would be reduced to "cook-book" medicine (Sackett, 1997), with overly strict adherence to treatment guidelines, protocols, and/or manuals rather than a personalized treatment plan based on a comprehensive evaluation of a patient's needs. Concerns also were raised that "cook-book" medicine would replace a physician's own expertise and experience.

Despite the controversial debate around evidence-based medicine, the need for the standardization of medical treatment and clinical therapies continued to grow. Other fields in health care, such as public health and psychology, began to adopt and adapt the core values of evidence-based medicine to their own disciplines. Evidence-based practice continues to be a broad term that is often misused and shrouded in confusion (Codd III, 2017). There are many different terms used interchangeably by clinicians and researchers when referring to a treatment supported by scientific research (e.g., "evidence-based approach," "evidence-based treatments," and "empirically-supported treatments;" Codd III, 2017). The extensive, and interchangeable, use of these terms only exacerbates misunderstanding as these concepts maintain distinct definitions from "evidence-based practice."

Given the ongoing confusion related to the terminology mentioned above, it is essential that we remain precise in our use of these terms. As such, throughout the remainder of this chapter, we use the term *evidence-based practice (EBP)* to refer to the evidence-based *process* and collective aspects of the so-called three-legged stool, which denotes that EBP constitutes a combination of the best available research evidence, clinical expertise, and patient preferences (Spring, 2007). We use the term *evidence-based treatment (EBT)* to refer to the mental health treatment protocols with the best available research support, whereas we refer to the specific intervention techniques (e.g., relaxation, exposure therapy) that comprise EBTs as "EBT intervention techniques." Finally, we use the term *evidence-based assessment (EBA)*, a core component of EBP (Jensen-Doss, 2011), to refer to the use of psychometrically supported assessment tools that align with research recommendations to assist the EBP process (Hunsley & Mash, 2007).

To date, the scientific literature has predominantly focused on the "best available research evidence" leg of the three-legged stool (Peterson et al., 2016; Stewart et al., 2018), with some arguing that this EBP component should be prioritized in practice over the others (Lilienfield et al., 2013). As such, we devote the most attention in this chapter to this stool leg.

Stool Leg 1: Best Available Research

We begin by briefly elaborating on how the field has sought to define what constitutes an EBT. Division 12 of the APA defines EBTs as treatments that demonstrate efficaciousness through randomized controlled trials or similarly rigorous methods, a definition which derives from the foundational work of Chambless and Hollon (1998). The term "empirically supported treatment" also has specifically been used to denote treatments that have demonstrated effectiveness with a given population in at least two separate methodologically rigorous studies, which are most typically randomized controlled trials (Chambless & Hollon, 1998).

However, the format of EBTs can vary widely, as we discuss below. We present several formats that EBTs commonly take in child services, including manualized treatments, transdiagnostic treatments, and modular treatments. We also devote time to discussing the role of so-called "common factors" within the context of EBP.

Manualized Treatments The evolution of behavioral health treatments and push towards EBP gave rise to the "manualization" of treatments. Initially, manualized treatments were created to provide a structured framework for treatment; this allowed for scientific comparison between treatments (e.g., through randomized controlled trials). These manuals provide a linear design where client needs are addressed in a fixed and structured order throughout treatment (Higa & Chorpita, 2008). Many manuals provide session-by-session guidance and others offer more formal guidelines for treatment overall. While the structure of treatment manuals can be somewhat rigid, prescribing specific delivery of intervention techniques and proscribing others, many manuals provide intentional opportunities for flexibility (Chambless & Ollendick, 2001).

From inception, manualized treatments have been subject to criticism (Chambless & Ollendick, 2001). While the decreased uptake of EBTs in real-world practice reflects a confluence of issues (Chambless & Ollendick, 2001; McHugh & Barlow, 2010; Beidas & Williams 2019), opponents of manualized therapies purport that they are reductive, impersonal, and antagonistic to more traditional forms of treatment, and unrealistically linear for most clients (Addis & Krasnow, 2000; Borntrager et al., 2009). These critiques are often cited to explain the limited efficacy of manuals and the only marginal benefits they provide when compared directly to non-manualized treatments (Weisz et al., 2006, 2017). As treatment manuals are often developed to be specific to distinct mental health conditions, manuals present additional challenges related to addressing the complex comorbidity profiles commonly seen in youth outside of clinical trials (Ehrenreich-May et al., 2011; Southam-Gerow et al., 2008; Chu et al., 2012). Explicit costs also include training on specific treatments and purchasing the manuals and associated patient workbooks themselves. In addition, manualized treatments can cause "choice overload" for clinicians given that there are often multiple options within diagnoses from which to choose (Chambless & Ollendick, 2001). As such, it is perhaps unsurprising that manual use remains low among mental health clinicians (Becker et al., 2013).

Transdiagnostic Treatments Challenges associated with early manualized treatments contributed to the inception of transdiagnostic treatments, which, unlike their predecessor, do not target specific disorders (Barlow et al., 2004; Chu, 2012; Ehrenreich et al., 2007; Marchette & Weisz, 2017). Transdiagnostic treatments can differ in approach, but ultimately strive to understand and treat mental health issues through a more unified approach than that of previous disorder-specific manuals. Marchette and Weisz (2017) detailed three transdiagnostic approaches, including the (1) "core dysfunction approach" which can be used to construct interventions that can address several issues or disorders through targeting similar etiological, maintenance, and process-related factors, (2) "principle-guided approach" which focuses on the conceptual elements that cultivate therapeutic change and form the basis of effective treatments, and (3) "common elements approach" which combines similar components of evidence-based treatments aimed at specific issues across different disorders. Of note, there is debate about whether this latter category should best be conceptualized as transdiagnostic (Chorpita et al., 2007), and we discuss this approach in more depth in the "modular treatments" section below. While ultimately transdiagnostic protocols are manualized for dissemination, proponents of transdiagnostic treatments argue that they may be able to leverage the most effective components of manualized treatments to create better treatments for youth (Marchette & Weisz, 2017). For example, one of the first transdiagnostic manuals for youth, the Unified Protocol for the Transdiagnostic Treatment of Emotional Disorders in Youth (Ehrenreich et al., 2017), was adapted from an adult version, the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (Barlow et al., 2011), and focuses on the prevention of anxiety and depression in youth through the "core-dysfunction approach." Several transdiagnostic approaches since have been used to meet a wide range of comorbidities in youth in specific environments like schools (Garcia-Escalera et al., 2019) and inpatient mental health programs (Thompson-Brenner et al., 2019).

Numerous benefits of transdiagnostic approaches have been cited, including the decreased need for multiple disorder-specific treatment models, improved ease of implementation and delivery of treatment, reduced training costs for clinicians/organizations, increased relevance to real-world practice, and higher levels of satisfaction from clients and clinicians (Marchette & Weisz, 2017). Additionally, transdiagnostic treatments have been lauded as especially relevant to youth, as youth are more likely to have comorbid conditions and shifting environmental and clinical needs (Chu et al., 2012).

While relatively new, research focused on transdiagnostic treatments and interventions is increasing. In practice, transdiagnostic treatments have encountered similar criticisms to those raised against treatment-specific manuals, including the increased compartmentalization of transdiagnostic manuals, limited evidence for their effectiveness in diverse populations, and questionable generalizability due to experimental design (Newby et al., 2015; Schaeuffele et al., 2021). Limitations aside, transdiagnostic treatments are a promising innovation for youth mental healthcare and those who provide it (Chu et al., 2012).

Modular Treatments As noted above, modular treatments are sometimes inappropriately grouped with transdiagnostic treatments (Chorpita et al., 2007) as they are both designed with the understanding that youth experience complex comorbidity patterns and that "single diagnosis youth" are relatively rare in practice. However, their underlying philosophies reflect meaningful differences. The foundation of the modular CBT approach is based on a method for synthesizing extant treatment literature in youth mental health: the distillation and matching model (DMM, Chorpita et al., 2005). The DMM model is an example of "chunking" youth treatments in common treatment components (Okamura, Becker-Haimes, et al., 2020a) that helps clinicians synthesize large amounts of information drawn from randomized controlled trials and treatment manuals. Distillation refers to the extent to which researchers can identify specific techniques (herein referred to as practice elements) in existing treatment manuals. Matching refers to the contextual factors, such as setting and client demographics, that can be matched to clinical trial data to identify practice elements that may be effective for a given population or subgroup. DMM relies on the following assumptions regarding practice elements: (a) they can be explicitly defined, (b) they can be reliably coded, and (c) different treatments may share practice elements in common.

The DMM has been used to create clinical decision-making tools for youth therapists since the early 2000s. The first products were developed within the Hawaii State Department of Health - Child and Adolescent Mental Health Division, which is where "Blue Menu" and biennial reports (https://health.hawaii.gov/camhd/clinical-tools/) were published by the Evidence-Based Services Committee on extant treatment literature outcomes and practices for youth. These reports helped to inform clinicians by identifying the best practices for problem areas (e.g., anxiety) by treatment "families" (e.g., Cognitive Behavior Therapy) and practice element profiles. One of the strengths of the DMM is its non-reliance on diagnostic categories as a taxonomic anchor. Instead, literature is coded based on targeted problem area, which is intended to allow for greater external and ecological validity in community mental health (Chorpita et al., 2005).

Early results from modular treatment trials derived from the DMM indicate that this approach is comparable to, or better than, standard manual treatments at improving youth outcomes (Weisz et al., 2012). Additionally, therapists tend to have more favorable attitudes toward the modular approach over time as well as more satisfaction with the flexibility of the treatment approach (Weisz et al., 2012). Subsequent trials also provide support for the modular design in addressing the needs of youth mental health compared to unstandardized treatment protocols (e.g., Chorpita et al., 2017).

Common Factors Unlike the traditional EBPs described above, all of which share elements of packaged sets of intervention techniques, *common factors* refer to the active therapeutic ingredients that underlie *any* successful psychotherapy (e.g., therapeutic warmth, development of therapeutic relationship and alliance, empathy; Wampold, 2015). Common factors models purport that "psychotherapy [is] a socially constructed and mediated healing practice…and a common factors model focuses on factors that are necessary and sufficient for change" (Laska et al., 2014, pp. 469). Specifically, Laska et al. (2014) argue that any treatment that includes all of the following is likely to be efficacious: (1) a strong bond between therapist and patient, (2) a safe, healing space in which therapy takes place, (3) the therapist provides "psychologically derived and culturally embedded" education in response to patient difficulties, (4) the therapist provides adaptive and acceptable explanations for how patients can overcome their difficulties, and (5) that treatment leads the patient to engage in something that is perceived as positive, helpful, or adaptive. Importantly, a common factors model states that improved outcomes will occur in the presence of these components, regardless of any specific theoretical model of change or formal treatment manual (Laska et al., 2014).

While understudied in youth, there is empirical evidence that specific common factors are uniquely associated with improved clinical outcomes within the context of youth psychotherapy (Shirk & Karver, 2003) and are highly valued by practicing clinicians (Bickman et al., 2000; Stewart et al., 2018). However, as with all elements of EBPs, the importance of common factors as a distinct driver of change is not without controversies (Mulder et al., 2017). For example, proponents of Cognitive Behavioral Therapy (CBT), a well-established EBT for youth, will note that these common factors are not only integral to the effective delivery of CBT (Hudson et al., 2014; Kendall & Frank, 2018), but also that it is artificial to attempt to separate out the effects of specific EBT techniques from common factors (de Felice et al., 2019). Consequently, more recent research has aimed to integrate the study of common factors with specific EBT treatment ingredients (Harder, 2018; Lorenzo-Luaces & DeRubeis, 2018); advancing the scientific literature around our understanding of the complex processes of youth psychotherapy is a much-needed next step to optimize youth mental health outcomes informed by the "best available research evidence."

The availability of research evidence to guide clinical practice is central to EBP in clinical child psychology – however, knowing the treatment components alone is likely insufficient to generate meaningful clinical change in youth. This brings us to the next leg of the EBP three-legged stool: clinical expertise.

Stool Leg 2: Clinical Expertise

Perhaps the most underdeveloped in the youth mental health literature, the second stool leg of EBP traditionally refers to clinical expertise. Lilienfield and colleagues (2013) propose that this stool leg can be conceptualized as two distinct parts: clinical *judgment* and clinical *experience.* Regarding the role of clinical judgment in EBP, even the most prescriptive EBTs cannot provide clinicians with a script for every scenario and there may be instances where EBTs are virtually equivalent for a particular presenting problem - as such, clinical judgment is a critical component of EBP. Additionally, clinicians always need to make quick judgments and decisions to effectively proceed in clinical scenarios, regardless of whether there are specific formulae or decision trees to guide them (Lilienfield et al., 2013; Meehl, 1957; Stewart et al., 2018). Clinicians cite factors like client and family characteristics as the most common reason treatment adaptations are made (Barnett et al., 2018), which highlights the potential interrelationship of this EBP stool leg with that of the third leg (patient culture, preferences, and values), described further below. For these reasons, the importance of clinical judgment has been argued by some as being essential for effective EBP (e.g., Fava et al., 2015; Tomba & Fava, 2012).

However, clinical judgment is not infallible. Most notably, when clinicians rely on their clinical judgment to make diagnoses, it is well-established that this leads to high rates of errors in diagnostic accuracy, even when diagnoses are collapsed into broader diagnostic categories (e.g., presence or absence of an anxiety disorder; Jensen-Doss et al., 2013; Rettew et al., 2009). In addition, recent work suggests that statistical models outperform treatment recommendations made by trained clinicians when predicting which EBP an individual patient is most likely to benefit from (von Bronswijk et al., 2021).

There is slightly more support for the role and importance of clinical experience as it relates to the relationship between more experience and improved clinical outcomes. Walsh et al. (2019) conducted a meta-analysis of 22 studies that demonstrated that clinical experience overall was associated with a modest impact on improved patient outcomes (Walsh et al., 2019). Important to note, however, is that Walsh et al. (2019) also found that the relationship between clinician experience and improved outcomes was attenuated when treatments were manualized. This suggests that effective delivery of treatment manuals by less experienced clinicians can potentially achieve comparable clinical outcomes to those obtained by more experienced clinicians.

Taken together, *how* and *when* clinical judgment is most valuable remains a complex question; ultimately, it is both essential, but likely insufficient alone, for optimizing youth psychotherapy outcomes (Waller & Turner, 2016). This underscores the importance of EBP delivery being guided by all three legs of the EBP stool.

Stool Leg 3: Patient Culture, Preferences, and Values

The American Psychological Association (Levant, 2005) defines the third stool leg of EBP as the characteristics, culture, and preferences of patients in the context of delivering treatment. This is particularly nuanced in youth mental healthcare given the many contexts under which youth may receive services (e.g., school-based, community outpatient, publicly funded systems), the multiple ecological environments (e.g., school, their peers, family, community), the rapid developmental changes that take place during youth (Weisz & Hawley, 2002), and the different “stakeholders” involved in a given child’s care (e.g., youth and caregivers; Hawley & Weisz, 2003). A central goal of youth EBP is to maximize patient choice among effective interventions and to acknowledge the many systems that affect phenotypic expression of mental health disorders.

The original APA EBP Task Force (2005) noted a plethora of patient characteristics including “gender, gender identity, ethnicity, race, social class, disability status, and sexual orientation” (Levant, 2005). Patient culture is arguably one of the broadest constructs and is defined as “the distinctive customs, values, beliefs, knowledge, art, and language of a society or a community” (APA, 2021). Patient culture has a profound impact on the effectiveness of treatment, which is particularly consequential since many leading EBTs were initially developed and tested with predominantly white, middle to upper-class samples (Baumann et al., 2015; Cabassa & Baumann, 2013; Mullarkey & Schleider, 2021). Additionally, minority youth have differential access to quality mental health care (Chambless et al., 1996; Hall, 2001), and patient values and culture are known to influence treatment delivery (Maina et al., 2018). Therefore, a systematic approach from assessment to the delivery of treatment is recommended for adapting treatments to be compatible with an individual patient’s culture (Bernal et al., 2009; Lau, 2006).

A unique complexity related to incorporating patient preferences into youth psychotherapy is the challenge of defining “the patient.” Youth, by nature of their age and legal status, rarely seek psychotherapy independently, but rather within the context of their family and community system. Additionally, to accurately understand a given youth’s concerns, a multi-informant (e.g., youth, parent, teacher) assessment approach is usually recommended (De Los Reyes, 2011; Hunsley & Mash, 2007). This can create challenges for shaping the intended goals of treatment when informants do not agree on the youth’s primary presenting issues (Hawley & Weisz, 2003). As many EBTs are designed for specific symptom clusters, it can be challenging for therapists to determine how first to proceed in treatment when these multiple stakeholders hold different priorities.

Finally, while not an exhaustive list, it is important to note that these patient characteristics described above largely refer to the *individual* patient without specific attention to the larger ecological context in which youth function. For youth with severe emotional disturbances, there are often multiple social service systems that intersect and can influence mental health treatment selection (Stroul & Friedman, 1994). The system of care framework is helpful for balancing and addressing the multiple goals and perspectives that may shape a given youth’s treatment. Guiding principles for youth EBP that align with a system of care framework include building a service array around youth to meet their individual needs, finding the least restrictive environment to keep them within their community, providing ease and access to transition and early intervention, and ensuring that services are culturally competent based on the individual youth (Stroul & Friedman, 1994).

In sum, considering individual patient values and the systems in which they reside is likely critical for effective EBP with youth.

Frameworks and Methods for Delivering EBP and Selecting EBTs

So far, this chapter has made clear that there are differing views of what does and should constitute “EBP”; however, EBP is more than merely selecting a specific treatment and delivering it. So, how does a mental health provider begin the process of EBP? To address this complex issue, we present several, non-mutually exclusive, frameworks that youth mental health providers can use to guide the process of EBP. In recognition of the importance of EBT protocols to EBP, we then provide more targeted guidance for how clinicians and researchers can identify what specific treatments for youth mental health constitute an EBT.

Evidence-Based Assessment (EBA) As noted above, EBA is a critical component of EBP, considered by some to be the cornerstone of high-quality youth EBP (Hunsley & Mash, 2018; Jensen-Doss, 2011; Youngstrom et al., 2017). EBA serves two key clinical functions with respect to guiding EBP and is associated with improved treatment engagement (Klein et al., 2010; Pogge et al., 2001) and response (Bickman et al., 2011; Eisen et al., 2000; Jensen-Doss & Weisz, 2008) among youth. Early in treatment, EBA guides initial case conceptualization (described further below) and supports the accurate identification of appropriate treatment targets. This latter point is particularly crucial, as the accurate detection of primary concerns is the "clinical roadmap" that guides clinicians to determine which EBT is the best match for an individual youth (Youngstrom et al., 2015). In addition, after the initial selection of an EBT is made, EBA can guide the monitoring of treatment progress and inform personalization and tailoring to optimize treatment success (Ng & Weisz, 2016; Youngstrom et al., 2015). The use of EBA throughout treatment, also referred to as measurement-based care, refers to the systematic and regular collection of treatment progress measures to inform ongoing clinical decisions (Scott & Lewis, 2015). Collecting and reviewing clinical data throughout treatment can be used to monitor the effectiveness of a current EBT and influence decisions about whether to continue with an initial treatment approach or whether adjustments to the treatment plan should be made.

Science-Informed Case Conceptualization Case conceptualization is one method proposed for supporting EBP delivery by providing a framework for clinicians to systematically integrate research evidence into their clinical practice (Christon et al., 2015). While the importance of case formulation and conceptualization has been highlighted for some time now (e.g., Persons & Tompkins, 1997), the science of case conceptualization for youth is relatively new. Christon et al. (2015) proposed a five-stage model that should guide case conceptualization-driven EBP. Specifically, in Stage 1, clinicians identify and quantify the presenting youth issues, then assess for and identify the causal and maintaining factors associated with those concerns, along with historical context. To be optimally effective, this should be guided by the collection of accurate assessment data that allows clinicians to generate (and subsequently test) hypotheses about the various antecedents and maintenance factors for maladaptive emotions and behaviors in youth (McLeod et al., 2013). This information then guides diagnostic assignment (Stage 2) and the development of an initial case conceptualization (Stage 3). An important component in Stage 3 is generating hypotheses about the interrelationships between the primary presenting concerns and the historical, causal, and maintaining factors; these hypotheses then inform initial treatment selection. For example, a hypothesis that a youth's anxiety and depressive symptoms are largely driven by family conflict may indicate a family-systems EBT would be beneficial. In contrast, hypotheses that anxiety is driven by maladaptive behavioral avoidance and irrational, catastrophic fears may suggest a cognitive-behavioral EBT as a more suitable approach. In Stage 4, the clinician would proceed with this initial treatment plan, and Stage 5 would include ongoing monitoring and revision of the case conceptualization as needed. Ongoing progress monitoring (e.g., through measurement-based care practices) is used to evaluate the generated hypotheses and inform future steps in treatment within Stage 5.

Shared Decision-Making Shared decision-making (SDM) refers to interactions between clinicians and their clients (i.e., youth and families) designed to foster a collaborative approach to making treatment-related decisions (Elwyn et al., 2012). SDM can facilitate EBP delivery by ensuring that a treatment plan is consistent with the patient's values and preferences (i.e., the third stool leg of EBP). Broadly, an SDM approach has promising support for its potential to improve patient engagement and outcomes (Trusty et al., 2019). This is a relatively nascent area in youth mental health; recently, Langer and Jensen-Doss (2018) proposed an illustrative protocol for shared decision-making that begins by identifying who should be involved in the decision-making process (e.g., youth and caregivers, youth alone) and how each stakeholder will be involved in the treatment process over time. The clinician can then facilitate a conversation around identifying the target problems (guided by EBA) and present the most promising treatment options for discussion. The clinician can then engage those involved in the SDM process in a conversation related to the benefits and drawbacks of the various options and work collaboratively to develop an initial treatment plan, ideally informed by the EBT literature. SDM processes can also guide the selection of targets for ongoing progress monitoring (e.g., number of instances of physical aggression in the home, number of days a child misses school per week) to ensure that ongoing monitoring of treatment progress aligns with a family's primary concerns.

Managing and Adapting Practices A direct service model that can also benefit case conceptualization and EBP in youth mental health is the Managing and Adapting Practice (MAP) system (https://www.practicewise.com/Community/MAP). The MAP system was created around the goal of improving outcomes and quality of care for youth and maintained an early foundation based on the DMM (Chorpita et al., 2005) and the Child STEPs effectiveness trial (Weisz et al., 2012). The MAP system provides clinicians with a framework that allows for structured collaboration and information-sharing between coordinating members of the care team around key decision-making with three important tools: (a) the PracticeWise Evidence-Based Services Database (PWEBS) – a searchable database of over 2000 randomized controlled trials that provides information on treatment practices by effectiveness level, problem area, and demographic variables, (b) the Practitioner Guides – step-by-step documents on how to deliver a practice element and clinical processes, and (c) Clinical Dashboards used to track youth progress and outcomes. The MAP system has been studied and used in youth public-sector service systems for many years (Higa-McMillan et al., 2020; Southam-Gerow et al., 2014).

Identifying Specific EBTs All of the above frameworks and systems provide guidance for clinicians to engage in a process of EBP as well as ensure that a clinician has the requisite information to design a treatment plan. However, this still begs the question of how to know whether a given treatment constitutes an "EBT." It is clear that there has been a proliferation of EBT protocols over the past several decades (Okamura, Orimoto, et al., 2020b), making it largely infeasible for practicing clinicians to simply "turn to the literature" to know what the current EBTs are for a client's presentation. *Clearinghouses and inventories* are important resources for organizations and professionals looking to implement EBTs. These resources aim to consolidate and disseminate information on the existence and efficacy of various EBTs to support clinicians, stakeholders, and organizations looking to utilize these practices (Means et al., 2015). Current leading clearinghouses (as of Spring, 2021) include the Blue Menu of Evidence-Based Psychosocial Interventions for Youth (https://www.practicewise.com/Community/BlueMenu), American Psychological Association Division 53 inventory of evidence-based treatments (http://www.effectivechildtherapy.fiu.edu/), and the Substance Abuse and Mental Health Administration National Registry of Evidence-Based Programs (https://www.samhsa.gov/resource-search/ebp).

Of note, the methodological decisions and processes involved with maintaining extant inventories can vary. For example, Walker and colleagues (2017) identified significant differences in the processes and outcomes in their review of prominent research inventories. While there were largely consistent approaches to the initial inclusion of literature (e.g., using unpublished versus published literature, accepting outside literature submissions versus sourcing literature internally), the breadth of evaluation elements varied (Walker et al., 2017). There were also differences as to how updates were made across inventories, including those related to the review process (e.g., number of reviewers per review) and inclusion of literature for updates (e.g., using unpublished literature versus published literature), and many of the inventories that were explored held different areas of focus; unfortunately, agreement on criteria for research inclusion between inventories was observed to be low (Walker et al., 2017). Walker and colleagues (2017) also demonstrated that separate inventories differentially rated the level of evidence for specific EBTs, which complicates one's ability to quickly identify whether a given intervention constitutes an EBT. The variation across inventories was most consequential for practices with less defined and/or established bases of evidence. Encouragingly, more established practices were more likely to consistently be rated as such across inventories (Walker et al., 2017).

Additional weaknesses related to clearinghouses are important to note. There is little consensus on the design, methodology, and data required to be sufficient across inventories dedicated to behavioral health topics (Burkhardt et al., 2015). Many treatments exist on one register only, emphasizing the stark differences in process and scope of behavioral health clearinghouses (Means et al., 2015). These realities make it increasingly difficult not only to have a comprehensive inventory related to behavioral health but also to maintain consistency across inventories. Additionally, many of these inventories cater to certain requirements from specific policymaking bodies. This limits the number of consumers that would be able to use the inventory as clinicians, organizations, and key stakeholders are forced to seek out content most relevant to the policies that most affect them. Some of these difficulties reflect larger limitations in the research, such as the lack of a strong evidence base for a specific treatment based on research involving racially, ethnically, or otherwise demographically heterogenous samples. Additionally, concerns related to sustainability, accessibility, and purpose remain problematic for clearinghouses and those who use them. Funding remains an issue as well, and as most revenue is used for review-related costs, there is little left over to devote to infrastructure and similar resources (Burkhardt et al., 2015). Research on the users of these clearinghouses is limited, which further complicates the objective of meeting the needs of consumers (Burkhardt et al., 2015).

As the push towards evidence-based treatment has become more widespread, alternatives to clearinghouses and evidence registers are also emerging. As an example of this, the Society of Clinical Child & Adolescent Psychology (SCCAP) recently sought to review and publish updates on the evidence base more frequently (e.g., every 10 years) in the Journal of Clinical Child & Adolescent Psychology (JCCAP) and through their website (https://effectivechildtherapy.org/). In each edition, experts are invited to review the previous decade of literature on topics in which they hold expertise. For certain treatments to receive an updated classification (e.g., from probably efficacious to well-established), contributors must demonstrate that there is enough research on each treatment to meet certain criteria involving both methodological quality and outcomes of interest (Southam-Gerow & Prinstein, 2014).

Despite these limitations, existing clearinghouses and evidence-based update series published by leading journals remain an important resource for identifying and selecting EBTs to be incorporated in youth EBP.

Future Directions

In this chapter, we have explored the history and definition of the term *evidence-based practice* (EBP), identified leading EBT models in clinical child psychology for clinicians, and discussed overarching frameworks that support EBP for youth. Our attention now shifts to the remaining controversies, future directions, and implications around EBP for clinical child psychology.

As this chapter describes, there have been many efforts to synthesize information, knowledge, and tools to support EBP for youth. As the youth mental health treatment literature continues to develop, there is a critical need to further enhance knowledge management tools to synthesize information for clinicians (Okamura et al., 2020a). Meta-analytic studies are an important method of understanding youth treatment literature growth that examines the strength of the evidence base for youth psychosocial treatment (Weisz et al., 1995, 2006, 2017). In their most recent meta-analysis, Weisz et al. (2017) examined 447 studies across the span of five decades of youth psychosocial treatment literature and found an overall moderate treatment effect size of 0.46 which was moderated by problem area (e.g., anxiety). Furthermore, long-term outcomes of our best treatments yield only mixed support for the sustained effect of EBTs over time (e.g., Curry et al., 2011; Ginsburg et al., 2018), suggesting the need for additional research aimed at optimizing current treatments and/or identifying novel treatment approaches to optimize outcomes in youth mental health.

A complimentary study examining therapeutic practice growth over five decades highlighted a nuanced perspective relative to literature growth (Okamura, Orimoto, et al., 2020b). Specifically, Okamura, Orimoto, et al. (2020b) examined 689 studies and found that while treatment manuals and randomized controlled trials continued to grow, the number of new discrete practice elements (e.g., exposure therapy, cognitive restructuring) leveled off over time. This has important implications for how youth psychosocial treatment studies are conducted given that, for many problem areas, new practice elements have not been identified for nearly a decade. As such, some argue that the paradigm shift needed to support youth mental health now hinges on researchers' ability to understand the complex process of community-based implementation and how treatments can be tailored to treatment response, rather than a singular focus on treatment development for youth (Okamura, Orimoto, et al., 2020b).

Emerging work is aimed at delineating the clinical skills needed to engage in careful adaptation of EBTs to address unique patient needs and to support youth in coping with unanticipated stressors they may face in their day-to-day lives. Much of the work done in this area has focused on how to deliver EBTs to youth experiencing emergent life events (Guan et al., 2019) including family or peer-related problems (e.g., death of a loved one), major emergencies (e.g., natural disasters), prominent national or local emergencies (e.g., the COVID-19 pandemic), and/or significant problems in the environment (e.g., community violence). Guan et al. (2019) categorized EBT adaptations related to client stressors into two areas: *content* – focused on adapting the actual practice for the current circumstance, and *coordination* – focused on adapting the sequence of the practices. Another clinical guide, the Strategic Flexibility Model, suggests that clinicians integrate clinical expertise with data-driven decision-making to inform systematic adaptations, guided by "Who, What, When, Where, and Why" questions (i.e., for whom should treatments be adapted, what components should be adapted and when, and in which settings; Georgiadis et al., 2020). Further developing systematic strategies for supporting clinicians to engage in appropriate EBT adaptations is an exciting area of future research for the field.

Additional work aimed at generating *practice-based evidence* (Margison et al., 2000) is also needed to better understand how and why clinicians make adaptations to EBTs in clinical practice to inform refinements to current treatment models and guide EBP. Insights from the implementation science field are useful here. Specifically, the Framework for Reporting Adaptations and Modifications-Enhanced (Wiltsey-Stirman et al., 2019) is a systematic reporting framework for researchers to document when clinical adaptations to EBTs are made, determining if they were planned or unplanned (and by whom), what is being adapted and at what level, and reasons for the adaptation covering improved fit, culture, cost, contextual factors, or idiographic/personalization needs. Research and synthesis of treatment adaptation will be critical to ensuring that youth EBP is meeting the needs of youth and families from diverse settings.

Finally, given APA's recent call to the psychology field to promote equity, diversity, and inclusion (APA, 2021), the future of EBP will need to address the longstanding disparities within mental healthcare. As noted by APA (2021) and other researchers in the field (Baumann et al., 2015; Cabassa & Baumann, 2013; Lau, 2006; Mullarkey & Schleider, 2021), psychological research and youth psychosocial treatments have mainly been developed and tested with white participants and published by white researchers. The history of inequity underlying our current healthcare landscape as well as the access, priorities, and procedures for funding treatment research indicates that EBP will undoubtedly undergo changes to meet the unique needs of society and to enhance equity in healthcare. However, the specific skills and treatment components that comprise current leading principles of youth EBP will likely remain fundamental to improving the lives of youth and families with mental illness and behavioral health conditions.

Conclusion

EBP in mental healthcare has much to offer in treating the mental health needs of youth. Just as individual issues are often complex and of multifactorial etiology, so too are the treatments to address youth needs. There is a robust evidence base from which clinicians and researchers can draw to support the delivery of EBP with youth, and there is no shortage of gaps in the literature that future researchers and clinicians can address.

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The WHO International Classification of Diseases 11th Revision (ICD-11)

4

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Introduction

The International Classification of Diseases and Related Health Problems (ICD) is the foundation for the identification of health trends and statistics globally and the international standard for reporting diseases and health conditions (WHO, 2021). The 11th Revision of the ICD (ICD-11) has been approved by the World Health Organization (WHO) and has important implications for practice and research. The update and specifically the chapter on Mental, Behavioural and Neurodevelopmental Disorders is of great interest around the world (Reed et al., 2019).

The ICD has played a major role in modern psychiatric research and practice (Clark et al., 2017). Its unique vision and aim of developing a psychiatric nosology that has clinical utility and can be used globally in multiple settings and by non-specialist health workers is in line with the broader aims of WHO (Clark et al., 2017). The majority of the world's population live in low and middle income

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countries (LMIC), and there is a strong emphasis on reducing the global burden of disease, particularly mental health which makes up 14% of that burden (MhGAP, 2021; Murray et al., 2020). The WHO Sustainable Development Goals and the WHO Mental Health Gap Action Programme (mhGAP) demonstrate the commitment of the global community and have been endorsed by all United Nations Member States (Patel et al., 2018). The ICD-11 is aligned with these efforts and represents the latest changes and advancements in the field of psychiatric classification with the aim of improving the delivery of primary health services globally.

This chapter is divided into four broad sections. The first will look at the origins, development, and future directions of ICD, and in particular, the chapter on MBND. This sets the ICD in context, noting its original development as a medical taxonomy under the instruction of the WHO. The classification system's development and progress, from including psychiatric categories to its shift towards global applicability and accessibility, will be detailed. The extensive development process that brought about the ICD-11 and specifically the chapter on mental disorders, including carefully coordinated working groups and large, global field trials, are also described. The second section will outline the overall structure of the ICD-11, with an emphasis on the MBND chapter. With 28 chapters and around 55,000 categories, the ICD-11 has a particular focus on utility and application which is emphasized. The third section gives an overview of the key changes related to mental, behavioural, and neurodevelopmental disorders. Given the global aims of the ICD-11, it also explores cultural considerations in this latest iteration of ICD. The final section will explore the clinical utility of the ICD-11 in more detail and some of the key debates surrounding the MBND chapter. Considerations of the broad status of psychiatric nosology, as well as criticisms relating to the lack of etiological focus, overpathologizing of problems in living, reification, arbitrary thresholds, overlap with DSM-5, and artefactual comorbidity will be covered. The specific inclusion of gaming disorder in the ICD-11 will be used to demonstrate the challenges of including new classification categories because of its relevance to adolescent mental health. There will be a particular emphasis throughout the chapter on the features and diagnostic categories of interest to clinical child psychology.

ICD-11: Origins, Development, and Future Directions

The ICD-11 emerges from a history of nomenclature, nosology, and medical taxonomy. Under the instruction of the World Health Organization (WHO), the development process was extensive, with a lifespan of more than a decade. Issues of mental health have been routinely acknowledged in the ICD, with a designated chapter since the 1940s. Its development is best understood against the broader historical context of the ICD as a medical classification system. Its lineage is traced back to the sixteenth century (WHO, 2004), and the current working version is considered a dynamic and comprehensive tool which may be utilized across health disciplines, emphasizing clinical utility and global applicability.

This section outlines the origins of medical statistics as they are related to the overall development of the ICD, as well as the ICD's multiple revisions throughout the twentieth century, with reference to considerations of mental health. The principal vision, development, processes, and implementation of the current revision, ICD-11, are provided. Development procedures and findings specifically related to the advancement of the current Mental, Behavioural and Neurodevelopmental Disorders (MBND) chapter are discussed, and consideration is given to future directions. This serves to situate the MBND chapter within the broader context of global health, an essential frame of reference when considering the psychological health of children.

Classifying Mortality: The Beginnings of the ICD[1]

The first known statistical records of death originated in sixteenth century England, where deaths "from distinctly medieval purposes" were recorded on a weekly basis by the London Bills of Mortality (ICD-11, 2019, p. 2273). Pioneered by John Graunt, the bills were reported to have been collected and collated by parish clerks who had not necessarily been exposed to the practice of medicine, or statistics (Chute, 2000). Regarding medical classification, very little else was recorded until the mid-nineteenth century (WHO, 2004). Formal use of statistics is evidenced by reports and papers issued by the London Statistical Society from 1838, and the International Statistical Institute in 1853. This was indicative of the increasingly widespread use of statistics at that time, as well as the emergence of more precise data-gathering.

Considered to be the first medical statistician, William Farr, associated with the General Register Office of England and Wales, advocated for a uniform nosology based on statistical principles. His reports were influential, and at the first International Statistical Congress in 1853, he was tasked – alongside Marc d'Espine – with preparing a classification of death with international applicability. The anatomical basis of categories and general arrangement suggested by Farr and d'Espine influenced the ICD architecture.

A major development in the emerging field of medical statistics involved the International Statistical Institute's collaboration with the Statistical Works for the City of Paris in 1891. Jacques Bertillon, a French statistician and social scientist, was tasked with the preparation of a comprehensive classification system to capture causes of death, with applicability to public health. The outcome of Bertillon's efforts, known as the Bertillon International Classification of Causes of Death, was formally adopted by the International Statistical Institute in 1893 and was soon recognized by other countries. Under the jurisdiction of the International Statistical Institute, international revision conferences saw the first three iterations of the ICD developed in 1900, 1909, and 1920, respectively, each reflecting advances in medicine and involving an increasing number of international collaborators. Each version took on the standard title of the *International Classification of Death (ICD).* The brief involvement of the Health Organization of the League of Nations (post-World War I) contributed to the use of tabulation in the ICD, which reflected global developments in the field of statistics. The ICD-4 and -5 were published in 1929 and 1938, respectively.

From Death to Disease

In response to growing public health demands, the Fifth Decennial Revision Conference of the ICD in 1938 acknowledged the potential utility of classification beyond records of mortality. As a result, a resolution to develop a corresponding list of diseases was instated. The need to include morbidity had been identified through the administration of multinational surveys and so it became standard practice to formally engage an internationally representative committee, a gesture suggestive of the inclusive processes that remain today.

The notion that a list of diseases would be beneficial within the health professions was considered by Farr in the early nineteenth century. Further, in parallel to the globally accepted *International Classification of Death,* a Parisian classification of diseases had been in use since 1900. While there were some attempts to integrate non-fatal diseases into the ICD-4 in 1929, these categories were generally omitted in administrative practice due to the existence of localized morbidity lists.

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[1] Much of this section has been adopted directly from the World Health Organization's 2nd edition of the ICD-10 manual, which provides a comprehensive narrative of the ICD's historical development. References to other sources are provided.

The major turning point in the ICD's implementation and development took place after World War II. The World Health Organization (WHO), founded under the jurisdiction of the United Nations in 1948, was granted responsibility for developing and maintaining the ICD; The recommendation to incorporate disease classifications into the ICD led to the *International Classification of Diseases, Injuries, and Causes of Death,* which was circulated to national governments. This was accepted at the first World Health Assembly in 1948, with the ICD-6, in the same year. The 6th revision comprised two volumes and included a chapter on psychiatric disorders. At this inaugural meeting, members were encouraged to establish national committees which would, in the future, contribute to the ongoing development and revision of the newly titled ICD.

ICD Revisions Under the Guidance of the WHO

The WHO released the ICD-7 in 1957, and the ICD-8 in 1968, setting a precedent for decennial revision (Janssen & Kunst, 2004). Between these revisions, the WHO's Nomenclature Regulations, an international treaty instated in 1967, were endorsed. The Nomenclature Regulations mandated all WHO Member States to instate the most current version of the ICD (WHO, 2021). The implementation of the treaty secured the ICD's status and function as a global communication tool which facilitates the collection of comparable health information (Clark et al., 2017).

The newly formed network of WHO member states, now committed to implementing the ICD, began to level criticism at the ICD, targeting its structure and utility. While the 9th revision (released in 1978) did not initiate structural changes, discussions regarding the future utility of the ICD were ongoing at the time of publication. The standard decennial revision of the ICD was determined to have an insufficient time period to facilitate adequate evaluation processes, leading to the decision to increase the preparation period leading up to the release of the ICD-10.

The ICD-10 was endorsed in 1990, and approved in 1992, but implementation was slow and inconsistent. The ICD-10 was updated almost yearly post-2000, with the most recent version released in 2019 (WHO, 2021). Initial work focused on remodelling the structure of the ICD and led to the WHO Family of International Classifications [FIC]. The 'family' is inclusive of several WHO-developed health and health-care system classification products, which may each be used independently or in conjunction with one another.

Mental Health Classification in the ICD

The ICD-6 chapter "Mental, Psychoneurotic, and Personality Disorders" (Clark et al., 2017) had a total of 26 categories that were put forward with suggested inclusion and exclusion terms. While the categories were broadly grouped into three clusters, no definitions or diagnostic guidelines were provided. As with the other sections of the ICD manual, the changes to this chapter between ICD-6 and ICD-7 were minimal.

Discussions regarding the inclusion of mental health within the ICD often invite comparison to the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM). This is due in part to the extensive collaboration between the WHO and American Psychiatric Association (APA) which led to a high level of consistency between the ICD-8 and the DSM-II, both of which identified psychoses, neuroses (including personality disorders), and "mental retardation" as the major categories for mental disorders. DSM-III included diagnostic criteria, and although these were included in ICD-10, DSM-III became more widely used for research and academic training purposes.

Following the release of the ICD-8, the WHO issued a glossary in which recognition of nosological problems within the psychiatric profession emerged. This was subsequently incorporated into the main statistical body in the ICD-9 (Clark et al., 2017; First et al., 2015). The glossary represented an important step towards the diagnostic guidelines included in later editions. DSM-III and DSM-III-R were developed independently of the WHO and ICD and reflected substantial changes with regard to disorder classification, namely a trend towards more thorough description. A more methodological approach was used to develop the DSM-IV and, apart from additional content, the edition was known for explicitly documenting its use of literature reviews, analysis, and field trials.

The publication of the ICD-10 marked an important step forward with the concurrent release of the *ICD-10 Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines (CDDG),* also known as "the blue book" (First et al., 2015). The CDDG expanded on the previous ICD glossary for mental disorders and was meant to provide diagnostic guidance to clinicians. However, the guidelines provided in the CDDG were often inconsistent in their level of detail, which impacted the CDDG's utility in clinical practice – while it allowed for flexibility, this came at the cost of consistency and therefore, potential global validity (First et al., 2015). This aspect of the CDDG was identified as one of the main areas for revision in the ICD-11 and was informed by work on and discussion of the DSM-5.

For example, an important addition to the CDDG in the ICD-11 expands the previously named 'mental retardation' subdivision (now named 'disorders of intellectual development' and included under the Neurodevelopmental Disorders section) via the provision of guidelines which outline both intellectual and adaptive domains. Children are uniquely considered within the diagnostic guidelines for this category, distinct from adolescents and adults, reflective of the developmental approach adopted by the ICD-11 (Reed et al., 2019). The recognition of the differences in presentation of mental disorders across the lifespan – in which the mental health of children is carefully contemplated – is an important result of the extensive, decade-long development process outlined below.

ICD-11: Vision, Development, and Process

Vision The current version of the ICD was built with the primary objective of overall utility, applicability, and accessibility. The final product needed to be user-friendly and appropriate for integration into the public health sector, while retaining statistical integrity and scientific credibility (Ustun & Jakob, 2009). The key settings identified for implementation included primary care, clinical care, research, and public health.

Development At the outset of development, three broad phases were outlined (Ustun & Jakob, 2009). The first phase, labelled "ICD-10-Plus", consolidated criticisms of the ICD-10, first combining all national modifications and other adaptations before inviting structured proposals for potential changes. The second phase saw the compilation of an "ICD-11 alpha draft". This was compiled by WHO assigned editors and Topic Advisory Groups, who reviewed taxonomic rules, definitions, and diagnostic criteria. Upon completion, the third phase involved the use of a "ICD-11 beta draft" as a field-trial version. This early version of the ICD was tested for feasibility, reliability, and utility through the Global Clinical Practice Network (GCPN) and allowed for direct comparison with the ICD-10.

Process To facilitate the revision of the ICD, the WHO established a comprehensive organizational structure which linked WHO headquarters to WHO's member states. This included a Revision Steering Group, which oversaw the many Topic Advisory Groups (TAGs), each consisting of field experts aligned to each major domain of the classification (e.g., a TAG was responsible for Chapter 5). Each TAG established Working Groups as needed; the working groups were tasked with assessing diagnostic issues within their domain, through a process of review of published literature, revision of the ICD-10 diagnostic categories, and the address of public comments. Following this process, the revised category was then submitted for testing in field trials via the GCPN – an innovative and collaborative web-based platform where members of the WHO-FIC network, NGOs, and interested health professionals with relevant experience participated in quarterly surveys. The GCPN used surveys to collect data which captured how clinicians understood and *used* diagnostic codes and categories. These data informed the revision of diagnostic criteria, and subsequently became the platform through which systematic field trials which allowed comparison between ICD-10 and proposed ICD-11 diagnoses were implemented. This allowed for reliability, validity, and clinical utility to be tested.

Mental Health Classification: The Approach of ICD-11

Major changes in the MBND chapter included a review of chapter structure, the addition and relocation of diagnostic categories, and the standardization of the format of diagnostic guidelines (Gaebel et al., 2020). Part of the restructuring process involved the adoption of a developmental and 'lifespan' approach. Where previously the ICD structure had aligned itself with the one presented in Kraeplin's seminal psychiatry textbook, the current version orders disorder categories from a developmental perspective, beginning with disorders most often diagnosed in childhood, and closing with disorders most often diagnosed in elderly populations (neurocognitive disorders) (Reed et al., 2018a, b). The official use of the term 'neurodevelopmental' is new to the ICD system, significant in its recognition of a group of chronic disorders which have a distinctly early onset and are characterized by lasting difficulties in both cognitive and social-communicate domains (Stein et al., 2020).

Regarding the clinical utility overall, both the core statistical chapter and the CDDG were revisited with a particular aim of enhancing clinical utility (IAG for Revision, 2011). The need for greater clinical utility was highlighted in two provisional surveys, in which only ~60% of mental health clinicians indicated routine use of classification systems, with practical references to the ICD-10 used predominantly for administration purposes (Evans et al., 2013; First et al., 2018). Other considerations identified by the IAG included the definition of mental disorders, the universality of categories, and the application of the system across contexts. The MBND chapter needed to be relevant to three stakeholder groups: governments and administrative bodies, mental health clinicians, and mental health service users and their families. The development process was based on the recommended ICD revisionary process, held the same organizational structure (namely TAGs and working groups), and included systematic literature reviews, country-level analysis, as well as international surveys of mental health professionals. An important function of the working groups was to use uniform 'content forms' in order to standardize the development of diagnostic descriptions for the CDDG (First et al., 2015).

Global collaboration for these processes was ensured through the creation of The Global Clinical Practice Network (GCPN) for mental health. The GCPN is considered the largest practice-based research network in global mental health. It is composed mostly of individual mental health practitioners, who are appropriately diverse and represent different professions (psychiatrists, psychologists, nurses, social workers, and occupational therapists), countries, years of experience, and professional contexts (Reed et al., 2015). As of February 2021, it included over 16,000 members from 160 countries (Socially Responsive Mental Health, 2021). Importantly, 40% of practitioners represent LMIC countries, 92% currently see patients, and a further 58% supervise others. This reflects the diversity of WHO member states, as well as the ICD's global relevance. Registration for the web-based platform was made available in nine different languages.

The primary function of the GCPN so far has been the facilitation of various field trials, which have been utilized throughout all three major phases of development. The field trials included both internet studies and clinic-based studies and were internationally inclusive. The internet-based field studies (surveys) were administered via the Global Clinical Practice Network (GCPN) web platform and were helpful in understanding accuracy, consistency, and clinician diagnostic judgement of the ICD-10 criteria, and formative in revising the overall architecture of mental disorder classification (Reed et al., 2015). One of the major applications of the web-based studies was the review of the newly proposed diagnostic descriptions for implantation in the CDDG. In addition, clinic-based studies used the revised criteria to assess reliability, and clinical utility and applicability (see Reed et al., 2018a, b).

Noteworthy studies included an early project in which over 500 mental health professionals provided input regarding the 'natural' taxonomical use of mental health classification (see Reed et al., 2013). Data from experienced clinicians – representing the diversity of WHO member states – indicated a high level of consistency in taxonomical application, suggesting a surprising level of utility in both the ICD-10 and DSM-IV. In support of this finding, a larger study, the product of a collaboration between the WHO and the International Union of Psychological Science (IUPsyS), which exclusively examined the views of psychologists, went on to highlight specific diagnostic areas requiring attention, as well as issues regarding cross-cultural applicability (Evans et al., 2013). For example, controversies regarding what is currently reflected as autism spectrum disorder, as well as the then 'hyperkinetic disorder' (now attention deficit/hyperactivity disorder in both the ICD and DSM), were identified by psychologists as disorders which were problematic in both validity and utility (Evans et al., 2013).

ICD-11 Field Trials: Relevance for Children and Adolescents

The implementation of ICD-11 field trials was a protracted process which took place over several years. The initial published results have focused on disorders more commonly diagnosed in adulthood, including schizophrenia and schizoaffective disorders (Luciano et al., 2020; Petersen et al., 2019), personality disorders (Kim et al., 2014), gender identity diagnosis (Robles et al., 2016) as well as mood disorders, anxiety disorders, and disorders specifically related to stress (see Keely et al., 2016; Reed et al., 2018a, b). Clinical presentations of relational problems in adults have also been evaluated by mental health clinicians (Heyman et al., 2018).

The disorder categories listed above have received adequate yet limited attention in relation to childhood and adolescence. Relevant *commentary* has focused on gender incongruence *in childhood* (see Drescher et al., 2016) as well as early life complex post-traumatic stress disorder and the restructuring of oppositional defiant disorder. Issues related to gaming disorder are also addressed in this chapter.

Regarding ICD-11 specific *field trials,* an initial child and adolescent study examined diagnoses related to childhood chronic irritability and oppositionality (Evans et al., 2021). In this comprehensive study, the vignette methodology described by Evans et al. (2015) required clinicians to differentiate between chronic irritability and non-irritable oppositionality, episodic bipolar disorder, dysthymic depression, and 'normative' irritability in children. The results were formative in the decision to exclude the DSM-5's DMDD and the reconfiguration of child oppositional and conduct disorders in the ICD-11. The impact of this field trial represents an important step forward in the nosology of this area of child functioning and highlights the utility of the field-trial methodology outlined in the ICD-11's overall vision.

A number of independent studies which reference disorders in children also exist, but ultimately highlight the need for further *field trials*. For example, regarding trauma and stress disorders, the works of La Greca et al. (2017), Murphy et al. (2016), Perkonigg and colleagues (2016), as well as others provide helpful information regarding clinical utility of PTSD and the newly included Complex-PTSD. Yet nosologically, there are still limitations regarding these diagnoses (see Vasileva et al., 2018). Data from completed ICD-11 global field trials, including those that are relevant to disorders impacting on children and adolescents, continue to be processed and analysed. It is expected that results from these trials will be published and provide continued opportunity for refinement and increased understanding of these disorders.

Future Directions

Reception of the ICD-11 MBND chapter has been mostly positive, though not without criticism (Stein et al., 2020). The inclusivity of the revision process has integrated the many demands made of the ICD system, reflecting the aims of clinical utility and global applicability, yet ensuring scientific validity. Ongoing commentary and advances in psychiatric classification and nosology will continue to inform future revisions of the ICD, with hopes that models based on dimensional – rather than categorical – approaches will inform both structure and diagnostic description (Gaebel et al., 2020).

The ICD's vision for the future is that it will remain a work in progress and always provide a global clinical utility which adequately reflects the most current knowledge base and advancements in the health professions. More immediately, issues of distribution, implementation, and adequate training will be prioritized, a process which is expected to be ongoing for several years. The WHO's International Advisory Group will oversee this process: its role is to identify practical next steps and to facilitate operational management, as well to provide consultation for the development of additional resources (such as case books, primary care versions, and assessment tools). This includes mechanisms for evaluating the effectiveness of the MBND chapter and monitoring of implementation progress.

Training in the use of the ICD-11 MBND chapter is crucial in ensuring ongoing utility and is expected to take place both in-person and online. Due to the extent of the current network, this is expected to be a resource intensive project which may have difficulties in scaling. Also, concerns have been raised regarding accessibility. In response, a web-based training academy is currently being both developed and piloted. Development of the online training platform, Global Mental Health Academy – informed by experts – aims to utilize best practices in medical training and is based on the empirical data collected in the field studies referenced above. Upon its completion, it will be available to practitioners, who will receive certificates of completion for each module. The content of the online training is planned to be iterative and will reflect revisions to the ICD-11 as it continues to be developed and updated.

ICD-11: Overall Structure

The ICD-11 consists of chapters, blocks, and categories arranged in a hierarchical manner which allows for different levels of detail to be communicated. This corresponds with the overall purpose of the ICD-11 – to classify diseases in a manner that is practical and clinically useful, while allowing statistical presentation of mortality and morbidity data for research, legislative, and other purposes. ICD-11 chapters are the top-level entities consisting of several categories which are arranged in a hierarchical manner within each chapter. A block is a group of related categories (World Health Organization, 2021) (Fig. 4.1).

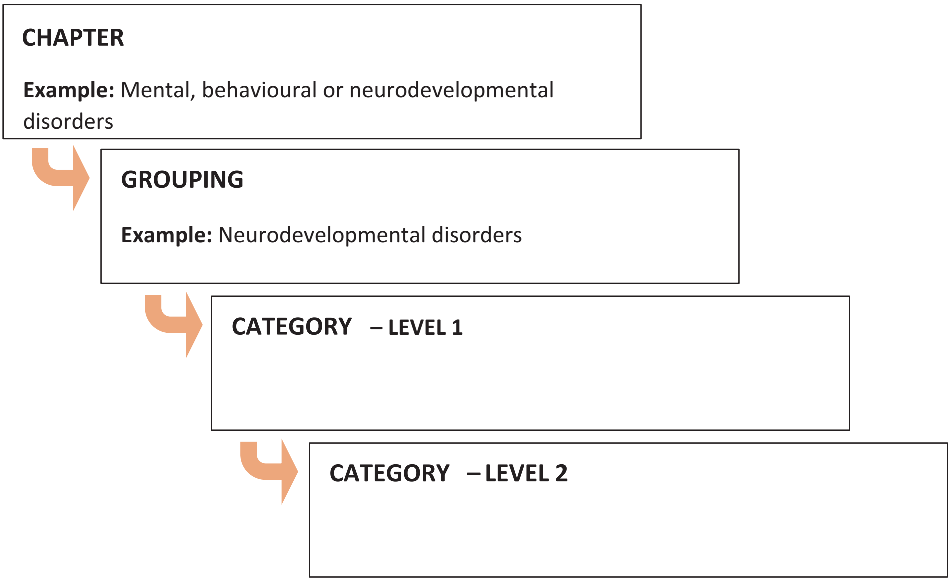

Fig. 4.1 A schematic representation of the ICD-11 showing the increase of detail in each level from the most general (chapter) to the most detailed (category) level

Categories included in the ICD-11 are mutually exclusive and cover the complete range of diseases or morbid conditions. Every disease or condition has a specific and well-defined place, or category, within the ICD-11 framework.

A health condition that meets classification criteria for a specific category is classified under that primary category (known as its primary parent). A unique feature of the ICD-11 is that it allows health conditions to be classified under secondary and even tertiary categories in different ICD-11 chapters. For example, Tourette's syndrome's primary classification is under Chapter 8 (Diseases of the Nervous System – Movement Disorders Grouping); it is however also classified under Chapter 6 (Mental, Behavioural and Neurodevelopmental Disorders – Obsessive-Compulsive Disorders Grouping and the Neurodevelopmental Disorders Grouping). Conditions that cannot be allocated to the specific categories are categorized in residual categories. Every category has a unique, alphanumeric code referred to as an ICD-11 code. Chapters and blocks do not have ICD-11 codes, and are therefore descriptive, and cannot be used for diagnostic purposes. For an entity to qualify as a category, certain criteria were considered during the development of the ICD-11. These include epidemiological evidence, clinical evidence, granularity (the level of detail reported and useful for a specific condition), continuity (relating to previous versions of the ICD), and parsimony (the need to describe and classify a condition in enough, but not excessive, detail) (World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021).

ICD-11 codes can be combined to describe a clinical condition in as much detail as needed. Additionally, unique identifiers can be assigned to category codes if a high level of granularity is necessary, or an ICD-11 category code can be used without identifiers to classify a condition in cases where detail is limited or not needed. The ICD-11 has 28 chapters and roughly 55,000 categories. Chapter 6 – Mental, Behavioural or Neurodevelopmental Disorders will be described in more detail.

The 23 groupings classified under the MNDB Chapter of the ICD-11 (Gaebel et al., 2017; Gozi, 2019; WHO, 2021) are as follows:

- *Neurodevelopmental Disorders*. This grouping refers to disorders that arise during the developmental period and involve challenges with acquisition and performance of specific intellectual, language, motor, and social functions. Examples include autism spectrum disorders, disorders of intellectual development (previously mental retardation and disorders of psychological development), and attention deficit hyperactivity disorder (previously hyperkinetic disorder). This grouping considers presentation across the lifespan and includes indicators for different age groups (early childhood, childhood/adolescence, and adulthood), levels of severity, and adaptive functioning domains (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Schizophrenia and Other Primary Psychotic Disorders*. This grouping includes conditions where psychosis is the primary or core feature. Disorders where psychosis are induced or affective (e.g. mood disorders or psychosis due to substance use) are classified elsewhere. Positive and negative symptoms should occur with sufficient intensity and frequency. Cultural norms are considered. Examples of Schizophrenia and Other Primary Psychotic Disorders include schizoaffective disorder, schizotypal disorder, and delusional disorder (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Catatonia* is a condition of psychomotor disturbances such as mutism, stupor, posturing, negativism, and psychomotor agitation to name a few. Catatonia may occur in the context of other disorders such as mood disorders, schizophrenia, or neurodevelopmental disorders (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Mood Disorders*, Including bipolar disorders and depressive disorders. The ICD-11 emphasizes the importance of a longitudinal pattern of a particular type of mood episodes over time. Examples of mood disorders include Bipolar or related disorder and Depressive disorder (Gaebel et al., 2017; Gozi, 2019; WHO, 2021)
- *Anxiety and Fear-Related Disorders* are characterized by excessive fear and anxiety that results in significant functional impairment. Although fear and anxiety are closely related, they can be clearly differentiated. Fear can be described as a reaction resulting from an impending threat. Anxiety is more future-orientated and relates to a perceived rather than imminent threat. Examples are generalized anxiety disorder, panic disorder, and agoraphobia (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Obsessive-Compulsive and Related Disorders* are characterized by repetitive thoughts and behaviours. Some disorders in the Obsessive-Compulsive and Related Disorders grouping include a cognitive component in the form of obsessions, intrusive thoughts, and preoccupations that is central to the condition. Examples are obsessive-compulsive disorder, body dysmorphic disorder, hypochondriasis, and olfactory reference disorder. Body-focused disorders lack a cognitive aspect and are characterized by recurring and habitual actions. Examples of body-focused disorders included are hair-pulling (trichotillomania) or skin-picking (excoriation disorder) (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Disorders Specifically Associated with Stress* are related to exposure to traumatic or stressful events. An identifiable, causal stressor is necessary for each disorder categorized under this grouping. Examples are post-traumatic stress disorder, prolonged grief disorder, and adjustment disorder (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Dissociative Disorders*, examples include dissociative neurological symptom disorder, trances disorder, and dissociative amnesia. These conditions are characterized by involuntary disruption or discontinuity of identity, sensations, perceptions, affects, thoughts, memories, control over bodily movements, or behaviour (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Feeding and Eating Disorders* involve abnormal eating behaviours that are not developmentally appropriate and cannot be explained by an individual's cultural context. Eating disorders involve preoccupations with food relating to body weight and body shape. Feeding disorders are not concerned with body shape and weight, for example eating non-food substances. Examples of eating

disorders are anorexia nervosa, bulimia nervosa, and binge eating disorder. Pica and rumination-regurgitation disorder are examples of feeding disorders (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).

- *Elimination Disorders* refer to repeated urination or defecation in inappropriate places after a developmental age when continence is expected. Enuresis after 5 years and encopresis after 4 years old are considered atypical. Elimination disorders may be present from birth or occur following acquired continence (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Bodily Distress Disorder* involve disturbances in a person's experience of their body. Examples are body integrity dysphoria and bodily distress disorder (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Disorders Due to Substance Use and Addictive Behaviours* result because of substance use.
- *Impulse Control Disorders* refer to disorders where an individual repeatedly fails to resist an impulse to perform an act that is harmful to either themselves or others. Examples are kleptomania and compulsive sexual behaviour disorder (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Disruptive Behaviour and Dissocial Disorders* are characterized by persistent defiant, disobedient, provocative, or disruptive behaviours. These behaviours violate the rights of others and are not in line with societal norms, rules, or even laws. Examples include oppositional defiant disorder and conduct-dissocial disorder. The onset of these disorders is most often, but not always, during childhood (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Personality Disorders and Related Traits* are characterized by dysfunctional patterns of behaviour relating to the self (e.g. identify, self-worth, or self-view) and/or interpersonal dysfunction (e.g. ability to form and maintain interpersonal relationships). The trait domain includes codes that can be assigned to describe prominent personality characteristic of an individual (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Paraphilic Disorders* refer to persistent and intense patterns of atypical sexual arousal involving others who are not able or willing to consent. Examples are exhibitionistic disorder, voyeuristic disorder, or paedophilic disorder (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Factitious Disorders* are characterized by intentionally feigning, falsifying, inducing, or aggravating medical, psychological, or behavioural signs and symptoms or injury in oneself or in another person (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Neurocognitive Disorders* involve deficits in cognitive functioning that are not developmental but arise later in life and involve a decline in cognitive ability and function. Examples include delirium and dementia (Gaebel et al., 2017; Gozi, 2019; WHO, 2021).
- *Mental or Behavioural Disorders Associated with Pregnancy, Childbirth, or the Puerperium.* These conditions develop following pregnancy, childbirth or the period after delivery, and can occur with or without psychosis. This category can be assigned with another mental disorder if symptoms meet diagnostic criteria for both categories.
- *Psychological and Behavioural Factors Affecting Disorders or Diseases Classified Elsewhere.* This category pertains to psychological and behavioural factors affecting health conditions classified in another chapter. The psychological or behavioural factor should adversely affect the health condition classified elsewhere by, for example, influencing treatment and posing additional risk or exacerbating symptoms. This code should always be assigned with a code from another chapter/diagnosis.
- *Mental and Behavioural Disorders Associated with Disorders or Diseases Classified Elsewhere.* Psychological or behavioural symptoms that are resulting from a health condition not classified under mental and behavioural disorders should be coded here. This category should be used with the diagnostic category for the underlying condition.
- *Other specified mental, behavioural or neurodevelopmental disorders.*
- *Mental, behavioural or neurodevelopmental disorders unspecified.*

Table 4.1 *Categorization of Autism Spectrum Disorder* and Attention Deficit Hyperactivity Disorder

Chapter 6 Mental, behavioural, or neurodevelopmental disorders		
Grouping	Category – level 1	Category – level 2
Neurodevelopmental disorders	6A02 Autism spectrum disorder	*6A02.0* Autism spectrum disorder without disorder of intellectual development and with mild or no impairment of functional language *6A02.1* Autism spectrum disorder with disorder of intellectual development and with mild or no impairment of functional language *6A02.2* Autism spectrum disorder without disorder of intellectual development and with impaired functional language *6A02.3* Autism spectrum disorder with disorder of intellectual development and with impaired functional language *6A02.5* Autism spectrum disorder with disorder of intellectual development and with absence of functional language *6A02.Y** Other specified autism spectrum disorder *6A02.Z*** Autism spectrum disorder, unspecified * 'Other specified' residual category ** 'Unspecified' residual category
	6A05 Attention deficit hyperactivity disorder	*6A05.0* Attention deficit hyperactivity disorder, predominantly inattentive presentation *6A05.1* Attention deficit hyperactivity disorder, predominantly hyperactive-impulsive presentation *6A05.2* Attention deficit hyperactivity disorder, combined presentation *6A05.Y* Attention deficit hyperactivity disorder, other specified presentation* *6A05.Z* Attention deficit hyperactivity disorder, presentation unspecified** * 'Other specified' residual category ** 'Unspecified' residual category

- Each grouping consists of categories arranged in a hierarchical manner. Table 4.1 illustrates the hierarchal categorization of two conditions, autism spectrum disorder and attention deficit hyperactivity disorder, that are categorized under the Neurodevelopmental Disorders grouping.

ICD-11: Overall Application

The ICD-11 is designed to be a versatile, user-friendly tool that can be used across a range of settings and speciality areas by a variety of people. An improvement that adds to the practical feasibility of the ICD-11 is the fact that it is completely digitalized and accessible free of charge online (WHO, 2021). This allows the ICD-11 to be used for many different purposes, including documenting causes of death, recording the incidence and prevalence of diseases, and documenting external causes of disease. The systematic, comprehensive design of the ICD-11 also allows for comparison of health data across different time frames and settings (countries, regions, cities, hospitals). Data gathered using the ICD-11 can be used by researchers, policy makers, clinicians, and financial decision-makers to identify health trends, make financing decisions, identify relevant research areas, and plan intervention strategies (Jones et al., 2018).

Clinical Descriptions and Diagnostic Guidelines for ICD-11 Mental, Behavioural, and Neurodevelopmental Disorders

To provide comprehensive guidelines for implementation in clinical practice, the WHO developed Clinical Descriptions and Diagnostic Guidelines (*CDDG*) for ICD-11 Mental, Behavioural and Neurodevelopmental Disorders. The CDDG version of the chapter contains detailed diagnostic guidelines for clinical application and is unique to the ICD-11 (Socially Responsive Mental Health, 2021; First et al., 2015; World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021). The format includes uniform categories of description in order to comprehensively comment on various features found across the presentation of health disorders.

The Clinical Descriptions and Diagnostic Guidelines for Mental, Behavioural and Neurodevelopmental Disorders contain the following eight sections for each disorder:

1. *Essential or Required Features* are characteristics that a clinician could expect to see in all cases of a disorder. These are listed as a bulleted list of symptoms or characteristics in the CDDG. Although this bulleted list of essential or required features may appear like diagnostic criteria, it is used in a different manner and for a different purpose than diagnostic criteria found in the DSM-5 for example. Essential or required features are intended to provide clinicians with guidance when making a diagnosis. They do not include symptom counts or precise durations and therefore allow for more flexible clinical judgement regarding the presentation of an individual case (First et al., 2015; Socially Responsive Mental Health, 2021; World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021).
2. *Additional Clinical Features* are clinical characteristics that are important and relevant to a specific health condition, but not necessary for diagnosis. This includes features and presentations of a disorder that are commonly associated with the specific disorder, but may or may not be present in a clinical case. These features are necessary to consider as they assist recognition of a condition when it can present in a variety of manners. Additional clinical features also need to be considered for clinical management and may assist in making a differential diagnosis (First et al., 2015; Socially Responsive Mental Health, 2021; World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021).
3. The *Boundary with Normality (threshold)* section intends to help clinicians differentiate between symptoms that are clinically relevant and can be described as a disorder and subclinical symptoms that can be more accurately described as a variation of normal functioning, as opposed to a disorder. Different criteria apply to different health conditions. For example, in some cases the level of functional impairment or distress is used to distinguish disorder from non-disorder (First et al., 2015; Socially Responsive Mental Health, 2021; World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021).
4. *Course Features* contain guidance on the typical prognosis or course the health condition is expected to run. This can include information about typical age of onset; whether the condition is persistent or episodic; duration of the condition; disorder progression or remission over time; and the relationship of the condition to life stressors and other disorders (First et al., 2015; Socially Responsive Mental Health, 2021; World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021).
5. *Developmental Presentation*. Many mental, behavioural, and developmental disorders present somewhat differently in different developmental stages. The developmental presentation section describes how symptom presentation may differ across the lifespan and provides guidance on recognizing health conditions based on their presentation across developmental stages (First et al., 2015; Socially Responsive Mental Health, 2021; World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021).

6. *Culture-Related Features* consider how features of a disorder may manifest in ways that are culturally specific. Taking culture-related features into consideration assists clinicians in making culturally informed and sensitive diagnosis (First et al., 2015; Socially Responsive Mental Health, 2021; World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021).
7. The *Gender-Related Features Section* provides information about gender differences in symptom presentation; base rates of disorders; and in help-seeking behaviours.
8. *Boundaries with Other Disorders and Conditions (or Differential Diagnosis)* describe characteristics that differentiate a specific disorder from a condition with similar features. In some cases, guidance is given regarding comorbidity and whether an additional diagnosis can be considered (First et al., 2015; Socially Responsive Mental Health, 2021; World Health Organization & WHO collaborating Centre for Capacity Building and Training in Global Mental Health, 2021).

The ICD-11 provides a common language and systematic classification system. The simplified coding structure of the MBND chapter adds to the clinical utility of the instrument.

Overview of Changes Related to Mental, Behavioural, and Neurodevelopmental Disorders in the ICD-11

The ICD-11 has received attention from mental health professionals across the globe. The chapter related to mental health in the ICD-11 was among the first truly global participatory processes in the area of mental health, as well as child and adolescent mental health more broadly (Gaebel et al., 2020). The inclusion of both mental health providers and users throughout the entire process of developing the classifications related to child and adolescent mental health made provision for applicability across the globe, scientific validity, and clinical utility (Gaebel et al., 2017, 2020).

The MBND chapter has broadly seen a number of changes (outlined in Table 4.2). One of the broad, overarching changes has been the extensive inclusion of 23 groupings related to mental health in the recent iteration of the ICD (see *ICD-11: overall structure* above), compared with the 11 group-

Table 4.2 Some differences between ICD-10 and ICD-11

ICD-10	ICD-11
Mental, behavioural, or neurodevelopmental disorders found in Chapter 5	Mental, behavioural, or neurodevelopmental disorders found in Chapter 6
Mental disorders examined in 11 sub-chapters	Mental disorders examined in 23 sub-chapters
No specific grouping for neurodevelopmental disorders, instead it makes use of ‘disorders of psychological development’, and ‘mental retardation’	Specific neurodevelopmental disorders grouping included in ICD-11
Autism spectrum disorder and attention deficit hyperactivity disorder could not co-occur in the same individual	Autism spectrum disorder and attention deficit hyperactivity disorder may co-occur in the same individual
Previously included childhood autism, atypical autism, and Asperger syndrome	Childhood autism, atypical autism, and Asperger syndrome are non-existent, but are grouped into one category, namely autism spectrum disorder
Gaming disorder not previously included, it is a new disorder	Gaming disorder included under the new grouping of disorders due to addictive behaviours
The coding system did not allow for a more detailed presentation of patient’s characteristics and features	The coding system makes provision for coding characteristics of patient’s clinical conditions in more detail

Table 4.3 New additions related to mental health in the ICD-11

Catatonia	Catatonia given the status of an independent syndrome. In child and adolescent mental health somatic conditions are more common (Remberk et al., 2020)
Bipolar Type II Disorder	Bipolar Type II Disorder has previously been recognized in DSM-IV, however it is the first inclusion in the ICD
Body Dysmorphic Disorder	The community prevalence of body dysmorphic disorder was estimated at 2.2% among adolescents (Veale et al., 2016). Body dysmorphic disorder has been incorporated into the obsessive-compulsive and related disorders group, noting the characteristic difference in symptomology and similarities to obsessive-compulsive disorder
Olfactory Reference Disorder	The concern about perceived body odour or breath unnoticeable or slightly noticeable to others has been included in the obsessive-compulsive and related disorders group
Hoarding Disorder	Hoarding disorder included in ICD-11 with similar diagnostic characteristics as outlined in the DSM-5 and is also in the obsessive-compulsive and related disorders grouping
Excoriation Disorder	Excoriation disorder, also known as skin-picking disorder, is another disorder included in ICD-11 falling under the obsessive-compulsive and related disorder section
Complex Post-traumatic Stress Disorder	Complex post-traumatic stress disorder makes provisions in the ICD-11 for 'persistent, pervasive, and enduring disturbances, in affect regulation, self-concept and relational functioning' which replaces the category of enduring personality change after a catastrophic experience in the ICD-10. In child and adolescent populations, the presence of multiple or chronic trauma, such as childhood physical or sexual trauma, is more likely to be related to complex post-traumatic stress disorder than post-traumatic stress disorder (Brewin, 2020)
Prolonged Grief Disorder	An added explanation of longer periods following a loss has not been clearly described in ICD-10, but the addition of Prolonged Grief Disorder for periods of grief after loss for more than 6 months has been added to the ICD-11
Binge Eating Disorder	An increase in research related to binge eating supported the inclusion in ICD-11, which previously would have been considered in ICD-10 as a diagnosis of other specified or unspecified eating disorder
Avoidant/Restrictive Food Intake Disorder	To differentiate between anorexia nervosa, the avoidant/restrictive food intake disorder made provision for behaviour that was characterized by inadequate amounts or types of food that does not meet the nutritional requirements deemed adequate but is not concerned with issues related to weight or body shape
Body Integrity Dysphoria	Body integrity dysphoria usually has an onset in childhood or early adolescence and is characterized by a desire to have a specific physical disability (such as amputation or blindness)
Gaming Disorder	In light of global concern, gaming disorder is included in ICD-11 under the new diagnostic group labelled *disorders due to addictive behaviours*. For adolescents, there has been an increase in online entertainment across numerous electronic devices which may be linked to the possible inclusion of this disorder related to child and adolescent mental health concerns (King & Potenza, 2019)
Compulsive Sexual Behaviour Disorder	Compulsive sexual behaviour disorder is when an individual experiences for a minimum of 6 months or more a repeated pattern of failure to control intense, repetitive sexual impulses or urges and this behaviour/activity becomes the focus of the individual's life and has adverse consequences. It has been included under the impulse control disorder section in the ICD-11
Intermittent Explosive Disorder	In the ICD-10, intermittent explosive disorder was grouped under the *other habit and impulse disorders*, the ICD-11 included it in the Impulse Control Disorders section
Premenstrual Dysphoric Disorder	Premenstrual dysphoric disorder is differentiated from premenstrual tension syndrome in the ICD-11 and is cross-listed in the sub-grouping of depressive disorders but is primarily grouped in the diseases of the genitourinary system chapter

ings which were examined in the ICD-10 (Gaebel et al., 2017). The chapter structure of the ICD-11 has attempted to compliment the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), which was done through a collaborative process between the World Health Organization and the American Psychiatric Association (Gaebel et al., 2017; Reed et al., 2019). In addition to the chapter structure, diagnostic and disorder classification has been grouped according to common aetiology, pathophysiology, and phenomenology (Gaebel et al., 2017).

Discussions and Debates Related to Changes in the ICD-11

The updated version of the ICD-11 has seen numerous changes, particularly in the section related to the classification of mental and behavioural disorders for children and adolescents. Some of these are briefly outlined:

Neurodevelopmental Disorders

The ICD-11 introduced a new grouping on neurodevelopmental disorders, replacing this grouping where the ICD-10 made use of classifications such as 'disorders of psychological development' and 'mental retardation'. Another key development and change seen within this specific grouping is that the ICD-11 recognizes that autism spectrum disorder and attention deficit hyperactivity disorder may co-occur in the same individual. This becomes important for treatment as children and adolescents with a diagnosis of autism spectrum disorder can benefit from treatment with the co-occurrence of attention deficit hyperactivity disorder, such as stimulant medication (Stein et al., 2020; Sturman et al., 2017). The recent ICD iteration also sees the amalgamation of diagnoses such as childhood autism, atypical autism, and Asperger syndrome as being categorized as autism spectrum disorder (Silleresi et al., 2020; Stein et al., 2020).

Disorders of Addictive Behaviours

The ICD-11 presents many clinically relevant changes related to addictive behaviours. The recent iteration of the ICD brings together substance use disorders under the category of addictive behaviours through the grouping of *disorders due to substance use or addictive behaviours*; mental health professionals have applauded the change in the recent iteration of the ICD as it resembles similar changes as seen in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, highlighting alignment between the two systems (DSM-5) (American Psychiatric Association, 2013). The ICD-11 also contributes to the conceptualization of disorders of addiction by recognizing a group of 'disorders due to addictive behaviours'. These are associated with distress/dysfunction surfacing from repetitive rewarding behaviours rather than from the use of dependence-producing substances (Stein et al., 2020). An advance to this grouping is the inclusion of gambling disorder as well as gaming disorder that may be relevant to child and adolescent mental health, which is a new addition to the ICD-11 classification and can be considered as being related to both online and offline behaviour (Rumpf et al., 2018).

Highlighting New Additions to Mental Health in ICD-11

The MBND chapter has seen new additions to the diagnostic characteristics and guidelines in terms of the revised classification interaction. These new additions included the incorporation of Catatonia as an independent syndrome, as well as the inclusion of gaming disorder and complex post-traumatic stress disorder in the ICD-11. The 15 new additions to diagnosis and disorders related to mental health in the ICD-11 have been outlined by Gozi (2019) and Gaebel et al. (2017) and are outlined in Table 4.3.

Cultural Considerations

The latest iteration of the ICD-11 has brought about a number of new changes, developments, and advances which have prompted numerous debates and discussion. One area is cultural considerations related to the classification system. While it has given an opportunity for global engagement in its development, it is essential to note that child and adolescent mental health and psychopathology takes place within a particular environment that can act as a protective or a contributory factor to mental health disorders. Coupled with the environment is the importance of culture and cultural considerations, particularly related to mental health (Gureje et al., 2020).

Mood, anxiety, and stress-related disorders, for both child and adult mental health alike, are among the most common presentations in mental health services and among the disorders commonly impacted by cultural factors (El Khourv et al., 2020). To account for culture and promote cultural sensitivity in the ICD-11, field studies were conducted in multiple countries to ensure global utility and cultural awareness of child and adolescent mental health. These field studies included diverse settings, including countries such as South Africa, Mexico, Japan, Russia, and Brazil (El Khourv et al., 2020).

The ICD-11 provides an international classification framework for child and adolescent mental health practitioners which can aid in addressing the treatment gap between the need for and access to services but remains culturally sensitive as indicated by the global field studies. While the ICD-11 makes some provision for cultural consideration and sensitivity, having an international classification system which promotes clinical utility and considers all cultural factors in mental health decision-making may be difficult. Gureje et al. (2020) have alluded to the cultural considerations of the ICD-11, noting child and adolescent mental health practitioners have been provided guidance for considering contextual and cultural considerations. This aims to strike a balance between global classification of mental health and the pertinent clinical information which should be geographically and culturally relevant. Striving for cultural consideration and sensitivity is a daunting task for a global classification system; however, clinicians and practitioners should be aware of the complexity of these areas when acting in the best interest of both children and adolescents as users of mental health treatment and services.

Clinical Utility of ICD-11

Clinical utility is regarded as an important priority of the WHO ICD-11 (Clark et al., 2017; Reed et al., 2018a, b). Improving the clinical utility of the ICD-10 is regarded as a major orientating principle in its revision (Reed, 2010).

The WHO has provided a detailed definition of a classification system's clinical utility based on earlier descriptions of the concept (First et al., 2004). In relation to the ICD classification of mental disorders, the clinical utility of a classification system, construct, or category depends on: (a) its value communicating (e.g. among practitioners, patients, administrators, families); (b) its implementation characteristics in clinical practice, which includes its goodness of fit (accuracy of description), its ease of use, and feasibility (e.g. how much time is required to use it); and (c) its usefulness in selecting interventions and in making clinical management decisions (Keeley et al., 2016; Reed et al., 2018a, b).

One of the critical objectives of the ICD-11 is to reduce the disease burden of mental and behavioural disorders by serving WHO Member States. This is emphasized by the International Advisory Group for the Revision of the ICD-10 Mental and Behavioural Disorders (2011) who state, 'People are only likely to have access to the most appropriate mental health services with the conditions that define eligibility and treatment selection are supported by a precise, valid, and clinically useful classification system' (p. 90).

ICD-11 revisions have sought to improve clinical utility with the understanding that this could improve public health (Keeley et al., 2016). If a system is not implemented or used extensively because it is not viewed as clinically useful by practitioners, this can impact in a number of ways. It will not generate valid data that can be used for health statistics; outcome evaluation at the individual level will be limited, resource allocation and needs assessment at the system level will be compromised, as will public health decision-making at many levels, including national and global (Keeley et al., 2016).

The ICD-11's emphasis on clinical utility is based on the challenges faced in this area by previous classification systems. As described by multiple authors, including those involved in the development of the systems (e.g. DSM and ICD), there are several problems with clinical utility (Andreasen, 2007). Reed et al. (2013) describe four primary concerns based on the literature. First, many people with mental health needs meet criteria for more than one disorder (Kessler et al., 2005; Kreuger & Bezdjian, 2009; Krueger et al., 2003). This may indicate that current classification systems are not efficiently capturing the core elements of mental disorders as they present in clinical settings (Reed et al., 2013). Second, a large proportion of mental disorders are recorded as either 'Not Otherwise Specified' (DSM terminology) or 'Unspecified' (ICD). This could indicate that current diagnostic categories are not easily understood by professionals or not accurately descriptive of patients. It may also reflect that the finer descriptions of diagnoses are not regarded as clinically useful by clinicians. Third, diagnostic categories are often poor predictors of treatment needs, particularly for those with severe forms of mental disorders. This is despite specific diagnoses often being used to define service eligibility. Existing diagnostic systems do not assist with the efficient use of often limited treatment resources, at either a clinical or country level (Reed et al., 2013). Finally, certain psychological and pharmacological treatments are effective over a range of mental disorders (e.g. Barlow et al., 2004; Harvey & Gumport, 2015). This suggests that several diagnostic distinctions currently made have limited relevance for clinical practice. In other instances, some disorders are significantly heterogenous, for example, the DSM-5 criteria for conduct disorder require only 3 of 15 possible criteria. Thus, for some disorders, it is possible that individuals with the same diagnosis will not share overlapping clinical features which have direct implications for treatment. These significant challenges in previous classification systems raise concerns about their increasing complexity and clinical utility. The ICD-11 revision has aimed to directly address these challenges.

As described in earlier sections of this chapter, the WHO Department of Mental Health and Substance Abuse conducted major field studies for ICD-11 which focused on improving clinical utility (Reed et al., 2018a, b). The subsequent substantive changes to the Clinical Description of Diagnostic Guidelines (CDDG) for ICD-11 Mental, Behavioural and Neurodevelopmental Disorder are intended for use by mental health professionals in clinical settings. Three main changes sought to improve clinical utility. First, providing consistent and uniform diagnostic information across categories (First et al., 2015). Second, allowing for appropriate clinical judgement and reducing arbitrary cut-offs when not strongly supported by evidence. And finally, the groupings and categories are intended to be more consistent with how mental disorders are conceptualized by clinicians (Reed et al., 2013; Roberts et al., 2012).

There is good evidence that these changes have been favourably received by clinicians. In a paper by Reed and colleagues (2018a, b), the clinical utility of the ICD-11 mental, behavioural and neurodevelopmental disorders diagnostic guidelines was assessed by 339 clinicians in 1806 patients in 28 mental health settings in 13 countries. They found very positive overall clinician ratings for the proposed ICD-11 diagnostic guidelines. The guidelines were regarded as easy to use, corresponded closely to patients' presentations (i.e. 'goodness of fit'), were clear and understandable, gave an appropriate level of detail, took a reasonable amount of time (i.e. about the same or less the clinicians' usual practice), and gave useful guidance in distinguishing normality from disorder. While clinicians rated the guidelines as less useful for assessing prognosis and treatment selection than for communicating with other professionals, all the ratings were nonetheless positive. Though every effort has been made to improve the clinical utility of the ICD-11, and early indications are positive that they have done so, it remains to be seen how the revisions will be taken up as the classification system is implemented globally.

Criticisms and Commentary on ICD-11

While some of the criticisms of ICD-11 relate to the larger status of nosology in psychiatry, others relate to more specific elements of the ICD-11, including the MBND chapter (Stein et al., 2015, 2020; Stein & Reed, 2019). This section will cover seven broad criticisms and attempts by ICD-11 to mitigate them. The status of psychiatric nosology, aetiology, overpathologizing of problems in living, reification, arbitrary thresholds overlap with DSM-5, and artefactual comorbidity will be covered in more detail. Finally, the specific case of gaming disorder will be used as an exemplar for controversies that can arise with the introduction of new disorders into classification system.

First, there are multiple classification systems, for example, ICD, DSM, Research Domain Criteria, and there is some debate regarding the need for more than one (Clark et al., 2017). Stein et al. (2020) argue that different systems are needed for differing purposes. For example, the ICD-11's emphasis on clinical utility and global applicability is designed to ensure it would result in a classification system that is of value for global mental health, ultimately reducing the mental health treatment gap and burden of mental disorder globally.

Second, ICD-11 and DSM-5 have been criticized for not being etiologically based (Gitlin & Miklowitz, 2014); this reflects uncertainty about the psychobiological underpinnings of psychiatric disorders (Clark et al., 2017; Gitlin & Miklowitz, 2014; Drabrik & Kendall, 2010). Not only is there a growing awareness that mental disorders are multicausal, but they are also incompletely understood (Clark et al., 2017; Stein et al., 2020). The ICD-11, and specifically the chapter on Mental, Behavioural or Neurodevelopmental Disorders, acknowledges this complexity and includes aetiology in certain groupings that have similar underlying mechanisms (e.g. addictive behaviours). It further details some diagnoses based on specified causes (e.g. anxiety disorder due to a medical disorder or substance use). Finally, certain causal factors can be classified though they aren't defined as disorders (e.g. chapter on Factors Influencing Health Status and Contact with Health Services) (Stein et al., 2020). Despite these efforts, the ICD-11 emphasizes the continuous need of careful individualized assessment that shows awareness of the multiple causal factors in mental illness and the consequent divergent range of interventions (Stein et al., 2020).

Another challenge for diagnostic systems is the difficulty of setting a proper balance between not overpathologizing human problems and being inclusive enough to ensure the treatment of suffering individuals (Frances, 2014; Gitlin & Miklowitz, 2014). There is a large literature on how nosologies have medicalized problems of daily life (Frances, 2014). On the other hand, it is key for disorders to be listed in ICD-11 to ensure clinical and public health attention.

A further consideration for diagnostic classification systems is that complex symptom profiles of individuals often do not fit neatly into diagnoses (Hyman, 2010). There is a danger that the reification of diagnostic categories may impede our deeper understanding of them (Hyman, 2010). Similarly, there is the temptation to inappropriately regard mental disorders as natural kinds (Stein et al., 2013).

The ICD-11 (and the DSM-5) are fundamentally categorical in design in order to achieve the purposes for which they were developed: clinical communication, allocation of mental health resources, compilation of health statistics, etc. (Clark et al., 2017). To mitigate the potential for reification, ICD-11 uses clinical guidelines rather than pseudospecific criteria sets. In addition, ICD-11 has a more dimensional approach to a range of conditions, for example, personality disorders, schizophrenia, and other primary disorders. In disorders of intellectual development, ICD-11 also moved away from using cut off scores based on standardized tests of intellectual impairment. To determine the appropriate severity-based subcategory in the updated system, clinicians must make judgements on multiple dimensions, considering intellectual functioning and adaptive behaviour across domains of social, conceptual, and practical skills (Clark et al., 2017; ICD-11). While dimensions may have some disadvantages for clinicians, field studies of the ICD-11 indicate that clinicians do find the guidelines acceptable and at least as easy to use as more categorical systems (Keeley et al., 2016; Luciano et al., 2020; Volpe, 2017; Reed et al., 2018a, b). How these revisions are taken up and used more broadly and on a global scale will be determined as the classification system is more widely implemented.

The problem of drawing thresholds is a fraught issue in mental disorders, particularly given the concerns described of inappropriate over-medicalization (Stein et al., 2020). Thresholds in this case relate to both between mental disorders and between disorders and normality. Setting thresholds in mental health disorders is difficult for three primary reasons: (1) the definition of mental disorder is under debate, (2) mental disorders are multidimensional, and (3) there are significant clinical and social ramifications for thresholds of mental disorders (Clark et al., 2017). To manage the potential pitfalls of thresholds and in keeping with its primary goals, the ICD-11 describes the essential features of each disorder, providing guidance about the symptoms that clinicians can reasonably expect to find in cases of the disorder (First et al., 2015). This approach enables more flexible applications of clinical judgement while also allowing for cultural variation in symptom presentation. Unlike the DSM-5 criteria, the ICD-11 guidelines don't contain precise symptoms counts, duration thresholds, or polythetic counts (e.g. a patient must have four of a list of seven symptoms). This puts particular emphasis on that distress and impairment that are associated with symptoms (Stein et al., 2020). Through these changes, the ICD-11 aims to support clinicians in identifying the diagnostic formulation that will be most useful in making treatment and management decisions (Clark et al., 2017). There may still be a temptation to reify the particular boundaries set, potentially overlooking the impact of subclinical presentations or underestimating the resilience of individuals meeting clinical thresholds (Stein et al., 2020).

There is a perennial challenge of comorbidity in the classification of mental disorders. As the current classification systems are not completely based on causality, there is the potential for artefactual comorbidity. Multiple diagnoses in an individual may be the result of an underlying dysfunction rather than an actual range of separate disorders with underlying psychological processes involved (Stein et al., 2020). The ICD-11 CDDG has taken a pragmatic approach to comorbidity and uses the term 'co-occurrence'. It has viewed the assignment of multiple diagnostic codes as sometimes necessary to accurately describe complex clinical conditions (Clark et al., 2017). The ICD-11 also has significantly fewer exclusions rules, although it does note some. For example, developmental language disorder with impairment of pragmatic language should not be diagnosed in the presence of ASD (WHO, 2021). This clinically focused approach by the ICD-11 has the clear advantage of addressing an individual's most prominent concerns. This is consistent with Wilk et al.'s (2006) findings that practicing clinicians often focus on the more problematic aspects of a symptom picture and tend not to document all possible comorbid disorders of an individual patient. On the other hand, it has been argued that the ICD-11 emphasis on primary conditions and utility does have the disadvantage that clinically important comorbid conditions could be overlooked (Clark et al., 2017).

Similarities and Differences with DSM-5

By design, there are many similarities between the DSM-5 and ICD-11. The broad groupings they contain and the order of these groupings resulted from a series of meetings between the APA (who oversee the DSM) and the WHO (Clark et al., 2017). Both systems used a model of working groups to oversee revisions and the ICD-11 working groups, which were developed later, typically included one or more members from parallel DSM-5 groups to facilitate harmonization. Despite their revisions, both remain categorical classification systems and are fundamentally descriptive in nature (Clark et al., 2017).

While there are many similarities, there are a number of distinct differences which are notable. ICD-11 coding is mandated globally and ICD guidelines are therefore used by clinicians around the world. By contrast, DSM is more widely used by researchers, because of its more specific operational criteria. A survey of close to 5000 international psychiatrists in 44 countries reported that 70% used the ICD-10 system in their everyday work, with only 23% using DSM-IV (Reed et al., 2011). Many countries, and WHO member states, have integrated ICD in policies and clinical processes relating to social services, care coverage, and disability benefits (International Advisory Group for the Revision of ICD-10 Mental and Behavioural Disorders, 2011). In addition, WHO member states are now responsible for reporting health statistics (e.g. prevalence, causes of mortality and morbidity) based on ICD to WHO.

Relating to more specific differences in classification between DSM and ICD, the ICD-11 gender identity disorders are substantially revised and renamed to ‘gender incongruence’ (see Reed et al., 2016 for further discussion). Particularly in relation to children, disruptive behavioural and dissocial disorders and impulsive control disorders are grouped in separate chapters, but combined in DSM-5. Complex-PTSD and prolonged grief disorder were recommended for inclusion in ICD-11, but not included in DSM-5. Conversely, DSM-5 has included disruptive mood dysregulation disorder while this is not in ICD-11. Finally, in relation to approaches to comorbidity, there is substantial similarity between the two systems, though the more specified criteria of DSM-5 can perhaps lead more individuals to have multiple diagnoses (Clark et al. 2017; First et al., 2021).

Gaming Disorder

Gaming disorder is a new addition to the ICD-11 and provides a useful exemplar for controversies that can arise with new diagnostic categories. A widely cited article in a peer reviewed journal by a group of authors in the field (Aarseth et al., 2017) reflected their concerns about including gaming disorder. Five main concerns were, (1) that there is low quality of research supporting its inclusion, (2) the operationalization leans heavily on the criteria of other, traditional addictive disorders, (3) there is little consensus among scholars on the symptomatology and assessment of the problem behaviours, (4) concerns around the stigmatization and potentially forced treatment of healthy ‘gamers’, and that (5) such false-positive cases would hinder research needed to better understand the phenomenology of problematic gaming.

A response paper by Király and Demetrovics (2017) reviewed the concerns raised by Aarseth and colleagues and submitted that on balance there were more advantages than disadvantages to the inclusion of Gaming Disorder (Billieux et al., 2021). The authors address all five of the original paper’s concerns; for brevity, only three will be reviewed here. Király and Demetrovics agreed that while the overall quality of research in the field requires improvement (e.g. there are few clinical and longitudinal studies, and survey studies are overrepresented), the qualitative studies there clearly demonstrate that a minority of gamers experience significant functional and psychological impairment related to their excessive gaming. This, they conclude, establishes with certainty that the problematic behaviour exists (King et al., 2019).

In reference to the suggestion that there is little consensus among scholars on the symptomatology, the authors argue that the gaming disorder criteria comprise only the less-debated criteria (behavioural salience, losing interest in, and reducing other recreational activities) and those with strong general support (loss of control continuation of the playing behaviour despite negative consequences, and risking relationships and opportunities). However, work on the ICD-11 revision has given impetus to review the evidence and obtain consensus (Castro-Calvo et al., 2021).

Finally, Kirăly and Demetrovics (2017) address concerns that the inclusion of gaming disorder may stigmatize millions of healthy gamers and could contribute to treatment of many false-positive casers. They contend that moral panic and stigmatization is more likely to originate from media scaremongering and generation gaps (e.g. mentality of younger and older generations) than the existence of a formal diagnosis. They conclude that a formal diagnosis might decrease stigmatization by regarding problematic gaming not as a personal weakness or bad character but rather as a disorder in the same way depression is considered a disorder rather than laziness. However, others have emphasized the public health benefits of including gaming disorder in the ICD-11 (Stein et al., 2018).

The inclusion of gaming disorder is one of several new disorders in the MBND chapter of ICD-11. Each has met with differing amounts of controversy and critique as might be expected. As Kirăly and Demetrovics conclude, ‘the definitions of mental disorders are the products of temporary consensuses among professionals and as such they are dynamically changing entities, there will be the possibility to smoothen or modify the criteria in the future based on new empirical results.’ (Kirăly & Demetrovics, 2017; Stein et al., 2021).

Conclusion

The ICD-11 represents an important advance in psychiatric nosology and global mental health. While there are clear debates around psychiatric nosology broadly and some of the specific revisions in ICD-11, it nonetheless reflects a step forward for psychiatric classification and is likely to impact widely on clinical practice. Three critical advancements are raised by Stein and Reed (2019). First, the ICD-11 has drawn on key strengths of the DSM and other classification systems like the Research Domain Criteria Project. In particular, ICD-11 emphasizes that nosological decision-making should be underpinned by evidence. Close collaboration between DSM-5 developers and ICD-11 Working Groups ensured neuroscience influenced decisions around the structure of the classification systems and that broadly similar structures were adopted (Clark et al., 2017; Stein & Reed, 2019). Second, ICD is available freely across the globe, making it more likely that it will be used in a range of settings, improving diagnosis and treatment (Stein & Reed, 2019). Its emphasis on clinical utility and efforts to ensure it is user-friendly and suited for adoption by non-specialists in primary care settings globally further increases the likelihood it will assist in efforts to reduce the global burden of disease. There are significant implications for clinical child psychology practitioners with the introduction of new diagnoses (e.g. gaming disorder, complex post-traumatic stress disorder) and an emphasis on guidelines and clinical judgement rather than fixed criteria. Finally, despite its revisions, the ICD-11 has maintained its unique identity and vision as a fit-for-purpose instrument (Stein, 2013; Stein & Reed, 2019). Its focus on providing flexible guidance in an acceptable and feasible manner for clinicians in multiple settings makes it more likely to be implemented on a broad scale. While it is too soon to determine the impact ICD-11 may have on global health and its efforts to reduce burden of disease, it is likely to play a significant role in psychiatry, psychology, and the advancement of mental health worldwide.

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5

DSM-5 and Clinical Child Psychology

Allison Smith Dupré and Paul Spano

Introduction

Dominating globally for the past 30 years, the American Psychiatric Association's (APA) *Diagnostic and Statistical Manual of Mental Disorders* (DSM) has been the most widely used and accepted diagnostic manual for psychological disorders in the United States (Demazeux & Singy, 2015; Arbanas, 2015; American Psychological Association, 2013). Since the publication of DSM-III, mental health professionals in over 40 countries have relied on the DSM for teaching, research, and clinical practice (Maser et al., 1991). To date, the DSM-5 (APA, 2013) has been published in 24 languages (DSM-5, 2017) and distributed around the world. For each disorder, the DSM provides an overview of the disorder, symptoms required to meet diagnostic criteria, prevalence rates, associated risk factors, and common comorbidities (APA, 2013). The development of the DSM served as a catalyst that increased the prominence of psychiatry in America (Demazeux & Singy, 2015) and research indicates that the majority of etiological and treatment research for psychological disorders relies primarily on DSM criteria (Castonguay & Oltmanns, 2013). Its utility ranges from clinical and research purposes in psychology to insurance codes and court testimony (Blackman, 2016). In addition to professional use, DSM criteria have been regularly mentioned in newspapers and health magazines in various countries to reference mental health (Demazeux & Singy, 2015).

The DSM has undergone several revisions since its original publication in 1952 (Akram et al., 2017), which have led to changes in how psychopathology has been defined and categorized over the past several decades. While criticisms surrounding the current publication remain, the DSM-5 continues to dominate the field in terms of guiding clinical practice, research, and informing insurance providers with necessary documentation for services. In this chapter, the DSM, its history, and its clinical and practical utility are reviewed and discussed.

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Nosology

Nosology, the “discipline and practices that deal with the classification of disease”, has been an interest in the fields of psychiatry and psychology for decades (Akram et al., 2017). The categorization of psychological disorders allows for advances in psychological research and clinical practice. Since the 1800s, attempts have been made to establish a standardized classification system for mental disorders in the United States. The efforts were primarily interested in achieving large-scale data collection and strengthening the legitimacy of the field of psychiatry (Grob, 1991). Endeavors to categorize mental illness have led to questions regarding the methodology of classification. Many have attempted to understand the etiology of psychological disorders in terms of genetics through identification of biomarkers (Van Dam et al., 2017). This research has explored biomarkers related to many psychological disorders ranging from autism spectrum disorder and attention deficit/hyperactivity disorder to major depressive disorder and posttraumatic stress disorder (Kennis et al., 2019; Lehrner & Yehuda, 2014; Rose & Ashwood, 2014; Wallis, 2010). However, unlike medical conditions, the field of psychology lacks an abundance of research pointing to reliable biomarkers.

A Case for Classification

The first step in studying, detecting, and treating psychological disorders is the identification and labeling of diagnoses. In order to successfully communicate within the fields of psychology and psychiatry as well as across other related fields (e.g., medicine) and the public, it is essential to use a common language. This is critical for standardizing classification in a universal and homogenized way (Akram et al., 2017).

Classification of disorders aids clinicians in directing treatment planning, enables researchers to study well-defined groups, and enhances communication among professionals and with the public. Additionally, standardized classification systems provide an organized way to gather information about various disorders and a basis for describing similarities and differences in presentation (Muris et al., 2019). By providing a framework for what is typical versus atypical, classification systems help clinicians determine when and how individuals should be treated. For example, a clinician would recommend and implement a very different treatment plan for an individual with autism spectrum disorder than one with an anxiety disorder. Further, even for diagnoses within the same category, differential diagnosis can inform treatment. For instance, an individual with a specific phobia diagnosis may undergo brief exposure therapy in One-Session Treatment (OST) (Zlomke & Davis, 2008), while an individual with generalized anxiety disorder would likely start a longer treatment plan such as cognitive behavioral therapy (CBT).

By classifying disorders, researchers can then use diagnostic categories to ensure homogenous samples (Tevis et al., 2021; Frances & Widiger, 2012). Additionally, classification provides researchers and clinicians within the field with a common language (Volkmar & McPartland, 2014). Without some formal diagnostic categorization and common language, psychological diagnoses would be left to clinician subjectivity. This would severely impede the reliability and validity of the field of clinical psychology at large, as specific disorders, their etiology, prevalence, symptom presentation, and treatment could not be studied differentially.

Challenges of Classification

Due to limited research of biomarkers at this time, current classification systems are forced to rely on symptomology. Unfortunately, this reliance on reported and observed symptoms can and has led to issues with construct validity, as the construct (e.g., disorder) being studied cannot be directly observed (Tevis et al., 2021). With concern about construct validity comes that of reliability. In other words, if the construct being studied is not measuring what it claims to be measuring, it is likely that the measure (or classification system) will not produce consistent results. Further, using classification systems to diagnose child psychopathology poses additional challenges, as a clinician must rely on the parent's report of their child's symptoms or the child's limited insight.

Research also suggests that psychological disorders are not typically the result of a single cause but are likely a combination of several factors. Etiological research indicates that genetics (Bolton et al., 2006), neurobiology (McClure et al., 2007), child temperament (Hudson & Dodd, 2012), family environment (Bögels & Brechman-Toussaint, 2006), and learning (Chorpita et al., 1996) all play a role in the development of psychopathology in children and adolescents. In addition to each factor's independent effects, the literature supports interaction effects. These gene-environment interactions can determine expressions of genetic or environmental predispositions. The constructs of equifinality and multifinality aid in understanding this process. Equifinality is the concept "in which multiple developmental paths lead to similar behavior" (Youngstrom & Algorta, 2014). This explains how two individuals with very different genetic makeup and environments can both arrive at the same diagnosis. Multifinality, a construct that says one pathway is associated with many outcomes (Kruglanski et al., 2015), can be used to describe how two individuals exposed to the same traumatic experience respond differently. In other words, different factors can result in the same disorder (equifinality) and similar factors can lead to various psychological disorders (multifinality). The etiological complexity of psychology makes it difficult to identify the root of disorders, thus, creating challenges to classification.

Further, child and adolescent psychopathology poses unique challenges to classification. While some behaviors are viewed as typical during development (e.g., defiance or shyness), if these behaviors persist and become severe and impairing enough, they may meet criteria for a diagnosis (e.g., oppositional defiant disorder or social anxiety disorder). To address this, many classification systems have incorporated some form of developmental considerations or age requirements in their diagnostic criteria. Still, those who are skeptical of classification systems argue that labeling disorders can increase stigmatization and pathologize non-Western cultures (Tyrer, 2014). Additionally, some argue that the use of classification systems overestimates psychopathology, as the number of diagnosable disorders grows. While some of this growth could be due to increased interest and study of psychopathology, critics suggest that the prevalence rates are out of proportion. Kessler et al. (2005) found that almost half of Americans meet criteria for at least one DSM disorder over the course of their life.

Despite the shortcomings of classification, all attempts to move away from grouping systems have led to alternate forms of classification or internal reliance on clinician's own internal classification system, leading to a lack of reliability. While imperfect, the advantages to having a universal system are undeniable: to facilitate communication, provide a reference system to be used in practice, and provide homogenous samples for research (Lempérière, 1995). Thus, several systems have been published to eliminate subjectivity and create a common language in the field. Among the most prominent classification systems are American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013) and the National Institute of Mental Health's *Research Domain Criteria project* (*RDoC*) (Insel et al., 2010).

History

Pre-DSM Nosology

In the nineteenth century, attempts to establish a standardized diagnostic taxonomy in the United States were made primarily to collect data that would inform public policies (Grob, 1991). Though a standardized taxonomy would have little clinical utility at the time, nineteenth-century psychiatrists recognized the value of large-scale data collection; for instance, quantitative research could provide information on recovery rates and bolster the legitimacy of the profession (Grob, 1991). In 1918, the APA published the first standardized diagnostic taxonomy in the United States: *Statistical Manual for the Use of Institutions for the Insane* (Grob, 1991). The manual's many critics cited the fact that it was extremely limited in scope, as it was primarily created to collect data for the United States National Committee for Mental Hygiene. As a result, it had little clinical utility and was ignored by many American psychiatrists who instead continued to rely on their own psychoanalytic conceptualizations. Because there were no effective treatments for many mental illnesses, many American psychiatrists believed that diagnostic precision was not clinically useful. Still, the APA went on to publish nine more editions of the *Statistical Manual* prior to World War II (Fischer, 2012).

DSM-I and DSM-II

The *DSM-I*, as it was called upon publication, reflected the heavy influence of psychoanalysis on American psychiatry. Nearly every disorder included in the *DSM-I* was considered a "reaction," and several were defined by the defense mechanisms that were likely to be used. Diagnoses were made by comparison to brief descriptions of typical presentations, and there were several restrictions on diagnosing comorbid conditions for ease of reporting statistics (Fischer, 2012; APA, 1952). Mental disorders were described as being caused either by organic brain dysfunction or "difficulty in adaptation" (i.e., environmental stressors). Each section opened with a brief description of a disorder, followed by paragraph-long descriptions of relevant psychiatric conditions termed "reactions" (APA, 1952). As would be the case for future editions, the *DSM-1* was considered a live document. The manual's introduction commented on the limits of the "present day descriptive nature of psychiatric diagnoses," noting that future editions should include information on etiology, pathology, prognosis, and even treatment (APA, 1952).

Almost all disorders were of adulthood, with the exception of two childhood "reactions": adjustment and schizophrenic. The latter reaction was characterized by "reduction in external attachments and interests and by impoverishment of human relationships" (APA, 1952). The *DSM-1* also referenced "the disturbance in intellectual development and learning ability" that might result from an organic brain syndrome occurring in utero, infancy, or childhood (APA, 1952). These brief descriptions of childhood psychopathology arguably set the foundation for future conceptualizations of autism spectrum disorders, intellectual disabilities, and other neurodevelopmental disorders.

The publication of the *DSM-II* coincides with the development of the eighth edition of the *International Classification of Diseases* (ICD-8) by the World Health Organization (WHO) in 1948. The APA's Committee on Nomenclature and Statistics sought to update the DSM in order to align it with the ICD (Fischer, 2012). In the 1950s and 1960s, the influence of psychodynamic traditions on American psychiatry had weakened; instead, psychopharmacology revolutionized the field as it underwent a "deinstitutionalization" phase that released many patients with severe mental illnesses into the community. Psychopharmacology, rather than psychoanalytic therapy, proved to be relatively more effective for these individuals (Akram et al., 2017). Published in 1968, the *DSM-II* expanded from the first edition's two divisions (i.e., organic and functional illnesses) to ten categories that were systematically arranged.

Like some modern structured diagnostic interviews, the manual was designed to allow clinicians to consider each category sequentially until they arrived at a diagnosis (Fischer, 2012; APA, 1968). For the first time, the manual devoted a section to "Behavior Disorders of Childhood and Adolescence" and introduced it with the following conceptualization: "This major category is reserved for disorders occurring in childhood and adolescence that are more stable, internalized, and resistant to treatment than Transient situational disturbances but less so than Psychoses, Neuroses, and Personality disorders. This intermediate stability is attributed to the greater fluidity of all behavior at this age" (APA, 1968). Representing a significant shift away from psychodynamic traditions, the term "reaction" was removed from all adult disorders. Still, the *DSM-II* used exclusively psychodynamic concepts to describe childhood psychopathology in the new "Behavior Disorders of Childhood and Adolescence" category. Seven reactions "of childhood (or adolescence)" were included: hyperkinetic, withdrawing, overanxious, runaway, unsocialized aggressive, group delinquent, and other (APA, 1968).

DSM-III and DSM-IV: A Paradigm Shift

In 1980, following intense scrutiny from both within and outside the field, the 132-page *DSM-II* was replaced by the 500-page *DSM-III* (Wilson, 1993; APA, 1980, 1968). An enduring criticism of the *DSM-II* set the stage for the development of the *DSM-III*: "Increasingly," noted two prominent *DSM-III* editors, "there is pressure for the medical profession and psychiatry in particular to define its area of responsibility" (Spitzer et al., 1978). The *DSM-III* is often heralded as a paradigm shift away from psychodynamic traditions and towards biological psychiatry, as the psychopharmacological boom of the 1960s demonstrated that neurobiological factors may underlie the development of psychopathology (Shorter, 2013). Unlike the *DSM-III,* previous editions encouraged diagnosis via comparison to prototypical case examples. Revolutionary to the *DSM-III* was the inclusion of "diagnostic criteria," or symptom lists that attempted to distill the core features of each disorder. This was the first edition to include explicitly defined criteria in an effort to bolster diagnostic reliability (Shorter, 2015; APA, 1980). In an attempt to incorporate the biopsychosocial model of psychopathology, the *DSM-III* introduced the multiaxial system of diagnosis. This system called for the assessment of presenting symptoms, personality characteristics, medical conditions, psychosocial and environmental factors, and general functioning (APA, 1980).

The *DSM-III* included the category of "Disorders Usually First Evident in Infancy, Childhood, or Adolescence," which contained five "classes" of disorders: intellectual, behavioral (e.g., attention deficit disorder [ADD] and conduct disorder), emotional (e.g., anxiety disorders), physical (e.g., eating disorders and stereotyped movement disorders), and developmental (e.g., pervasive developmental disorder). This edition was first to include the diagnoses of ADD, bipolar disorder, posttraumatic stress disorder, and several new anxiety disorders (Shorter, 2015; APA, 1980). Borrowing from European nosology, the *DSM-III* was also the first edition to distinguish between affective disorders based on polarity – and with psychopharmacology in vogue, bipolar disorder quickly became one of the most popular diagnoses and led to heavy marketing of mood stabilizers by pharmaceutical companies (Shorter, 2015). Ultimately, the influence of the *DSM-III* is difficult to overstate: its publication launched hundreds of disorder-specific randomized controlled trials and led to the investment of billions of federal dollars for psychopharmacological research (Kawa & Giordano, 2012). A slightly revised edition, the *DSM-III-R*, was published in 1987, changing ADD to attention deficit/hyperactivity disorder (ADHD), removing the schizoid disorder of childhood or adolescence, and introducing the term "mood disorders" in place of "affective disorders" (Akram et al., 2017; APA, 1987).

Notably, the *DSM-III* was the first to utilize federally sponsored field trials to ensure good diagnostic reliability (Spitzer et al., 1978). Prior editions demonstrated fairly low reliability. *DSM* developers expected that new diagnostic criteria, the use of a multiaxial system, and changes to the grouping of disorders would result in improved reliability. Indeed, the reliability of the *DSM-II* was fairly good for nearly all disorders. Major disorders, such as schizophrenia and major affective disorders, demonstrated the strongest reliability; disorders such as schizoaffective disorder and similar personality disorders demonstrated only fair reliability (Spitzer et al., 1979). Another phase of field trials investigated the utility of the multiaxial system, concluding that clinicians generally find the system useful, though the fourth axis – which asked clinicians to rate the severity of psychopathology – suffered from inconsistent reliability (Spitzer & Forman, 1979). Similar critiques of the multiaxial system persisted until its elimination by the *DSM-5* (APA, 2013).

The *DSM-III* also introduced the use of a specialized task force responsible for the overall research and compilation of the manual. Fifteen experts from various subfields were recruited to increase the precision of diagnostic definitions, update diagnostic criteria in light of new research, and settle debates about the inclusion or removal of certain criteria (Davies, 2017). Essentially, the use of a task force was an early step towards the democratization of the *DSM*; now, diagnostic criteria were developed after a consensus was reached by members of the task force. This represented a significant departure from previous editions, which relied on widely accepted, but not necessarily empirical, definitions (Davies, 2017).

Subsequent editions did not deviate far from the *DSM-III;* each enhanced the specificity of diagnostic criteria while exponentially increasing in size and scope (Akram et al., 2017). Published in 1994, the *DSM-IV* included only minor revisions that sought to clarify certain diagnostic criteria and correct several inconsistencies in light of new research (APA, 1994). A minor text revision, *DSM-IV-TR*, was published in 2000; included was a brief update to the description of Asperger's disorder. A major contribution of the *DSM-IV* was the addition of criteria for the "clinical significance" of each disorder, emphasizing the importance of subjective impairment or distress to the definition of "mental disorder" (APA, 1994). Similarly, the *DSM-IV* included a category for "culture-bound syndromes," recognizing that certain mental disorders may present differently across cultures (APA, 1994). The fourth edition also added Rett's disorder and Asperger's disorder to the pervasive developmental disorder category (APA, 1994), foreshadowing the *DSM-V*'s shift towards a dimensional conceptualization of autism spectrum disorders.

Like the previous edition, the *DSM-IV* was also subjected to rigorous field trials, many of which were directed specifically at disorders of childhood and adolescence. One field trial concluded that, compared to *DSM-III* criteria, *DSM-IV* criteria for ADHD were better able to detect impairment in girls and preschool children (Lahey et al., 1994a). Similarly, field trials were conducted for the diagnoses of oppositional defiant disorder (ODD) and conduct disorder (CD); this trial concluded that, despite loosening criteria, the prevalence of each disorder remains largely unchanged. Each disorder also demonstrated higher internal consistency and test-retest reliability when compared to previous editions (Lahey et al., 1994b). Finally, a field trial of autistic disorder (considered a type of pervasive developmental disorder) concluded that previous *DSM-III* criteria were overly broad and associated with false positives, in part because it failed to address developmental issues (Volkmar et al., 1994). In comparison, the detailed ICD-10 criteria demonstrated fairly high reliability; as a result, Volkmar et al. (1994) concluded that use of modified ICD-10 criteria in the *DSM-IV* would allow for convergence between the two manuals.

Developing the DSM-5

DSM-5 Task Force

Led by a dedicated task force, the development of the DSM-5 was a 12-year process that concluded with publication in 2013 (APA, 2013). Like subsequent editions, the *DSM-5* was informed by 13 work groups, each responsible for a particular diagnostic category (e.g., mood disorders, childhood and adolescent disorders, and ADHD and disruptive behavior disorders). They were tasked with conducting rigorous literature reviews to identify key points of contention. These work groups then drafted diagnostic criteria and accompanying text, before subjecting these drafts to intensive peer and public review (APA, 2013). The APA (2013) noted that, generally, the *DSM* serves as a "historically determined cognitive schema imposed on clinical and scientific information to increase its comprehensibility and utility." In other words, the *DSM-5* is considered a "living document," as it is ultimately a culturally informed, theoretical distillation of available literature. For this reason, conceptualizations are expected to change as the field generates new findings in neurobiology and epidemiology, and as it reckons with the blurred distinction between disorder and normalcy.

DSM-5 Field Trials

The DSM-5 work groups also conducted several field trials to empirically demonstrate the reliability of proposed diagnostic categories, a precedent set by the *DSM-III* (APA, 1980). The DSM-5 field trials were conducted both at large academic medical centers, to establish reliability and clinical utility with a large sample size, and smaller clinical practices, in order to evaluate clinical utility in a routine, everyday clinical environment (APA, 2013).

Field trials concluded that many diagnostic categories demonstrated good to very good test-retest reliability (e.g., ADHD, ASD, PTSD, and adult neurocognitive disorders). Notably, the reliability of major depressive disorder fell within the questionable range, likely due to its comorbidity with several other disorders and the heterogeneity in presentation. These trials also failed to find evidence for a distinct, and newly proposed, "mixed anxiety-depressive disorder" (Regier et al., 2013a, b). As a temporary solution, the DSM-5's conceptualization of MDD includes several specifiers to bolster precision and improve the reliability and validity of differential diagnoses. For instance, the "mixed" specifier suggests prominent features of mania/hypomania, and the "anxious distress" specifier signals the presence of prominent anxiety (APA, 2013).

Major Developments

Dimensional Approach

Prior editions of the *DSM* utilized a categorical approach, conceptualizing psychopathology in terms of distinct, narrow constructs. This approach proved to be problematic, as it did not account for shared symptoms or etiological risk factors. Several DSM-5 field trials provided evidence for the utility of a dimensional approach, which conceptualizes psychopathology on a spectrum of severity (APA, 2013; Regier et al., 2013a, b). Within child and adolescent disorders, this change is best demonstrated by the elimination of Asperger's disorder, last seen in the *DSM-IV*, in favor of a general autism spectrum disorder (ASD). Underlying this change is the idea that all "forms" of ASD, regardless of "severity," share underlying etiological and neurobiological factors. For this reason, Asperger's disorder may be better represented by a diagnosis of ASD, Level one (APA, 2013).

The use of a dimensional approach reportedly serves two purposes. First, this approach ostensibly serves as a "bridge" to novel diagnostic approaches (e.g., those based primarily on neurobiological underpinnings), without significantly interfering with current clinical practices. Second, this approach acts as a framework for researchers to systemically investigate etiological factors and neurobiological similarities between disorders, as they are no longer held to strict categorical bounds (APA, 2013). In line with a dimensional approach, *DSM-5* field trials also informed the *DSM-5*'s distinction between internalizing and externalizing clusters of disorders, as evidence from twin studies suggests that disorders within each cluster are associated with similar genetic and environmental risk factors (APA, 2013).

Developmental and Lifespan Considerations

Disorders in the DSM-5 are arranged developmentally, beginning first with those that often manifest early in one's life. For instance, the manual first describes neurodevelopmental disorders (e.g., ADHD and ASD). Towards the manual's end are descriptions of disorders associated with older adulthood, such as neurocognitive disorders (e.g., cognitive impairments due to Alzheimer's disease). Similarly, disorders within each chapter are also arranged developmentally. For example, the chapter on depressive disorders begins with a description of disruptive mood dysregulation disorder; major depressive disorder and substance/medication-induced depressive disorder are described later in the chapter. This organization is meant to encourage the consideration of lifespan information when making diagnostic decisions (APA, 2013).

Elimination of the Multiaxial System

Finally, the *DSM-5* eliminated the multiaxial system utilized by the *DSM-IV* (APA, 1994). This change was explained by the fact that the *DSM-IV* never formally required the use of this system; rather, its widespread use was to the benefit of insurance and governmental agencies (APA, 2013). Instead, the *DSM-5* combines axis III with axes I and II and offers notations for documenting psychosocial and contextual factors (i.e., axis IV). Axis V, once a measure of global functioning (i.e., GAF scale), was eliminated, as it demonstrated poor construct validity and questionable reliability (APA, 2013).

Implications for Child and Adolescent Psychopathology

Attention-Deficit Hyperactivity Disorder

Like the DSM-IV (APA, 1994), the DSM-5 describes three variants of ADHD (i.e., predominantly inattentive, predominantly hyperactive/impulsive, and combined). Based on longitudinal research suggesting that the *DSM-IV* subtypes are fluid across the lifespan (Wilcutt et al., 2012), the DSM-5 considers each variant a different "presentation," rather than a discrete subtype. In other words, presentations of ADHD are prone to changing across the lifespan. Each presentation is associated with functional difficulties in its respective behavioral domain (i.e., attention or hyperactivity/impulsivity), with the combined presentation still referring to significant levels of both inattention and hyperactivity/impulsivity (APA, 2013).

Obsessive-Compulsive Disorder

Consistent with the *DSM-IV*, the conceptualization of OCD is similar for both children and adults. However, in the *DSM-5,* OCD was removed from the anxiety disorders category and placed into a novel category: obsessive-compulsive and related disorders (OCRD). The category also includes body dysmorphic disorder, hoarding disorder, trichotillomania, and excoriation disorder (APA, 2013). This reorganization is supported by research suggesting that these disorders are associated with similar risk factors, neurocircuitry, comorbidities, and treatment responses (Hollander et al., 2008). In other words, research has shown that these disorders are more related to each other than they are to the various anxiety disorders. Proponents of this change also argue that these disorders have been historically undertreated and underresearched; the inclusion of a dedicated OCRD category should, in theory, draw attention to the screening, diagnosis, and study of these disorders. Others argue that the change is premature, and that OCRDs might be best subsumed under a broader affective spectrum disorders category, which could also include depressive and anxiety disorders (Hollander et al., 2008).

Autism Spectrum Disorder

Perhaps the most controversial change was that made to the conceptualization of autism. Wing (1996) first used the term "autistic spectrum disorders" to suggest that pervasive developmental disorders (PDD) are best organized on a spectrum of severity. In line with Wing (1996) and more recent research, the *DSM-5* eliminated the category of PDD, thereby eliminating the popular diagnoses of Asperger disorder and PDD, not otherwise specified (PDD-NOS). Diagnoses that were once subsumed under PDD demonstrated inadequate inter-rater reliability, and *DSM-IV* criteria were vague enough that many clinicians began to develop personal criteria for making differential diagnoses between PDD subtypes (Lord & Jones, 2012). Ultimately, this dimensional approach suggests that ASD should be classified according to dimensions of its core features (i.e., deficits in social communication and restricted, repetitive behaviors or interests), as the severity of these features tends to predict treatment response (Sheinkopf & Siegel, 1998).

Still, this dimensional approach undermines the *DSM-5's* attempt to group disorders based on distinct neurobiological factors, as literature on these factors and how they relate to each "dimension" of ASD has been relatively inconclusive (Lord & Jones, 2012). Instead, this approach emphasizes practicality and assists with treatment planning. In other word, each "level" of ASD is associated with the level of support required to increase quality of life and, if possible, independence. Level one refers to individuals "requiring support," level two refers to individuals "requiring substantial support," and level three refers to individuals "requiring very substantial support" (APA, 2013).

Posttraumatic Stress Disorder

The *DSM-5* retained the four symptom categories described by the *DSM-IV* (i.e., exposure to a traumatic event, presence of intrusive symptoms, avoidance of feared stimuli, and heightened arousal) and added a fifth symptom category related to negative alternations in cognitions and mood (APA, 2013, 1994). Criteria were also modified to include developmentally appropriate presentations of PTSD symptoms that emphasize observable behavioral symptoms. For instance, in young children, “recurrent, involuntary, and intrusive distressing memories” may be manifested in repetitive play, and dissociative reactions may be manifested as “trauma-specific reenactments.” Additionally, the *DSM*-5 notes that children with heightened arousal may engage in extreme temper tantrums (APA, 2013).

Criticisms

Diagnostic Inflation

A major critique that has persisted for decades is that the widening of diagnostic criteria potentially contributes to overdiagnosis and the pathologizing of typical responses to life experiences. For instance, Kessler et al. (2005) noted that nearly half of Americans will meet *DSM-IV* criteria for a disorder in their lifetime. However, research suggests that changes to *DSM-5* criteria had only a minimal effect on prevalence rates for each disorder. A meta-analysis found that, despite constantly shifting diagnostic criteria for ADHD, the prevalence of ADHD has not significantly changed with each *DSM* edition (Thomas et al., 2015). Similarly, *DSM-5* criteria for binge eating disorder and bulimia nervosa were found to result in better detection without significantly raising the lifetime prevalence rate (Trace et al., 2012). A recent meta-analysis suggested that inflated diagnoses are generally no more common than deflated diagnoses (Fabiano & Haslam, 2020). Still, the largest degree of inflation was observed after the transition from *DSM-III* to *DSM-III-R* and from *DSM-IV* to *DSM-V*, though these trends were weak and unreliable between disorders. In other words, no particular disorder is associated with significant hyperinflation, and authors conclude that concerns of diagnostic inflation with each *DSM* edition are likely “overstated” (Fabiano & Haslam, 2020).

Limited Data on Neurobiological Substrates

In many ways, the ideology behind the *DSM-5* has yet to be fully realized. Editors of the *DSM-5* sought to establish distinct clusters of disorders based on shared neurobiological factors and etiologies (APA, 2013). Kupfer and Regier (2011), two of the *DSM-5*’s editors, suggested that the goals set in their research agenda (Kupfer et al., 2002) would not be entirely met in time for publication of the *DSM-5*. Ultimately, these goals were met to varying degrees. For instance, the *DSM-5* included an autism spectrum disorder, thereby eliminating the *DSM-IV*’s diagnoses of pervasive developmental disorder, autistic disorder, and Asperger’s disorder, to name a few (APA, 2013). This decision was informed by studies suggesting that those *DSM-IV* diagnoses may have a common neurobiological substrate (Kupfer & Regier, 2011). On the other hand, there may be a weaker empirical basis for the addition of a distinct “Obsessive-Compulsive and Related Disorders” category based on shared neurobiological substrates. Though the category ostensibly raises awareness of historically understudied disorders, Abramowitz and Jacoby (2015) noted that the category should be rejected on scientific grounds as it seems partially informed by misinterpreted – and cherry-picked – brain-imaging and treatment outcome studies. Still, editors of the *DSM-5* provided an optimistic commentary: “As we gradually build on our knowledge of mental disorders,” Kupfer and Regier (2011) noted, “we begin bridging the gap between what lies behind use (presumed etiologies based on phenomenology) and what we hope lies ahead (identifiable pathophysiologic etiologies).”

Much criticism surrounding the DSM can be attributed to what is characterized as a disorder. Due to the lack of known biological basis, current psychological diagnoses rely on report and observations of symptoms associated with disorders. Unlike physicians, clinicians cannot depend on blood tests or x-rays to determine whether or not an individual's symptoms meet the clinical threshold for a particular disorder. Classification systems such as the DSM will undergo "continual refinement and modification" (Akram et al., 2017). With this knowledge, scientists are encouraged to maintain a healthy balance of confidence and questioning of the systems in place.

Using the DSM

Structure of the DSM-V

One primary goal in developing the organizational structure of the DSM-5 was to group disorders into "clusters based on shared pathophysiology, genetics, disease risk, and other findings from neuroscience and clinical experience" (Regier et al., 2013a, b). Typically, disorders that are listed in the same cluster or chapter of the DSM are assumed to have shared etiology, have high rates of comorbidity, and share similar methods of treatment. Clustering of disorders can also aid in differential diagnosis. For these reasons, the way disorders are grouped can have significant implications in assessment and treatment (Stein et al., 2011). Attempts to group disorders is a complex process, as many disorders with shared symptom presentations and treatment approaches differ in the neuronal circuits at play (e.g., OCD and other anxiety disorders) (Stein et al., 2010). Efforts to cluster individual disorders proves to be a trying task, as there is an abundance of research showing commonalities and distinctions in disorders. It is an effort to balance the current research including distinctions found in neuroimaging and biomarkers to symptom presentation and treatment response.

The current manual reflects this effort to group individual disorders into meaningful clusters by reordering and reorganizing existing disorders. In the introduction of the DSM-5, the authors state that "the revised structure" should "stimulate new clinical perspectives" and "encourage researchers to identify the psychological and physiological cross-cutting factors that are not bound by strict categorical designations" (APA, 2013). The DSM-5 task force utilized several scientific validators such as shared neural substrates, genetic and environmental risk factors, symptom similarity, and high comorbidity to inform decisions about how to cluster disorders in a way to maximize clinical usefulness and validity (APA, 2013). Additionally, in order to reflect a more developmental approach, the DSM-5 organizes diagnostic categories and diagnoses within each category in order of earliest to latest manifestation. For instance, the first category covers neurodevelopmental disorders such as intellectual disabilities, autism spectrum disorder, and attention-deficit/hyperactivity disorder. Within the anxiety disorders section, the developmental approach is reflected by listing separation anxiety disorder at the beginning, as this disorder typically affects a younger population than the other anxiety disorders.

At the beginning of each chapter (i.e., cluster of diagnoses), there is a brief introduction describing the category of disorders. This provides a reference for clinicians and researchers to understand how the disorders found in the chapter are related. For each individual disorder, the manual lists diagnostic criteria, occasionally including age of onset, duration, and frequency of symptoms (Joyce-Beaulieu & Sulkowski, 2016). Below, various applicable sections follow including: specifiers, diagnostic features, associated features, prevalence, development and course, risk and prognosis, culture-related and gender-related diagnostic issues, diagnostic markers, differential diagnoses, comorbidity, and relationship to other classifications. The sections following the diagnostic criteria provide useful information for clinicians regarding defining characteristics consistent with each disorder, differences in prevalence based on gender, age, and nationality, lifetime patterns of each disorder, and information to help make decisions about ruling a disorder in or out (Joyce-Beaulieu & Sulkowski, 2016).

DSM in Assessment

The DSM-5 is clear about the way in which the manual should be appropriately utilized. Rather than relying on the diagnostic criteria as a checklist to diagnose disorders, clinicians must employ their clinical judgment in order to clearly understand the severity and impairment associated with the symptoms present. The manual should be used as a guide by clinically trained professionals to aid in clinical case formulation. Several measures have been developed based on the DSM's criteria to aid in clinical assessment and research, including structured and semi-structured interviews, questionnaires, and observation-based measures. Using the DSM as their guide, these measures aid clinicians in their diagnostic assessments of various disorders.

Structured and semi-structured interviews based on standardized questions, based on DSM criteria, are popular tools used in assessment (Matson & Hong, 2018). Some of the most common interview systems used for psychological evaluations of youth include: the Child and Adolescent Psychiatric Assessment (CAPA; Angold et al., 1995), the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS; Puig-Antich & Chambers, 1978), the Interview Schedule for Children and Adolescents (ISCA; Sherrill & Kovacs, 2000), the Child Assessment Schedule (CAS Hodges et al., 1982), the Diagnostic Interview for Children and Adolescents (DICA; Reich, 2000), the Diagnostic Interview Schedule for Children (DISC; Costello et al., 1982), the Structured Clinical Interview for the DSM (SCID; First, 2014), and the Anxiety Disorders Interview Schedule for Children (ADIS-C/P; Silverman & Albano, 1996). While less flexible than other methods of assessment, the major strength of these interviews is the standardized questions (Matson & Hong, 2018). Some of these interviews, such as the ADIS-C/P, have separate versions to administer to parents and children, allowing clinicians to gather standardized information from both the child being assessed and their caregiver, thus, formulating a clearer picture of any diagnostic impressions.

During assessments, clinicians often give various questionnaires to gather information from parents, children, teachers, and other involved caretakers. The DSM has played an important role in guiding the development of these questionnaires, as the goal is to better understand the symptoms present and their severity in order to decide whether one meets for a disorder based on DSM criteria. There are various broadband questionnaires that serve to assess a large number of psychological problems in a short amount of time (Hoffman et al., 2016). Questionnaires such as the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Rescorla, 2001) and the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992) allow for multiple informants (e.g., parents, teachers, child) to answer questions regarding a child's behavior and emotions (Rescorla, 2009). Each of these widely used systems has attempted to mimic DSM criteria on DSM-oriented scales and "facilitate differential diagnosis among DSM psychiatric categories" (Rescorla, 2009).

Additionally, more narrowband questionnaires have been constructed in efforts to evaluate specific categories of diagnoses or individual disorders. Some DSM-based questionnaires include the Revised Child Anxiety and Depression Scale (RCADS; Muris, 2002), the Youth Anxiety Measure for DSM-5 (YAM-5; Muris et al., 2017), and the Questionnaire for Eating Disorder Diagnoses (Q-EDD; Mintz et al., 1997). Further, observation-based methods such as the Childhood Autism Rating Scale (CARS; Schopler et al., 1980) and the Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2000) use diagnostic criteria outlined in the DSM to assess for behaviors related to autism spectrum disorder. Observation-based methods offer more flexibility than questionnaires, accounting for the nuances and various presentations of the diagnostic criteria listed in the DSM. Not only do interview systems, questionnaires, and observation-based methods aid in clinical assessment, but they also provide opportunities for research that evaluates DSM criteria. The ability to continue research through these standardized assessment measures allows for continued improvement of future revisions of the DSM.

DSM in Treatment

In addition to its uses for diagnostic assessment, the DSM's defining of disorders has great implications for treatment services. The DSM provides the coding system that insurance companies rely on to decide what is covered for psychological treatment (Knopf, 2022). Each disorder is assigned a code that is tied to an ICD code in order to facilitate financial reimbursement for services (Joyce-Beaulieu & Sulkowski, 2016). In some cases, certain diagnoses even qualify an individual for their own insurance policy. For instance, a diagnosis of autism spectrum disorder (ASD) qualifies an individual for their own insurance under Medicaid in order to provide "medically necessary" treatments such as Applied Behavior Analysis (ABA). DSM diagnoses also qualify youth to access services in the school system. For example, schools in the United States of America are required by law under the Individuals with Disabilities Education Act (IDEA) to provide children with disabilities free, appropriate education in the least restrictive environment (Individuals With Disabilities Education Act, 2004). This can include 504 accommodations or individualized education plans (IEP) to aid children who qualify based on diagnoses (e.g., ADHD, specific learning disorder, ASD). Further, the DSM guides differential diagnosis, which then directs treatment, as empirically supported treatment plans vary depending on the diagnosis. Lastly, DSM diagnoses can offer validation to children and families of children who receive diagnoses. While there are claims that labeling disorders can have a negative impact, other studies show positive effects associated with labeling. For instance, the use of psychological diagnostic labels is associated with effective help-seeking behaviors (Wright et al., 2011).

Conclusion

As the leading diagnostic manual for psychological disorders in the United States (Demazeux & Singy, 2015; Arbanas, 2015; American Psychological Association, 2013) and beyond (Maser et al., 1991), the DSM has served as the catalyst for advancing American psychiatry (Demazeux & Singy, 2015). Additionally, the majority of research of psychological disorders has been shown to rely on DSM criteria to varying extents (Castonguay & Oltmanns, 2013). Throughout the history of its development, beginning with its first publication in 1952, the DSM has undergone significant revisions in order to create the most reliable and evidence-based manual for clinical and research use. The first edition of the manual did not address childhood disorders, aside from a couple childhood "reactions" (APA, 1952). However, subsequent editions expanded upon this to broaden the extent to which disorders of childhood were represented. For instance, DSM-II included seven reactions of "childhood or adolescence" (APA, 1968) and DSM-III created an entire category devoted to "Disorders Usually First Evident in Infancy, Childhood, or Adolescence", introducing ADD (Shorter, 2015; APA, 1980). Acknowledging developmental and cultural considerations, the fourth edition of the manual allowed for better detection of ADHD in females and younger children (Lahey et al., 1994a). DSM-IV and DSM-IV-TR also adjusted diagnostic criteria to ensure better reliability, better reflect current research, and be in line with the ICD. With the publication of the DSM-5 came changes acknowledging child development and disorders even further. For example, developmentally appropriate presentations of PTSD were included (APA, 2013) and more fluid presentations of ADHD (Wilcutt et al., 2012) and ASD (APA, 2013) were emphasized across the lifespan. However, despite these advances, like any good science, the field of psychology continues to critically evaluate current systems and grow with the current research.

Several criticisms of the DSM and classification systems remain, including diagnostic inflation and limited data on neurobiological bases for disorders. Additionally, critics suggest that labeling can increase stigmatization (Tyrer, 2014). While there is a negative stigma associated with labeling, giving a formal DSM diagnosis can increase treatment motivation, inform more successful treatment, and give validation to children and parents. Another issue associated with the DSM is how to use differential diagnosis and deal with the high rate of comorbid disorders. It is difficult for classification systems, such as the DSM, to accurately guide clinicians to decipher between distinct comorbid disorders. While the field has aimed to move toward a more dimensional approach, abandoning classification altogether would impede clinical decision making in assessments and treatment. There has also been concern surrounding overreliance on the DSM. Some have suggested that since the publication of the manual, there is no longer room for clinical judgment. Demazeux and Springy emphasize that clinicians should use caution not to rely solely on standardized criteria but to incorporate their clinical experience into their case conceptualization (2015). Recognizing the permeable nature of diagnostic boundaries, the authors of the DSM explicitly state that the manual should be used by experienced clinicians as a tool to determine diagnosis (APA, 2013). It was not created to be a checklist for lay persons to identify disorders. Rather, the DSM should be used by trained individuals to guide identification of prominent symptoms and clinical diagnoses. Clinicians should utilize and incorporate various measures, assessment tools, and reporters (parents, teachers) when forming their clinical conceptualization.

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NIMH's Research Domain Criteria (RDoC) and Clinical Child Psychology

6

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Introduction and Rationale

Background

The predominant nosological system in adult and child psychiatry in the United States is based on the Diagnostic and Statistical Manual of Mental Disorders (DSM). The DSM system utilizes categorical diagnoses derived from clinically observable signs and symptoms and, since 1980 (when DSM-III was released), has achieved improved diagnostic reliability (i.e., the rate at which different interviewers agree on the same diagnosis) in clinical practice and research (Spitzer et al., 1980). However, given that DSM diagnoses are etiologically and pathophysiologically agnostic, questions about their diagnostic validity (i.e., the ability of diagnoses to capture "true" or natural phenomena) remained. Evidence for limited validity of DSM diagnoses includes symptomatic heterogeneity not adequately accounted for by DSM diagnostic criteria, leading to frequent use of "not otherwise specified" diagnoses (especially among child patients), as well as diagnostic comorbidity (i.e., the co-occurrence of multiple diagnoses in individual cases) that may reflect a common underlying pathogenic process rather than multiple co-occurring distinct disorders (Goldstein & Schwebach, 2004; Kendler et al., 1992; Reiersen et al., 2007).

The introduction of the Research Domain Criteria (RDoC) by the National Institute of Mental Health (NIMH) in 2009 grew out of this concern regarding the limitations of the DSM approach towards psychiatric research. RDoC also came at a time of growing interest in viewing mental disorders as brain disorders (more specifically, as disorders of brain systems) and bringing psychiatry more in line with the medical model of pathophysiology-directed diagnosis and treatment (Hyman, 2007; Insel, 2005). The incorporation of research findings from genetics and neuroscience into clinical prac-

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tice has yet to come to fruition - thus one of the ultimate goals of RDoC is to expedite this advancement (Clark et al., 2017). It should be noted that RDoC is not currently designed to serve as a clinical diagnostic system but rather to organize research efforts and findings and to inform the development and refinement of future diagnostic systems (Cuthbert, 2020).

RDoC Assumptions and Goals

The conception of RDoC was predicated on three assumptions: (1) mental disorders are disorders of brain dysfunction; (2) brain dysfunction can be quantitatively measured using available technology; and (3) brain dysfunction data (and other biomarkers like genetic sequence) can be combined with clinical interview data to yield biosignatures that improve clinical care (Insel et al., 2010). A similar approach using clinical biomarkers is common in other fields of medicine, such as the use of genetic and molecular signatures to direct the diagnosis and treatment of cancers (e.g., Paez et al., 2004).

Built upon these assumptions, a number of short- and long-term aspirations of RDoC have been outlined by others (Cuthbert & Insel, 2013; Insel et al., 2010; Sanislow et al., 2010), summarized here in three goals:

(1) **Develop a research framework oriented to study psychopathology with a focus on underlying mechanisms.** The assumptions of RDoC described above dictate that manifestation of psychopathology is dependent on (dys)functional brain mechanisms, and that study of these mechanisms is necessary to gain better understanding of psychopathology. As is described later in this chapter, RDoC defines *constructs* representing a multitude of functional mechanisms within the brain and associated systems that mediate normal neurobehavioral functioning and, when dysfunctional, psychopathology. A primary goal of RDoC research, then, is to define these constructs, both theoretically and by means of measurable indicators of the constructs (termed “units of analysis” in the RDoC matrix), such as biomarkers, laboratory tasks, and self-report scales/interviews. Once constructs are defined (including ranges of normative functioning), their dysfunction can be mapped to associated problematic behaviors, symptoms, or syndromes. It should be emphasized that the goal here is not to search for mechanisms that *explain* DSM disorders, but rather to define mechanisms underlying dimensions of normal-abnormal functioning – a *bottom-up* approach that may or may not map to DSM disorders. This is in contrast to the *top-down* approach utilized in most DSM-oriented research, in which subjects with a DSM-defined disorder (or disorders) are studied in search of underlying neurobiological mechanism(s) of the disorder, an approach that has yielded limited findings. Considering that there are 227 possible combinations of major depressive disorder criteria that would allow one to meet the DSM-5 threshold for diagnosis (Zimmerman et al., 2015) (and even more if one splits the ‘or’ symptoms, such as worthlessness or guilt), it seems unlikely that a single neurobiological mechanism underlies the heterogeneity of syndromes labeled by DSM-5 as “major depression.” Thus, by starting with the study of mechanisms and working *upwards* toward symptoms and phenotypes, RDoC is poised to bring clarification to the current understanding of psychopathology.

(2) **Develop a research framework that dynamically integrates research findings from genetics, neuroscience, and behavioral sciences.** A major criticism of the current state of clinical diagnosis and treatment of mental disorders is the lack of progress in translating the findings from genetics and neuroscience to improve diagnosis and treatment. By defining neurobehavioral functional constructs using objective biomarker data, RDoC aims to integrate findings across multiple areas of research, such as genetics, neuroscience, and behavioral science, into a unified framework. RDoC is intended to be dynamic rather than fixed, so that it can be updated as new research findings emerge.

(3) **Develop a research framework that ultimately improves prevention and treatment outcomes.** This is the primary goal of mental health research. As is discussed in the final section of this chapter, the RDoC initiative's success will likely be judged based on its ability to deliver improvements in patient outcomes. An illustrative example of such work is a recent study by Wu et al. that showed that treatment response to the selective serotonin reuptake inhibitor (SSRI) sertraline in depressed adults could be predicted using patterns of resting-state electroencephalography (EEG) (Wu et al., 2020). While not yet validated for use in clinical care, these types of biomarker findings provide preliminary evidence that approaching mental disorders as brain disorders with measurable brain (dys)function can result in clinically relevant findings and suggest RDoC may be able to inform clinical assessment in a way that improves patient outcomes.

Structure of the RDoC Framework

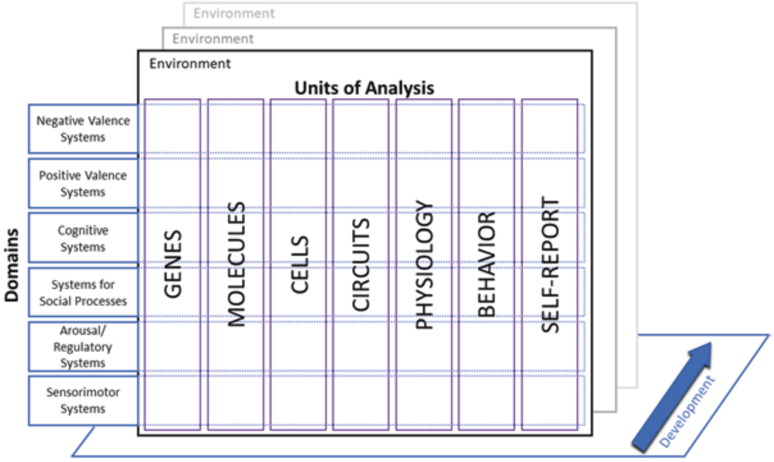
As noted above, the RDoC framework was not initially intended as a clinical diagnostic system per se but rather a research framework to integrate research findings and orient research studies. RDoC was developed through a transparent process coordinated by the NIMH that incorporated expert opinions from leading researchers in various domains (e.g., clinical neuroscientists, behavioral scientists, nonhuman animal researchers, etc.). This section presents the current structure and components of the RDoC framework.

Defining Construct and Dimension

It will aid further discussion of RDoC to first briefly define the terms *construct* and *dimension* as they apply to the study of brain function. A construct is a concept or label that represents an observable brain function or behavior (e.g., general intelligence or risk-taking) that can be measured with specific indicators (e.g., behavioral task, questionnaire, etc.). A construct is considered dimensional (rather than categorical) if it can be measured along a continuum of function (a dimension). While the DSM diagnostic system favors classifying subjects based on categories (i.e., DSM diagnoses), the RDoC framework favors classification based on dimensional constructs that span normal-to-abnormal, such as the RDoC construct *acute threat,* which is conceptualized along a dimension from hypo- to hyperreactivity (to a perceived threatening stimulus) rather than as a dichotomous normal/abnormal diagnostic category (e.g., DSM-defined anxiety disorders).

There are several characteristics to consider when exploring dimensional constructs. First, values along a dimension may be distributed normally or skewed, and the distribution may depend on the population being sampled. Second, the normative range of values should be defined, outside of which values are considered abnormal. Third, it is important to determine whether one or both tails of the distribution are potentially pathologic. For example, an individual's general intellectual ability can be measured and described along a dimension (e.g., intelligence quotient (IQ) of 65) and as a category (e.g., intellectually disabled). As a dimensional construct, IQ might be expected to be normally distributed among a general population of high school students but skewed among students taking advanced placement courses. While a broad "normal" range of IQ scores might be 70–130, only those individuals falling below 70 would be considered pathologic and potentially diagnosed categorically as "intellectually disabled". Meanwhile, individuals with IQ above 130 might be categorized as "exceptional" but not considered pathologic.

Fig. 6.1 The RDoC matrix is depicted with the domains as the rows of the matrix and the units of analysis as the columns. Neurodevelopment is depicted by the arrow proceeding into the page. Environments are shown as cross-sections of the matrix to depict the dynamic nature of the matrix in different environmental contexts



The RDoC Matrix

Dimensional constructs are central to the RDoC framework, which is operationalized as a matrix comprising domains of functioning (the rows) and units of analysis (the columns) at which the domains can be interrogated and instantiated (Fig. 6.1) (Sanislow et al., 2010). The domains are superordinate structures within the matrix that each contains constructs (and subconstructs) intended to represent unique neurobehavioral functions. The RDoC framework proposes that domains – and their (sub)constructs – can be studied across multiple units of analysis, which integrates understanding across research disciplines. The central unit of analysis is the neural circuit, based on the previously mentioned assumption of RDoC that neurobehavioral functioning (and psychopathology) can be attributed to the function (and dysfunction) of neurobehavioral systems comprising neural circuits. Additional units of analysis in the framework include the lower-order components that contribute to neural circuit function (genes, molecules, and cells) and the higher-order components that reflect the products of neural circuit function (physiology, behaviors, and self-reports). Not depicted in the matrix are paradigms, which are standardized laboratory tasks that can assess multiple units of analysis of a given RDoC construct simultaneously (Barch et al., 2016).

The organization of the RDoC matrix encourages researchers to develop sets of prototypical measures for each construct at different units of analysis, while also considering that the constructs occur (and vary) along developmental trajectories and interact with environmental contexts. Collectively, RDoC aims to understand neural circuits and function through the integration of psychiatrically relevant biomarkers and clinical data into a systematic, but flexible, framework that also incorporates the moderating roles of development and the environment.

RDoC Domains and Constructs

The six domains of functioning of the current RDoC matrix include Negative Valence Systems, Positive Valence Systems, Cognitive Systems, Systems for Social Processes, Arousal/Regulatory Systems, and Sensorimotor Systems. Below, these domains are briefly defined. Example constructs are included to illustrate how RDoC constructs may function within the clinical context of well-known DSM disorders.

1. **Negative Valence Systems** underlie neurobehavioral responses to aversive stimuli. Within this domain, one construct is *potential threat* which refers to the neurobehavioral system activated by a perceived threatening stimulus that is not an imminent threat, but rather distant and/or not likely to occur. The repetitive worry observed in DSM-defined generalized anxiety disorder may relate to abnormalities in the potential threat construct (Gillett et al., 2018; Sylvers et al., 2011).
2. **Positive Valence Systems** are responsible for neurobehavioral responses to positive, motivating stimuli, such as reward-seeking behaviors and reward learning. The construct of *reward responsiveness* is responsible for the hedonic responses to impending or received reward. Abnormalities in reward responsiveness are likely to inform the sorts of behaviors that define substance use disorders (Powell et al., 2002) and depressive disorders (Baskin-Sommers & Foti, 2015; Nusslock & Alloy, 2017; Olino, 2016) in the DSM.
3. **Cognitive Systems** include a variety of neurocognitive processes, such as *perception* (e.g., auditory perception) and *language* (i.e., symbolic representations that support thought and communication). The positive (e.g., auditory hallucinations) and negative (e.g., alogia) symptoms of DSM-defined schizophrenia may be understood as abnormal functioning of these constructs (Kelly et al., 2019) .
4. **Systems for Social Processes** underlie neurobehavioral responses to varied interpersonal situations, including but not limited to the constructs of *affiliation and attachment* (i.e., engagement in social interaction and social bonding) and *perception and understanding of self* (i.e., awareness and understanding of one's emotional states, traits, and abilities). Abnormal functioning of these RDoC constructs may provide mechanistic understanding of the maladaptive attachment and unstable sense of self observed in DSM-defined borderline personality disorder (Beeney et al., 2016; Roepke et al., 2012).
5. **Arousal/Regulatory Systems** govern context-appropriate activation of neurobehavioral systems (e.g., arousal to threat) and homeostatic regulation (e.g., energy balance and sleep). The hyperarousal often observed in DSM-defined posttraumatic stress disorder may be understood through abnormal functioning of the construct of *arousal* (Schmidt & Vermetten, 2018), whereas the *arousal*, *circadian rhythms*, and *sleep-wakefulness* constructs each likely inform the psychopathology of DSM-defined bipolar disorder (Cardinale et al., 2018).
6. **Sensorimotor Systems** are responsible for development, learning, and regulation of motor behaviors. Several subconstructs within *motor actions* – i.e., *action planning and selection, initiation, execution* – may help explain the motor abnormalities observed in psychotic or manic states (Walther et al., 2019).

RDoC Approach to Conduct Disorder – An Illustrative Example

The utility of RDoC in understanding mechanisms of neurobehavioral function can be illustrated with a clinical example. Conduct Disorder (CD) is a pediatric disorder conceptualized in the DSM-5 as a "repetitive and persistent pattern of behavior in which the basic rights of others or age-appropriate societal norms or rules are violated" (*Diagnostic and statistical manual of mental disorders*, 2013). The diagnosis is met if a youth displays at least 3 of 15 possible behaviors in the past 12 months, with at least one occurring in the last 6 months. The conceptualization of CD as a categorical construct has been challenged (Lewis et al., 1984). Heterogeneity is a primary issue – not only in terms of the types of behaviors exhibited, but also the severity and age of onset of these behaviors (Brislin et al., 2021; Fanti, 2018; Frick & Nigg, 2012; Klahr & Burt, 2014). Other areas of potential nosological concern include extensive comorbidity with other disorders (Connor et al., 2007), continuity with antisocial personality disorder in adults (Holmes et al., 2001; North & Yutzy, 2018; Zoccolillo et al., 1992), and failing to identify subthreshold pathology due to criterion-based cut-off (Angold et al., 1999; Copeland et al., 2009; Fairchild et al., 2019; Fanti, 2018; Lewinsohn et al., 2004; Raine, 2018). Furthermore, the descriptive approach to CD – i.e., deriving diagnosis (and therefore informing treatment) from observed behaviors – does not specifically characterize the neurobehavioral dysfunction that may mediate these behaviors. In contrast, a dimensional approach rooted in the RDoC framework incorporates domains and (sub)constructs across units of analysis that help to understand the dysfunctional neurobehavioral mechanisms that may mediate symptoms of CD.

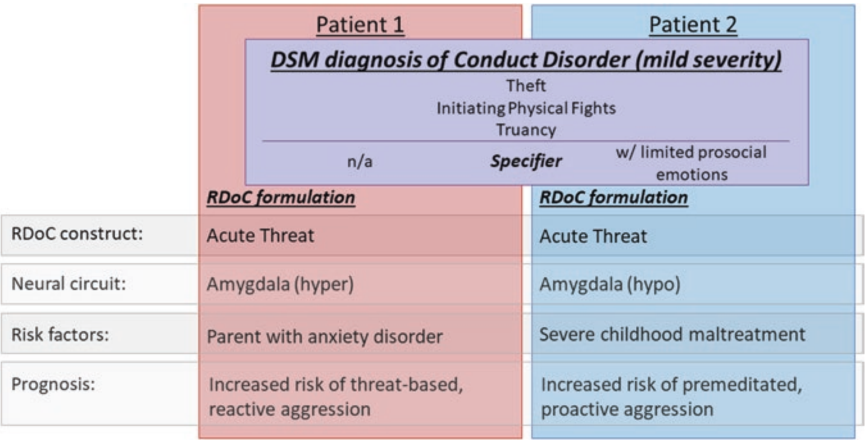
RDoC Approach to Two Conduct Disorder Vignettes

Consider the following two clinical vignettes created to illustrate the advantages of conceptualizing CD in terms of RDoC constructs.

Patient 1 is a 16-year-old male with a history notable for anxiety disorders among first-degree relatives. He is seen for court-mandated evaluation after being arrested for shoplifting. He claims his friends pressured him to steal headphones. Beginning around seventh grade, he often failed to attend school. He explains that his friends skip school so he followed suit. He has also gotten into physical fights with peers, claiming he was provoked. Truancy and fighting have led to several suspensions from school.

Patient 2 is a 16-year-old male with a history notable for severe childhood neglect. He is seen for court-mandated evaluation after being arrested for shoplifting. He states he stole headphones because he lost his other pair. Beginning around seventh grade, he often failed to attend school. He explains that he does not view school attendance as important. He tends to initiate physical fights with peers, offering no justification. Truancy and fighting have led to several suspensions from school.

Features of these vignettes above are depicted in Fig. 6.2. Within the diagnostic framework of the DSM-5, these two cases are nearly identical, containing the same observable behaviors and fulfilling the same criteria for a diagnosis of CD (i.e., theft, initiating physical fights, truancy). However, the differences between underlying mechanisms of these two cases can be more completely understood when examined through an RDoC lens.



DSM diagnosis of Conduct Disorder (mild severity)
Theft
Initiating Physical Fights
Truancy

n/a	***Specifier***	w/ limited prosocial emotions

	Patient 1	Patient 2
	RDoC formulation	***RDoC formulation***
RDoC construct:	Acute Threat	Acute Threat
Neural circuit:	Amygdala (hyper)	Amygdala (hypo)
Risk factors:	Parent with anxiety disorder	Severe childhood maltreatment
Prognosis:	Increased risk of threat-based, reactive aggression	Increased risk of premeditated, proactive aggression

Fig. 6.2 Comparison of RDoC case formulations and prognostic implications for two cases meeting DSM criteria for conduct disorder. Characteristics common to both cases that are sufficient to reach a diagnosis of conduct disorder are listed in the horizontal rectangle. Characteristics specific to the individual RDoC formulations for each case are listed in the vertical rectangles for patient 1 (left) and patient 2 (right)

Patient 1 demonstrates vulnerability to peer pressure (theft, truancy) and a tendency to fight back physically in response to provocation. In this case, these behaviors could be viewed as reactive to an imminent threat and thus as products of the "fight or flight" fear response mediated by the *acute threat* RDoC construct (Blair et al., 2014b; Fairchild et al., 2019). Meanwhile, Patient 2's problematic behaviors seem to arise in the absence of strong negative emotional valence, suggestive of an attenuated acute threat response and consistent with the "callous/unemotional traits" research phenotype that has been identified in a subset of CD patients (Blair et al., 2014a; Fairchild et al., 2019; Fonagy & Luyten, 2018). Indeed, the DSM-5 has incorporated these findings with the "limited prosocial emotions" specifier; however – like the CD diagnosis – this specifier is both descriptive and categorical and does not explicitly consider neurobehavioral mechanisms governing these observations (*Diagnostic and statistical manual of mental disorders*, 2013). Thus, while fulfilling the same three criteria for DSM-5 CD, Patients 1 and 2 may exhibit differential functioning of the acute threat construct.

Acute threat can be interrogated at the level of the neural circuit, wherein differences in amygdala activation during threat perception have been demonstrated among CD patients (Fonagy & Luyten, 2018). These differences suggest that similar problematic behaviors (e.g., aggression) might arise via distinct neurobehavioral mechanisms within the population of CD patients. Aggression that is reactive in nature has been associated with amygdala hyperactivation (i.e., elevated acute threat response, as in Patient 1), while proactive aggression has been associated with amygdala hypoactivation (i.e., blunted acute threat response, as in Patient 2) (Marsh et al., 2008; Viding et al., 2012; White et al., 2016).

An RDoC-based approach to case formulation also affords a more precise understanding of how certain factors may mediate risk for psychopathology. Patient 1 (but not Patient 2) has a family history of anxiety disorders, a category of disorders that are associated with elevated acute threat responses and highly comorbid with CD, in particular among those CD patients lacking callous-unemotional traits (Angold et al., 1999; Blair et al., 2014a; Briscione et al., 2014; Frick et al., 1999; Sumner et al., 2016). These findings suggest that elevated acute threat responses may underlie and hypothetically mediate the association between risk factor (family history of anxiety disorder) and phenotype (CD without callous/unemotional traits). In contrast, Patient 2 experienced early childhood maltreatment, a risk factor that predicts the development of callous/unemotional traits (Joyner & Beaver, 2021). This relationship between childhood maltreatment and callous/unemotional traits has been shown to be mediated by amygdala hypoactivity (i.e., attenuated acute threat response) in children with conduct problems (Lozier et al., 2014). Collectively, these findings suggest that differences in neurobiology, as assessed via RDoC, may underlie phenotypic differences in subsets of CD patients.

Finally, it is important to note how examining CD (or disruptive behaviors more broadly) through the RDoC lens may aid in clarifying prognosis and intervention - for example, by predicting the type of aggression an adolescent with CD is at highest risk to engage in. Research findings to date suggest that functional differences in neurocircuitry underlying acute threat responses among CD patients can predict aggression risk – elevated acute threat (and associated hyperactive amygdala) responses are predictive of threat-based reactive aggression, while attenuated acute threat (and associated hypoactive amygdala) responses are predictive of premeditated proactive aggression (da Cunha-Bang et al., 2019; Lozier et al., 2014; Urben et al., 2018). Distinguishing between these subsets of CD patients by aggression predisposition may have important implications for treatment (Kempes et al., 2005). As illustrated in the case vignettes above, the RDoC approach to case formulation encourages a more mechanistic understanding of patient symptoms, which can aid in determination of prognosis and treatment course beyond that provided by the DSM approach alone.

This section sought to introduce the structure of the RDoC framework, describe the domains of function and constituent constructs and subconstructs, provide clinical context for how constructs may function abnormally and result in psychopathology, and illustrate with case vignettes how consideration of RDoC construct functioning can augment case formulation. The next section aims to provide an overview of the critical role of neurodevelopment in the RDoC framework.

Research Domain Criteria – Development

The study of neurobehavioral development aims to understand how physiologic maturational and environmental experiences that occur throughout the lifespan promote the establishment of neural systems (comprising neural circuits) that then endow an individual with capabilities to detect, interpret, and respond to the complex physical and social environments of human existence. Research into neurobehavioral development promises to provide insight into typical as well as abnormal human development and how the latter may lead to psychopathology. The RDoC framework offers an approach to understand the complexities of neurodevelopment by defining individual developing systems (i.e., RDoC domains and constructs) and attempting to delineate the developmental trajectories of the domains and constructs as well as the factors that promote, delay, or disrupt their development. Better understanding of psychopathology in the context of neurobehavioral development can allow for more accurate assessment of risk and prognosis as well as effectiveness of treatment and prevention.

Developing Neural Circuits

Decades of research have shown that neurobehavioral development is not a linear, continuous, monolithic process, but rather a composite of the development of various neural systems, each with its own rate and trajectory. The structural and functional brain changes along the course of development have been measured. Decades ago, Thatcher et al. showed evidence that cortical development is asymmetric and nonlinear based on longitudinal electroencephalographic studies (Thatcher et al., 1987). More recently, Gogtay et al. used longitudinal MRI to track spatiotemporal structural cortical development in healthy young subjects and showed that areas of cortex that support basic sensorimotor functions (primary motor and sensory cortex, visual cortex, olfactory cortex) matured earlier, while cortical areas that support higher order functions like executive function (prefrontal cortex) matured later (Gogtay et al., 2004). Longitudinal studies have identified changes in resting-state connectivity patterns over the course of neurobehavioral development in children and adolescents (van Duijvenvoorde et al., 2019) and over the course of normal aging in cognitively stable older adults (Oschmann & Gawryluk, 2020). Interestingly, this work with children and adolescents showed that strengthening and weakening of neural connectivity patterns is influenced by factors such as pubertal stage. Thus, studies using structural and functional brain analyses support the idea that measurable brain development proceeds throughout the lifespan.

RDoC and Neurodevelopment

The RDoC framework organizes the complex array of overlapping, simultaneously developing neurobehavioral systems using the RDoC constructs to represent individual developing functions. Notably, RDoC constructs are considered to be dynamic during development; therefore, studies that incorporate RDoC constructs must take care to define the neurodevelopmental timeframe and context of interest, and not just examine the simple effect of 'age' (Bufferd et al., 2016).

To illustrate how the RDoC approach may inform our understanding of the influence of neurobehavioral development on psychopathology, consider the DSM-defined anxiety disorders, which vary in age of peak onset (e.g., separation anxiety in childhood, social anxiety in adolescence, and generalized anxiety in early adulthood) (Lijster et al., 2017). The DSM-informed approach would be to view these as separate, distinct disorders. However, RDoC suggests that these separate categorical diagnoses may actually represent different phenotypical presentations of a single or small number of RDoC constructs (e.g., the *potential threat* construct) that vary based on the neurodevelopmental timeframe. For example, a young child with elevated potential threat sensitivity may be more likely to manifest anxiety in separation from a parent, while an adolescent with the same abnormality may be more likely to develop anxiety regarding social evaluation by a peer (Ahlen & Ghaderi, 2019; Weems, 2008).

Casey et al. (2014) highlight three areas of focus of neurobehavioral developmental research that harness the strengths of the RDoC approach and can improve understanding of developmental mechanisms and potentially improve clinical diagnosis and treatment: (1) developmental trajectories; (2) sensitive periods; and (3) interacting systems.

Developmental Trajectories

Developmental trajectories are the progressions of change in individual neurobehavioral systems across developmental time (i.e., age). Research has shown that neurobehavioral systems (and neural circuit or neuroanatomic correlates) develop with different trajectories. For example, in adolescents, limbic circuits that generate emotional responses to aversive stimuli mature earlier than prefrontal circuits that regulate such responses (Casey et al., 2008). These differences in developmental trajectories between the two systems are considered normal yet also provide tangible explanation for the changes (and challenges) in emotion regulation during the adolescent developmental timeframe. Developmental trajectories can be measured using RDoC units of analysis, such as progression of functional connectivity or performance on standardized laboratory paradigms. Importantly, assessing RDoC constructs across developmental time may require different developmentally appropriate measures – for example, probing the reward learning construct in infants may utilize an eye-tracking paradigm with maternal-cued rewards (Tummeltshammer et al., 2019), whereas probing the same construct in adolescents may utilize a gambling paradigm with monetary rewards (Kwak & Huettel, 2016). Other constructs (e.g., sleep-wakefulness) can be measured throughout the lifespan with the same measures (e.g., 24 h EEG).

A critical impediment to research on trajectories of RDoC constructs is a lack of understanding of the constructs' "normative" trajectory. Studies that define the normative developmental trajectories for each RDoC construct are paramount for comparison to developmental trajectories in subjects afflicted with mental disorders. For example, Shaw et al. longitudinally assessed structural cortical development in subjects with attention-deficit hyperactivity disorder (ADHD) and compared to neurotypical subjects. The investigators found that the developmental trajectories in both groups, as assessed by structural MRI, were similar in pattern but delayed in the ADHD group (Shaw et al., 2007). Further, this delay was most prominent in prefrontal cortical regions that mediate the functions of *cognitive control* (an RDoC construct), disruption of which would be expected to lead to the symptoms of ADHD. A follow-up study showed that trajectories of delayed cortical maturation corresponded with dimensional measures of ADHD behaviors in neurotypical children, providing support for the idea that the categorical diagnosis of ADHD likely identifies individuals at the extreme end of a dimension of normal to delayed prefrontal cortical developmental trajectory (Shaw et al., 2011). However, this conclusion is based on the assumption that the neurotypical children in the study in fact represent ‘normative’ neurodevelopment (defined, in this study, by the absence of psychiatric or neurological diagnoses in the subjects’ histories). It remains possible that the neurotypical sample differed from the general population in other, unmeasured ways. To truly assert that a sample is representative of the general population on objective neurobehavioral measures, the field would benefit from established norms as a basis for comparison, similar to the norms used routinely by pediatricians (e.g., growth charts, hormone levels). Research groups are working towards this goal of establishing normative data sets for neurobehavioral measures (e.g., Imburgio et al., 2020), though concern remains for the current validity of such norms for research aimed at detecting individual-level differences or for clinical application (e.g., Clayson et al., 2021).

Sensitive Periods in Development

Sensitive periods are windows of time during development when the developing neurobehavioral system (or construct) is most malleable to change – in other words, a sensitive period of increased risk for abnormal development but also potentially for therapeutic intervention. By delineating these sensitive periods, researchers can better understand when specific systems are most vulnerable to the disrupting influence of environmental risk factors, potentially providing etiologically relevant information about risk for psychopathology. Such findings can also inform the development of treatment strategies that target abnormal constructs at critical times of highest likelihood for normalization of function. In addition to delineating the boundaries of sensitive periods, research will need to identify which neurobehavioral or environment factors define these periods, as well as which factors can potentially extend or reopen them, allowing for better mechanistic understanding of psychopathology risk and resilience.

As mentioned earlier in this section, in the course of normal adolescent neurodevelopment, there are differences in developmental trajectory between limbic and prefrontal structures. These differences seem to create a “window of risk” or sensitive period in which the system for generating negative emotional responses (limbic) develops before the system for regulating such responses (prefrontal cortex). This developmental window may explain the increased risk for onset of emotional disorders in this developmental stage (Powers & Casey, 2015), a window that seems to tighten (at least to some extent) by adulthood when prefrontal cortical maturation “catches up”. Notably, additional factors beyond developmental trajectories can influence windows of risk, such as environmental stressors in the burgeoning social world of the developing adolescent (e.g., increasing complexity of peer relationships).

Dynamic Interactions in Development

Dynamic interactions refer to the continuous influence that developing systems have on one another throughout development. These systems do not mature in isolation or in complete unison, but rather interact dynamically during development. As discussed previously, studies on cortical development have shown that lower-order systems, like those responsible for sensory functions, develop earlier than those responsible for higher-order functions like complex social interactions. Thus, an early developmental deficit in one system could lead to a cascade of developmental abnormalities in other developing systems. This idea underscores the need for future studies of development to examine multiple systems simultaneously and across developmental time in order to understand how the dynamic interaction of systems influences one another’s development. To illustrate this point, consider the construct of *cognitive control*, the system that modulates operation of other cognitive and emotional systems, in the service of goal-directed behavior (often referred to as "executive functioning"). The construct of cognitive control is thought to be supported primarily by three subconstructs: response inhibition (deliberately suppressing cognitive or behavioral responses to stimulus); working memory (holding and manipulating information in the mind); and cognitive flexibility (considering a single stimulus in multiple perspectives and responding adaptively) (Zelazo, 2020). Davidson et al. investigated whether these subconstructs of cognitive control function independently during development in children and adolescents (Davidson et al., 2006). Overall, their results do not show independence, but rather correlation of the function of these subconstructs, providing support to (but not proof of) the notion that the subconstructs of cognitive control may influence one another during development. Importantly, the extent to which RDoC constructs interact dynamically during development remains largely undefined and requires further study.

RDoC Approach to Developmental Research

To further illustrate the RDoC approach to understanding development and psychopathology, consider the example of motor development and its association with premorbid phases of psychosis (Mittal & Wakschlag, 2017). Developmental abnormalities in the Sensorimotor Systems domain have been found across the clinical stages of psychosis (premorbid, prodromal, acute, chronic) (Cannon et al., 2002; Fish, 1987; Marcus et al., 1985). Early motor abnormalities can provide valuable information about premorbid vulnerability for later psychosis emergence (Walker, 1994). Currently, the predictive value of these motor abnormalities is neither specific nor sensitive, as children who go on to develop psychosis do not always manifest observable motor abnormalities, nor do all children who manifest such abnormalities go on to develop psychosis. Thus, there is valuable, but limited, clinical and predictive utility in currently observable motor abnormalities during development. The predictive value of such motor abnormalities can be enhanced by understanding the neural circuit functioning that underlies motor behavior abnormalities. For example, while analyses of videotapes of early childhood behaviors have shown that those who go on to develop psychosis exhibit more observable motor abnormalities than those who do not (Walker et al., 1994), it is unclear *which* specific children will develop psychosis. By incorporating neuroimaging or other biomarker techniques, it may become possible to differentiate those children who will and who will not go on to develop psychosis. An RDoC-oriented approach to study motor developmental abnormalities could simultaneously and longitudinally assess abnormal motor behaviors (e.g., dyskinesias), psychotic symptoms, and underlying neural circuit abnormalities (for example, in cortical-striatal-pallido-thalamic circuits). While, at present, no pathognomonic neurodevelopmental motor trajectory has been defined that reliably predicts emergence of psychosis, prospective RDoC developmentally oriented studies that define the spectrum of the motor development dimension (and underlying neural mechanisms) are poised to uncover the early developmental events that lead to abnormal motor development in those who go on to develop psychosis, potentially providing clinically valuable prognostic and preventative treatment-directing information. It should be noted that early motor abnormalities are not specific to psychosis, as recent studies have also implicated the role of motor abnormalities in the clinical course of depression in youth (Damme et al., 2022).

To improve reliability of developmental biomarkers like motor behavior abnormalities, groups are working to validate instrumental approaches to measure and track motor abnormalities that are likely more sensitive than traditional observer-based clinical scales. Various assessment methods, from EEG, to grip strength, to handwriting assessments, can be employed at developmentally appropriate stages to interrogate the same underlying neural circuit (Dean et al., 2020; Dean & Mittal, 2015; Perrottelli et al., 2021). These approaches can also be employed simultaneously with functional neuroimaging to assess a given construct at multiple units of analysis. An important consideration in standardizing such instrumental approaches to assess development is that such approaches must be both developmentally appropriate (i.e., one cannot assess handwriting or gait in infants) and also tap into the desired underlying construct (i.e., motor behavior). Mittal and Wakschlag provide an example illustrating how the use of different, developmentally appropriate assessments can track functioning of an underlying neural circuit across developmental time (Mittal & Wakschlag, 2017). In this example, assessment of EEG in infants, hand postures in toddlers, force variability (a measure of muscle contraction patterns, for example in finger tapping) in older children, and task-oriented functional neuroimaging (e.g., during a hand grip task) in adolescents are all instrumental methods to objectively assess functioning of the motor system at various points in development, which collectively can provide insight into trajectories of motor development and associations with psychopathology (Dean & Mittal, 2015; Mittal & Wakschlag, 2017).

In sum, this section sought to introduce the complex process of neurodevelopment and illustrate how the RDoC framework can be used to organize findings and research efforts on neurodevelopment into a unified model. The strength of RDoC here is the ability to separate complex interconnected neural systems (e.g., motor systems, emotional systems) into component parts (i.e., RDoC constructs) that can be assessed at multiple points in development. With this information, the field is poised to define the trajectories, sensitive periods, and interactions of developing RDoC constructs, understand risk and etiology of abnormal development and its association with psychopathology, and potentially direct diagnostic, treatment, and prevention strategies.

Research Domain Criteria – Environment

Converging evidence from decades of research suggests that psychopathology arises from the effects of both internal (e.g., genetic) and external (e.g., environmental) factors (e.g., Kendler & Prescott, 2006). In general, the concept of *environmental factors* is meant to encompass all sources of influence outside the person (e.g., other people, physical environment, social environment). Bronfenbrenner's classic ecological systems theory provides a common model to organize and understand sources of environmental influence during child development (Bronfenbrenner, 1979a, b). This model posits that a child develops within a complex environmental topology that can be defined at multiple levels (or "systems") that differ by their proximity of influence on the child and are nested within one another, commonly depicted as concentric circles with the child at the center. These systems incorporate various external influences on the developing child, including close relationships (e.g., family, peers), neighborhood, and sociocultural expectations. Importantly, this model also accounts for interactions between environmental factors that may indirectly influence the child (e.g., parental unemployment in a troubled economy). The important influence of environment on psychopathology is evident in, for example, the consistent finding that early adverse life events are predictive of psychopathology onset and persistence (Green et al., 2010; McLaughlin et al., 2010a). These early adversities include parental loss, divorce, parental psychopathology, abuse, neglect, serious childhood physical illness, or extreme poverty. Although these relationships between environment and psychopathology have been repeatedly and consistently demonstrated, the mechanistic underpinnings of these relationships remain incompletely understood (March-Llanes et al., 2017).

Environmental Factors in the RDoC Framework

The RDoC framework conceptualizes environment as a separate dimension from the domains and constructs, much like development (Fig. 6.1). This is notable given the bidirectional relationship between neurobehavioral functioning and environment; environment can influence neurobehavioral functioning (e.g., elevated scanning for threats in an unfamiliar environment) and neurobehavioral functioning can influence environment (e.g., seeking a familiar environment when sensitive to threat).

Correlations between RDoC construct functioning and environment can be considered to fall into three categories, similar to how genotype-environment correlations have been categorized: reactive, selective, and passive (Jaffee & Price, 2008). A reactive construct-environment interaction occurs when construct functioning evokes a particular reaction from the environment. For example, a child with limited *cognitive control* may be more prone to impulsive behavior in the classroom, which can evoke negative responses from teachers who have a reciprocal effect on the child (and the child's development). A selective construct-environment interaction occurs when construct functioning influences environment selection. A child with elevated *potential threat* (i.e., sensitivity to uncertain or distant threat) may be less likely to seek out new peer connections, whereas a child with elevated *reward responsiveness* (i.e., hedonic reward response) may be drawn to novel social interactions and thus develop a more robust (and perhaps riskier) social network. These selected behaviors could in turn exert influence on further development of their threat appraisal and reward-seeking systems. A passive construct-environment correlation occurs when both the construct functioning and the environment are the result of a third factor, like genetic influence. For example, consider a child with elevated *reward-delay* (i.e., favoring long-term over short-term rewards) who exhibits high academic achievement and is raised by similarly high-achieving parents in a home environment that promotes delayed gratification. At first, it may appear that the rearing environment promotes elevated reward-delay (and, thus, academic achievement), while in actuality both elevated reward-delay and rearing environment might be genetically determined by genes shared by parents and child. Thus, all construct-environment correlations are not directly causal, and research studies – like those promoted by the RDoC approach – are needed to disentangle whether environmental factors act as moderators (i.e., determinants of construct function and development) that can serve as potential treatment targets, or whether such environmental factors passively correlate with construct function.

Environmental Influence on Psychopathology

RDoC-oriented research studies have attempted to illuminate the mechanisms by which early environmental adversities contribute to lifetime psychopathology by their impact on RDoC constructs (McLaughlin et al., 2020). For example, children exposed to physical or sexual trauma are prone to develop a bias in sensitivity and attention to recognizing facial and other expressions of anger or fear (but not other emotions like happiness or sadness) (Pollak & Sinha, 2002; Shackman et al., 2007). These findings, which can persist beyond childhood, likely correlate with aberrations in RDoC constructs like *social communication* and *potential threat* and have been associated with a broad array of psychopathologies, including anxiety, depression, PTSD, and psychosis (Briggs-Gowan et al., 2015, 2016; Gibb et al., 2009; Masten et al., 2008; Platt et al., 2017; Underwood et al., 2016). Beyond disruptions in attention and processing of potentially threatening stimuli, children exposed to trauma are also at risk of developing emotional problems, such as difficulty recognizing and regulating their own emotions – deficits that map onto RDoC constructs like *perception and understanding of self* (e.g., (Maughan & Cicchetti, 2002)). Similar to deficits in attentional bias and facial interpretation, such difficulties in emotional recognition and regulation have been associated with psychopathologies across the internalizing and externalizing spectra (Heleniak et al., 2016; McLaughlin et al., 2010b; Weissman et al., 2019). While the works cited here illustrate how exposure to trauma in childhood – in particular – may impact neurobehavioral functioning and predict risk for psychopathology later in life, it is worth noting that other aversive environmental exposures (e.g., neglect) may predict risk for psychopathology via differing or overlapping neurobehavioral mechanisms (Milojevich et al., 2019).

The findings presented here converge to suggest that environmental factors (e.g., trauma) can disrupt neurobehavioral development (including RDoC construct function) and increase risk for a broad array of psychopathologies. By dissecting the mechanisms by which environmental factors affect RDoC construct function, RDoC-oriented research is poised to identify those factors that serve as moderators of psychopathology risk and therefore may serve as targets for prevention and treatment of mental disorders.

Research Domain Criteria – Current Status and Future Directions

The evolution of the RDoC framework is ongoing and depends on emerging research findings to reinforce or reshape its structure. The success of the RDoC initiative will ultimately depend on whether this framework satisfactorily integrates research findings from related sciences (e.g., genetics, neuroscience, behavioral science) and promotes better clinical outcomes via prediction of clinical prognosis and/or development of treatment and prevention strategies (Carpenter, 2016; Sullivan, 2016).

RDoC in Clinical Research – Subject Selection

RDoC is promoting change in the design of clinical research studies. Traditional clinical research commonly measures between-group differences using DSM categorical diagnoses as inclusion criteria (i.e., comparing treatment vs. placebo response in major depressive disorder subjects) or utilizes DSM diagnoses as outcome variables (i.e., a prevention trial examining whether subjects develop a major depressive disorder or not). However, the known heterogeneity of research subjects classified by DSM disorders (e.g., lumping subjects with either hypersomnia or insomnia into major depressive disorder) may be obscuring important findings that could be better appreciated by stratifying subjects by construct-oriented symptom dimensions or biomarkers (Hyman, 2011). In other words, rather than dividing research subjects into those who do and do not meet a criterion-based threshold for a DSM diagnosis, researchers can harness the dimensional power of RDoC by recruiting research subjects who vary along symptom dimensions (e.g., mood disorder symptoms) or along the dimension of an RDoC construct. Subjects can be chosen agnostic to any DSM diagnosis, allowing researchers to incorporate subjects with a range of DSM disorders, better accounting for the well-known diagnostic comorbidity and symptomatic heterogeneity and overlap in the DSM system (e.g., (Grant et al., 2004; Unick et al., 2009)). For example, a study may specifically include subjects who report experiencing anhedonia (a manifestation of blunted *reward responsiveness* construct sensitivity that is found transdiagnostically among multiple DSM disorders). Taken further, researchers can forego using symptom report or DSM diagnosis altogether as inclusion criteria, and instead rely on transdiagnostic biomarkers to define subject groups, like performance on a laboratory paradigm to assess reward responsiveness, or genetic variation associated with anhedonia risk (two approaches probing potential mechanisms of anhedonia). In sum, by classifying research subjects using dimensional constructs or biomarkers instead of categorical diagnoses, RDoC-oriented research studies may be better positioned to produce findings directly relevant to the neurobehavioral mechanisms underlying psychopathology.

RDoC in Clinical Research – Variable Selection

Because the RDoC approach is oriented to the study of function of neurobehavioral constructs, clinical research designs can incorporate biomarkers from the units of analysis as outcome variables. This approach allows a divergence from traditional "distal" trial endpoints like diagnostic status or symptom burden (which, as described above, are heterogeneous and not unique to specific DSM diagnoses) and toward more "proximal" trial endpoints like engagement of the biological or behavioral target of interest by the intervention. This approach, termed "fast-fail" at NIMH (Grabb et al., 2020), can allow for both faster trial results (by targeting more proximal endpoints) and a more complete understanding of the mechanism of action of the intervention under investigation. A recent trial is illustrative of this type of study. Krystal et al. published a proof-of-mechanism phase two trial investigating a novel kappa opioid receptor antagonist to target the symptom dimension of anhedonia (Krystal et al., 2020). Instead of focusing on change in anhedonia symptoms as the primary endpoint, the investigators used a validated biomarker of the reward responsiveness construct (reward-related striatal activity as measured by functional MRI) as the primary endpoint. By taking this approach, the investigators were able to show that the novel agent successfully "hit" the therapeutic target (i.e., increased activity in a neural circuit within the reward system). Secondary outcomes, which included self-reported symptoms of anhedonia and behavioral measures on a validated laboratory paradigm of reward-related behavior (the Probabilistic Reward Task), provided some evidence that the neural circuit-level primary outcome (striatal activation) may have relevant clinical effects that are measurable at other units of analysis (self-report and paradigm). Importantly, the investigators note that larger, high-powered trials will be required to investigate whether the observed primary outcome has clinically significant effects on subjects' symptoms or other clinically relevant outcomes. In sum, using RDoC dimensional constructs and units of analysis as independent and dependent variables in clinical research promotes research findings that are more mechanistically informative and transdiagnostically applicable. As research progresses, one can anticipate the clinical utility of such biomarkers (as defined by the units of analysis) to serve as clinical prognosticators and treatment targets.

RDoC in Clinical Research – Incremental Findings over DSM

RDoC-oriented research is already beginning to disentangle neurobehavioral mechanisms and provide clinically relevant data beyond that provided by DSM diagnosis. For example, Whitton and colleagues classified mood disorder subjects by their performance on a laboratory-based reward learning task (highly relevant to mood disorders) and assessed multiple reward-related brain functions via neural biomarkers (Whitton et al., 2021). The authors found that reward learning ability, the independent variable, predicted certain aspects of reward-related brain function better than DSM diagnosis. The authors further found that those same aspects of reward-related brain function could then predict severity of longitudinal mania-spectrum symptoms better than DSM diagnosis alone. Importantly, however, the prognostic relevance of those reward-related brain function biomarkers in this study was restricted to subjects meeting diagnostic criteria for bipolar disorder (but not major depressive disorder), suggesting a potential synergy between psychiatrically relevant biomarkers and categorical diagnoses. Evidence continues to emerge that assessment of RDoC constructs can provide clinically relevant prognostic information beyond what is predicted by DSM diagnoses (e.g., (Stevens et al., 2019; Whitton et al., 2021)).

RDoC in Clinical Assessment

The utility of RDoC may one day extend beyond clinically oriented research and into the realm of clinical assessment. In this vein, Yager et al. reviewed the clinical relevance of the first five RDoC functional domains and curated a set of detailed questions comprising an "RDoC review of systems", which a clinician could use to gain insight into a patient's neurobehavioral functioning (Yager &

Feinstein, 2017). One hope for the future of RDoC is the development of RDoC functional profiling – a standardized battery of assays that can be applied transdiagnostically to generate results that inform investigators (or clinicians) of the objective functional status of a broad swath of RDoC constructs/domains, i.e., an individualized "profile" of overall RDoC construct functioning. Several interesting early applications of such profiling have been undertaken, including development of mobile applications that could be used to screen young children for autism (Dubey et al., 2021) and cognitive developmental abnormalities (Bhavnani et al., 2019). Similarly, investigators at NIMH are developing a battery of RDoC-informed smartphone tasks to be deployed to research subjects as part of the *All of Us* research program at NIH (Gordon, 2020).

In addition to augmenting diagnostic assessment, RDoC-based approaches could also inform predictions of treatment response. Hui (2020) conducted a systematic review of antidepressant trials that incorporated psychometric instruments that probe RDoC constructs in the negative valence systems domain (e.g., acute threat, potential threat, loss). The findings provided preliminary evidence that existing, commonly utilized medication treatments may affect function of specific RDoC constructs. Thus, RDoC-informed clinical assessments, while still nascent, show the potential to provide investigators and clinicians with important information that could augment current diagnostic practices, predict treatment response, and provide a more complete and mechanistic understanding of an individual's neurobehavioral strengths and vulnerabilities.

RDoC in Developing Treatments

The RDoC approach is also being utilized in the development of treatment strategies that specifically target RDoC constructs and related symptom dimensions. For example, Positive Affect Treatment is an investigational psychotherapy developed to target the symptom dimension of anhedonia in depression (Craske et al., 2019). A treatment program for adolescent depression (named TARA – Training for Awareness, Resilience, and Action) has been developed that aligns with RDoC by targeting the sustained threat and arousal constructs, which are thought to play a central role in adolescent depression (Henje Blom et al., 2014). Similarly, a treatment program for late-life depression called Engage has been developed that focuses on reward-related RDoC constructs as the primary source of dysfunction in this population, while also taking into account relevant constructs in other domains (Alexopoulos & Arean, 2014). These examples illustrate how targeting relevant RDoC constructs represents a productive avenue for development of novel psychotherapeutic treatments. In some cases, the dimensional approach of RDoC has been leveraged to develop broadly applicable (transdiagnostic) treatment strategies. The Unified Protocol for the Transdiagnostic Treatment of Emotional Disorders is a cognitive behavior therapy-based psychotherapy protocol developed to target higher-order temperamental dimensions like negative affect that affect patients with a range of emotional disorders (e.g., depressive and anxiety disorders) (Ellard et al., 2010). Similarly, a research project called MATCH has developed a school-based mental health care treatment protocol that employs a dimensional – as opposed to diagnosis-based – approach to treating common mental health problems in school-aged children that requires less training for providers than traditional interventions (Evans et al., 2021; Harmon et al., 2021). Finally, in addition to psychosocial treatments, pharmacologic treatments are also under development that target transdiagnostic functional constructs or symptom dimensions rather than DSM diagnoses, such as the previously mentioned kappa opioid receptor antagonist for treatment of anhedonia (Krystal et al., 2020).

RDoC in Education and Training

The RDoC framework also has important implications for the education and training of mental health clinicians and researchers. Although current clinical training predominantly adheres to the taxonomy of mental disorders put forth in the DSM, the potential role of RDoC in teaching the mechanistic neuroscientific underpinnings of psychopathology is increasingly recognized (Benjamin, 2014; Cozza & Shankman, 2021; Etkin & Cuthbert, 2014). The dimensional orientation of RDoC would encourage learners to understand observable clinical phenomena (e.g., panic attacks) as manifestations of over- or underactivity of normative neurobehavioral systems (e.g., the fight or flight response of the *acute threat* RDoC construct), rather than just discretely abnormal phenomena (as panic attacks are considered by DSM). Such an approach would also introduce learners to innovative techniques to interrogate the functioning of RDoC constructs and measure objective, psychiatrically relevant biomarkers, which will likely become an increasingly valuable component of clinical data in the future. Certainly, the incorporation of the dimensional RDoC framework into trainee education would be a complex process requiring significant supervisor/faculty buy-in for the value of the approach, which may be a challenge given the majority of current faculty supervisors were not themselves trained in RDoC. Nevertheless, if such efforts were successful, developing clinicians and clinician-researchers may benefit and be better prepared to incorporate RDoC-based research findings into their understanding of psychopathology and their approach to clinical practice.

Evolution of RDoC

While the RDoC approach is already driving change in mental health research, it is important to consider that RDoC is a flexible framework to be continuously reassessed and updated based on emerging research findings (Sanislow et al., 2010). Future changes to the RDoC matrix may include the incorporation of new domains of function or constructs, new biomarkers at various units of analysis, a more nuanced understanding of developmental trajectories and their impact on construct functioning, and a more formalized consideration of the role of environmental context to construct functioning. In recent years, based on scientific evidence and expert consensus, the RDoC framework was expanded to include a sixth domain – sensorimotor systems (Harrison et al., 2019; Walther et al., 2019). As evidence continues to emerge, RDoC will evolve to become more comprehensive and aligned with cutting edge neuroscientific understanding and contemporary clinical need.

Much of this change will likely result from an increased emphasis on computational approaches to studying brain-behavior relationships (Cuthbert, 2020; Gordon, 2020; Sanislow et al., 2019). Data-driven efforts will continue to map associations between related biomarkers within a given construct, providing quantitative support to the theoretical notion that biomarkers probing the same neurobehavioral mechanism or construct should associate more closely than those probing disparate mechanisms or constructs. As these relationships are more precisely deconstructed, their functioning can be more accurately represented by mathematical modeling. In addition to computational approaches, the evolution of RDoC will also rely on the development and optimization of tools for measuring the functional domains of behavior/RDoC constructs, from functional neuroimaging to laboratory paradigms to RDoC-oriented psychometric scales (Gordon, 2020).

In summary, RDoC is a research framework developed at NIMH to direct mental health research toward a better mechanistic understanding of neurobehavioral functioning and psychopathology. The overarching goal of RDoC is to integrate findings from related areas of mental health research and inform future research to improve patient outcomes.

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7

Child and Youth Psychopathology: Ethics and Legal Considerations

Gerald Young and Maureen C. Kenny

Working with children and youth experiencing psychopathology is important and rewarding, but the ethical and legal challenges are complex and require careful professional consideration. The areas to consider in these regards cover the full range of work with children, from assessment and psychotherapy to research and consultation. Given children's status as minors, there are many legal considerations in working with them that are not present with adults.

The ethics code of the American Psychological Association (APA, American Psychological Association, 2017) describes the ethical principles and standards that govern ethical conduct in psychological practice, and we refer to it extensively. However, the code does not address special considerations ethically related to children. Therefore, we further consulted the ethics code of the American Academy of Child and Adolescent Psychiatry (AACAP, American Academy of Child and Adolescent Psychiatry, 2014) for an ethics code that applies directly to the topic at hand.

The five main principles of the APA ethics code involve: (a) beneficence and nonmaleficence; (b) fidelity and responsibility; (c) integrity; (d) justice; and (e) respect for people's rights and dignity. Clearly, all five principles apply to children, including in cases of child psychopathology. As we proceed, we indicate which principles and associated standards in the code apply to the ethical requirements of the particular topics chosen in dealing with children and youth with psychopathology. The APA ethics code principles are considered aspirational, referring to values that overarch its obligatory ethical standards. The code includes multiple standards, for example, related to informed consent and other areas related to Autonomy. There are multiple mentions related to law, for example, when the ethics code and the applicable law in one's jurisdiction are in conflict. We rely on the APA code from 2017, but the APA ethics code is currently in revision (American Psychological Association, 2020).

The value of the AACAP (2014) code of ethics is illustrated by its placement of "developmental perspective" as its first principle. Then, it refers to Beneficence and Nonmaleficence as its next two principles. Principle IV and V refer to Autonomy (i.e., respectively, assent and consent, confidentiality, which are embedded in the APA principle E) and the associated Fidelity, which is also in Principle VI on Third Party Influence. Principle VII refers to Scholarship and Research, Principle VIII to

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Table 7.1 Comparison of APA and AACAP Ethical Principles

American Psychological Association APA (2017)	American Academy of Child and Adolescent Psychiatry AACAP (2014)
A. Beneficence and non-maleficence	I. Developmental perspective
B. Fidelity and responsibility	II. Promoting the welfare of children and adolescents (beneficence)
C. Integrity	III. Minimizing harmful effects (non-maleficence)
D. Justice principle	IV. Assent and consent (autonomy)
E. Respect for people's rights and dignity	V. Confidentiality (autonomy/fidelity)
	VI. Third party influence (fidelity)
	VII. Research activities
	VIII. Advocacy and equity (justice)
	IX. Professional rewards
	X. Legal considerations

Justice, Principle IX to Professional Rewards (e.g., financial), and Principle X to Legal Considerations. There is much overlap in the AACAP code with the APA ethics code, but topics that are covered in the standards of the APA ethics code are placed as principles in the child psychiatric ones. That said, the AACAP code highlights research and law as separate areas of principled ethics, which are noteworthy additions (see Table 7.1 for a comparison of principles).

While both ethics codes under discussion are fairly comprehensive, there are some important areas that are missing. Young (2017, 2020) has advocated for a principle on science focus, for example, including assessments and evidence-based psychotherapy. The draft of the revised APA ethics code does refer to the principle of Scientific mindedness, which is a noteworthy addition. Young (2017, 2020) has also proposed a principle on Life Preservation that would include dealing with suicidal intent, duty to warn, and the prohibition of participating in or condoning torture. The latter topics are covered in the APA ethics code and standards, but explicit inclusion related to them, as well as science and law, would be helpful. In our review of ethical considerations in dealing with child and youth psychopathology, we add these three topics (life preservation, law, science). Moreover, because we are dealing with child and youth psychopathology, we add the topic of Assessment and Diagnosis. Finally, we include topics such as child maltreatment and divorce as they might be preludes to child psychopathology or complications in its presence and also include ethical and legal issues.

Therefore, this chapter on ethical and legal considerations in child and youth psychopathology includes the following topics: (a) Developmental Considerations; (b) Beneficence/Nonmaleficence; (c) Autonomy and Life Preservation (including child abuse); (d) Assessment and Diagnosis; (e) Research; (f) Divorce; and (g) Law and Science. We consider each of these topics in relation to child psychopathology. The principles in the APA code that we do not mention here are important but are less pertinent to ethical and legal considerations with respect to child psychopathology or would require much more space than we have (e.g., the ethics of cultural considerations), so we have elected to leave them out.

Mental health ethics can be considered from two points of view. First, ethics codes provide obligatory rules and guidelines that must be followed in dealing with patients, research subjects, colleagues, and so on. Second, ethics codes provide insight into how to address ethical conflicts, for example, if one's applicable jurisdictional ethics code conflicts with the law in the jurisdiction. When conflicts seem intractable, various ethical decision-making models exist to help navigate the conflicts (e.g., Pope et al., 2021; Young, 2017).

Our own approach to the question is that psychologists have a duty to their own moral codes as much as to the law and applicable ethics codes, which is illustrated by the torture imbroglio that bedevilled the APA for years (Pope, 2016) and remains not fully resolved. With respect to the question of ethics, law, and child psychopathology, ethical issues will arise that will challenge psychologists in their work, and only full knowledge of the law for the issue at hand can illuminate whether the psychologist has to take a moral stance beyond them. A major law that we deal with in this chapter concerns autonomy, in particular, per the Health Insurance Portability and Accountability Act (HIPAA, 1996). Practitioners should be familiar with all state laws applicable to children, such as family acts, school and educational acts, and juvenile offender acts. We refer to these as required as we proceed.[1]

Ethics

(a) Developmental Considerations

Children are dynamically changing with age, in a developmental process cognitively, behaviorally, socially, and emotionally. They manifest great individual differences in this regard (Young, 2021), from serious developmental abnormalities to being gifted and talented. Epidemiological research indicates that 17% of children will be diagnosed with an impairing central nervous system, brain, or neurodevelopmental abnormality (Zablotsky et al., 2019), with another 13–20% diagnosed with a mental disorder (O'Connell et al., 2009). The most common mental disorders diagnosed in children are Attention Deficit Hyperactivity Disorder (ADHD), behavioral problems, anxiety, and depression (Centers for Disease Control and Prevention, 2021).

Moreover, children are exposed to multiple risk factors for developmental disorders, such as early adversities, child maltreatment, and abuse. These risks impact the neurodevelopmental trajectory and alter the mediating factors in children's adaptive behavior, such as executive function, emotional regulation, inhibition, and self-control (Young, 2022a). Further, these changes alter children's perception or appraisal of their competencies (self-esteem) and variables in the environment that impact them (e.g., having a negative hostility bias, a fear bias in cases of abuse). From an ethical standpoint, the mental health professional needs to be aware of the vulnerabilities of children in these regards. Also, they need to be aware of the family dynamics, which family members provide support, and who potentially perpetrate abuse.

Ethically, we add that workers need to respect and not violate children's fundamental rights. These include those specified by the Nuremberg code (U.S. Government Printing Office, 1949). Specifically, in its 10 principles, the code indicates that the voluntary consent of the person as medical subject must be obtained. The research involved should avoid all possible unnecessary mental as well physical injury and suffering. This ethical proscription applies psychiatrically, as well. Also, we make reference in these regards to the Convention on the Rights of the Child (Convention on the Rights of the Child, United Nations, 1989). It specifies that children have inherent dignity and equal and inalienable rights without discrimination. They are entitled to special care, safeguards, considerations, assistance, and protection. Their best interests should be paramount. They have the right to multiple freedoms, including the freedom of expression (directly or through a representative) in any proceedings about them.

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[1] Note: as we proceed, we refer to children generally instead of to the cumbersome term of child and youth or adolescence. Currently, the term "developmental psychopathology" is referred to more than that of "child psychopathology," but, either way, we focus on the ethical and legal challenges and obligations in working with children who have psychological disorders that affect their development and outcome.

(b) Beneficence/Nonmaleficence

Beneficence/Maleficence is a primary principle in most ethics codes, including those for psychologists and psychiatrists. According to AACAP, Beneficence concerns optimizing children's welfare, functioning, and development. AACAP continued with describing the mental health worker's obligation to avoid harming children (the principle of Nonmaleficence).

In cases of children with psychopathology, we maintain that the ethic of beneficence (nonmaleficence) becomes even more salient, given children's increased vulnerability. The psychologist should assess the particular developmental issues and disorders involved and determine their impact on the child's welfare, functioning, and development. Work with these children requires increased care and sensitivity because of their vulnerabilities and dependencies. For example, the informed consent process must address the child's psychopathology and its possible impact on proposed assessments and treatments. Assessment and therapy procedures that might be scientifically supported for the normally developing child might not find an evidence base for the child with psychopathology.

(c) Autonomy and Life Preservation

Autonomy concerns having meaningful voice or choice that is not interfered with by others or from limitations that are not accommodated and should be the rule in obtaining informed consent (Greig et al., 2013). Related topics concern maintaining privacy and anonymity. This chapter delineates when breaking confidentiality is warranted, especially in cases of child abuse. Life Preservation concerns dealing with suicidal ideation/intent and the threat of harm to others in particular. These difficult situations require ethical reflection and consideration of intent and severity before confidentiality is breached. This section of the chapter deals with issues such as these with others related to them not considered due to space limitations.

To review, there are three primary reasons considered here for a mental health professional being required to breach confidentiality with minors. These include: (a) suspected harm to the child (abuse or neglect); (b) concern over serious self-harm (suicide; non-suicidal injury; McManus et al., 2021; North et al., 2021) by the minor; and (c) threat of harm to others by the minor (including homicide). These conditions are also typically mandated by law as exceptions to professionals related to children with confidentiality. Given that parents technically and legally hold the right to the child's confidentiality, there is also the need to balance the confidentiality of the child with the parents' desire for information about the child's emotional state and progress in treatment. We will review each of these considerations.

Informed Consent

Fried and Fisher (2019) described that informed consent should be based on having all the relevant information to make a rational decision, and the decision should be made freely or without coercion. This includes not losing normal privileges should participation in the research be refused. For example, participation in research should not be sought using excessive gifts or monies and extant services should not be withdrawn as a penalty should participation be refused. The decision needs to be made by a rational party, which leads to minors requiring parental consent. That said, youth should provide assent for participation in services, therapy, or research. [We discuss some exceptions to this rule below.] The opportunity to provide consent is consistent with giving voice to children and respecting their participation and developing autonomy. Child psychopathology might even undermine the capacity to give assent, which should be discussed with the parents.

For further review of informed consent in the research and pediatric context, consult Hirascau et al. (2014), Noiseux et al. (2019), Powell et al. (2012), and Yao et al. (2021). These articles include international perspectives.

Child Abuse Reporting

In ensuring beneficence, psychologists have a responsibility to do good for others and promote the well-being of others. One way in which this is demonstrated is by being proactive and preventing harm to clients where possible. Protection of a child, in the form of recognizing and reporting child abuse, is a significant ethical obligation for psychologists (e.g., APA, 2017). The notion behind mandatory reporting is that the professional should protect those vulnerable populations who cannot advocate for themselves (e.g., children). Reporting of suspected child abuse and neglect exemplifies this concept and is not only a professional responsibility but also a legal mandate in many jurisdictions. Many countries require reporting of suspected or confirmed cases of abuse including the US, Canada, and Australia (e.g., Mathews & Kenny, 2008).

Given that reporting abuse is required for psychologists and the result is a break of confidentiality, it should be included in discussions with the family as part of the informed consent procedure at the initiation of treatment. Explaining the limits of confidentiality to children must be done in a way that takes into consideration their developmental and cognitive level. The APA Ethical Standard 4.02 Discussing the Limits of Confidentiality recommends that this occur at the start of the relationship. Specifically, the standard states: "(b) Unless it is not feasible or is contraindicated, the discussion of confidentiality occurs at the outset of the relationship and thereafter as new circumstances may warrant" (p. 7). This latter part reinforces the suggestion of these authors that when a situation arises in which confidentiality needs to be broken, such as reporting abuse, the psychologist revisits the discussion. Standard 4.05 Disclosures states, "(b) Psychologists disclose confidential information without the consent of the individual only as mandated by law, or where permitted by law for a valid purpose such as to (1) provide needed professional services; (2) obtain appropriate professional consultations; (3) protect the client/patient, psychologist, or others from harm" (APA, 2017, p. 8). The mandatory reporting of abuse would be applicable as points (1) and (3). While it may be acceptable to disclose without the consent of the individual, good clinical practice would dictate discussion with the child and the family so that they understand the legal requirement and are prepared for a potential visit by child protective services.

If limits of confidentiality are addressed at start of treatment, there will be less of an impact on the therapeutic relationship (Bean et al., 2011; Davidov et al., 2012). In order to minimize anger and damage to therapeutic relationship, it is best to involve the client in the process of making a mandatory report of abuse or neglect. Involving them in the process will also reduce client distrust and demystify the process of reporting. Failure to report may not only violate legal standards but also violate the APA ethical code. Many psychologists fear that breaking confidentiality in the case of child abuse will harm the therapeutic relationship; however, research has not found this to be true. Weinstein et al. (2000) found that 75% of mandated reports have either no effect or a positive effect on the therapeutic relationship (i.e., client expressed relief and increased self-disclosure). However, failure to comply with mandated reporting may have serious negative effects on the abused child, who may continue to be abused and will not receive the proper interventions (see Chapter 52 on Child Abuse and Maltreatment).

These issues are magnified in cases of child psychopathology. The child might have developed trauma reactions, PTSD, complex PTSD, dissociative disorders, depression, and the seeds of bipolar disorder or personality derangement because of the abuse experienced. The psychologist will have to not only report the abuse but handle the repercussions for the child. Early identification and reporting of abuse can facilitate necessary clinical services for the child and family and halt the abuse.

Harm to Self

In the course of treatment with youth, particularly those who are depressed, they may express suicidal ideation or intent. While the handling of this clinically is beyond the scope of this chapter (see Chapter 77 Suicidal Behavior), there is a need to break confidentiality and take several potential actions. Primarily, the parents need to be informed so that they can be involved in the decision-making. Actions that might be taken include referring the child for assessment at a crisis center, informing the parents so they will monitor the child closely, potentially initiating an involuntary hospitalization of the child for a suicide watch, or referral to a psychiatrist for medication (Sori & Hecker, 2015). As with child abuse reporting, this breach is best handled by discussing with the child the psychologist's concern over the child's physical and mental health and the need to keep the child safe from self-harm. Learning of non-suicidal self-injury (e.g., cutting) has the same ethical obligations, depending on the severity.

Harm to Others

There is probably no case that had as large an impact on breaking confidentiality than the landmark case of Tarasoff v. Board of Regents of University of California (Tarasoff v. Regents of University of California, 1976). While this case took place decades ago, its effect on therapeutic confidentiality is undeniable. The outcome of this case in terms of its historical importance is the establishment of what is commonly referred to as the *Tarasoff duty* or *duty to warn*. Duty to warn is ethically warranted when the therapist ascertains that there is a likelihood of physical harm. (In the US, some states have statutes mandating that the threat actually be communicated). While psychologists cannot control the behavior of the client, they have an obligation to the public to protect members of the public from harm. The duty is not warranted without a foreseeable victim. This condition indicates that the identity of the intended victim is known, either through direct statement by the client, (e.g., I am going to kill Hillary Sommers) or through detection (e.g., I am going to kill my math teacher). In this latter case, the psychologist could identify the teacher with minimal effort by contacting the school and determining who is the client's math teacher (Sori & Hecker, 2015).

The concept of duty to warn has been expanded in many states to include duty to protect. This expansion allows for greater latitude in the psychologist's actions. In these cases of harm to others, psychologists would need to check their legal requirement and obligation to warn the intended victim. However, there are other actions that can be taken including removing the threat of the client by initiating an involuntary hospitalization of the client, which would also reduce the threat by removing the client from society for a specified period of time. The psychologist could warn the intended victim, notify the client's family of the potential harm, or notify the police. There are many actions that can be taken to ensure safety.

Balancing Child Privacy with Parental Rights

Legally, all parents have the right to information shared by children in treatment given the youths' status as minors. However, in order to establish a trusting relationship with children and encourage open communication, psychologists will often assure youth of confidentiality. Parents are typically notified of this arrangement by helping them understand the necessity of the youth feeling safe disclosing to the psychologist. Issues arise, however, when psychologists may believe they need to break this agreement to inform the parent(s) about some aspect of the youth's behavior. There is a balancing act for psychologists with ensuring no harm comes to the client and risking damage to the therapeutic relationship. Sullivan et al. (2019) reported that psychologists are likely to encounter this situation because adolescents often engage in risky behavior that may place them in harm's way.

Issues of privacy with youth are difficult due to the often competing interests of the youth and parents. There are many factors to consider before sharing information a child has disclosed with parents (Sori & Hecker, 2015). Technically and legally, parents have the right to information about their child's treatment. There are several ways to manage the issue of confidentiality with minors. One way would be for the parents to have complete access to the content of what the child shared in session. While this may satisfy the parents, the child is not likely to feel comfortable opening up and disclosing, particularly about content the child does not want the parents to know. Another way would be to explain to the parents that you will not be sharing with them what happens in treatment with the child. This approach will probably not be satisfactory for the parents and is not really feasible. Involving the parents in the treatment and keeping them abreast of the child's state is important. We advocate for an approach that seeks to balance these two positions and informs the child before any disclosures are made. In practice, this would entail telling both parties (child and parents) at the outset about the rules you have established for the child's confidentiality. When the time for sharing information with the parents arises, the child and psychologist would talk about what is being shared so it would not come as a surprise or the disclosure occurring in secret without the child's knowledge. Helping the parents to recognize that the child needs privacy and a trusting relationship with the psychologist, but also letting them know you will inform them of certain concerns, is challenging. These difficult topics might include substance abuse, pregnancy, reckless behavior, etc. Psychologists will want to consider the severity of the behavior and the age of the child in determining whether disclosure to parents is warranted (Isaacs & Stone, 2001).

With older children (aged 14–17 years), there may be an increase in risky behavior that may give the psychologist cause to consider breaking confidentiality. Rae et al. (2002) found that pediatric psychologists generally considered it ethical to break confidentiality when health risk behaviors are more intense, more frequent, and of longer duration with adolescents. They concluded that at a certain point the adolescent's health is more important than confidentiality. Sullivan et al. (2019) found a "push-pull relationship" (p. 298) such that the negative nature of the behavior may push one to break confidentiality, whereas maintaining the therapeutic process may pull one away from breaking confidentiality. They recommended that psychologists would be wise to gain a knowledge base of risky behaviors (e.g., sexual activity, substance use, suicide) such that their decisions are not based solely on intuition but on empirical data.

Treatment Without Parental Consent

Some states have allowances for minors to seek treatment without parental consent in the case of emergencies. For example, in the state of Florida in the US, FL §394.4784 (Fla. Stat. §394.4784, 2020) allows for minors age 13 years or older to access services if the provider deems the child is "experiencing an emotional crisis to such degree that he or she perceives the need for professional assistance". The law further states that such services shall not exceed two visits during any 1-week period in response to a crisis situation before parental consent is required for further services. Thus, a child may be seen without parental consent or knowledge but only for a short period of time. The age of 13 may be used as it could indicate an unplanned pregnancy or other crisis situation that the minor may need assistance with and not want parental knowledge. Other issues that a minor may potentially seek treatment for without parental consent could include drug abuse, birth control counselling, sexually transmitted diseases, or sexual assault (Lawrence & Kurpius, 2000). We recommend that while, legally, the psychologist may be able to treat the minor, procuring parental consent as soon as possible is the best option.

We have examined several topics related to Autonomy involving children who require ethical reflection and obligatory practice. These include reporting child abuse, protecting against suicidal ideation/ intent, and reporting danger to specific others. Therapists need to balance children's desire for confidentiality and parents' desire to know details in therapeutic sessions. These issues are magnified in cases of child psychopathology, and the psychologist should be on heightened alert. For example, in cases of child psychopathology, in which psychologists need to deal with suicidal ideation and intent, they must exhibit greater need for caution and should have a lower bar for reporting. As with the findings that treatment will not be negatively impacted by having to report abuse, the obligation to act in cases of suicidality/intent normally should not lead to significant worsening relations with the reporting professional party.

(d) Assessment and Diagnosis

Assessment The APA (2017) ethics code deals extensively with assessment and is complemented by the standards for assessment the APA has cowritten with the American Educational Research Association and the National Council on Measurement in Education (2014). In this section, we review the ethical standards for assessment put forth by the APA, which are ones common to all ages and psychological conditions. In the last section of the chapter on law and science, we list some widely used tests in work with children.

The APA ethics code (APA, 2017) considers assessment in its ninth standard. For bases of assessments (in Standard 9.01), psychologists use information and techniques that are sufficient "to substantiate" their findings. The information and techniques need to support their statements and conclusions; we add that these would often concern their diagnoses, recommendations, and prognoses. The constraints and limitations in the examination, if any, on the adequacy of the assessment process (and the consequent reliability and validity of the assessment) need to be mentioned in the assessment reports. For use of assessments (in Standard 9.02), psychologists use assessment protocols (the instruments, tests, techniques, or interviews, and their administration, adaptation, scoring, interpretation) in appropriate ways for the question at hand according to the research on or other evidence related to them. The tests need to be standardized on a population related to the examinee profile (e.g., racial, ethnic, age), thus assuring that they are reliable and valid for the assessment at hand. If this is not the case, the psychologist describes the strengths and limitations of the instrument results and their interpretation. One such limitation might relate to language.

Standard 9.06 of the APA ethics code concerns the interpretation of test results. It indicates, "When interpreting assessment results, including automated interpretations, psychologists take into account the purpose of the assessment as well as the various test factors, test-taking abilities, and other characteristics of the person being assessed, such as situational, personal, linguistic, and cultural differences, that might affect psychologists' judgments or reduce the accuracy of their interpretations" (APA, 2017, p. 13). They indicate any significant limitations of their interpretations. We would add that age, developmental status, and associated diagnoses, disorders, and psychopathology are part of the critical characteristics of the examinee in test interpretation. Psychologists need to be aware of these variables or risk arriving at incorrect and even harmful interpretations of a child's test results.

Diagnosis The APA (2017) ethics code does not refer to diagnosis except tangentially in one standard. The process of diagnosis is integral to the work of a psychologist with children, especially in cases of child psychopathology, yet the APA ethics code expresses a serious lack by not considering the ethics in diagnosis (Young, 2017). Young (2016) reviewed the criticisms of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Publishing, 2013). The main concerns were that categories might not be valid or have their bar lowered for diagnosis, leading to more psychopharmacological prescriptions for children. Therefore, psychologists should not apply the DSM-5 without reflection or knowledge of its criticisms and the extant literature of the diagnosis/disorder/psychopathology in question.

(e) Research

The United Nations Convention on the Rights of the Child [UNCRC](Convention on the Rights of the Child, 1989) during the 1990s represented a change from viewing children as passive objects subordinate to their parents to viewing them as human beings with their own legal rights (Cater & Øverlien, 2014). Simon et al. (2020) noted that the US is the only country that has not ratified the UNCRC. The UNCRC presents the dichotomy in dealing with children: that they are competent and have the right to be heard (e.g., in Article 12), while also being vulnerable and in need of protection (e.g., in Article 19).

Falch-Eriksen et al. (2021) reviewed the literature with respect to whether children's voices are being heard in child protection service proceedings given the passage of the UNCRC. They found that this was not the case in the multiple countries examined: The children felt that they were not being asked, listened to, or heard, even in unsafe or harmful contexts. Tobin and Cashmore (2020) noted that for it to be effective, countries need to adopt a rights-based approach such that children are involved in decision-making in which their lives are affected; as well as in the research that affects them. This legal tension in children needing to be heard and needing protection is more salient with children expressing psychopathology. Children experiencing psychopathology still should be heard but, granted, they are more vulnerable, including in situations and problems over which they have little to no control. As mentioned, another situation about children's voice involves research; next, we consider the issue of trying to obtain assent for participation, which is accentuated in children with psychopathology.

All research involving children should be reviewed by a research ethics board to ensure the protection of children. The research ethics board must consider the potential benefits, risks, and discomforts of the research to children and assess the justification for their inclusion in the research (Office for Human Subjects Protection, 2016). In assessing the risks and potential benefits, the IRB should consider the demographics and characteristics of the children to be enrolled in the study – for example, their health status, age, and ability to understand what is involved in the research – as well as potential benefits to participants, other children with the same condition, or the greater community. Whatever the level of participation, researchers have responsibilities to ensure that they protect children's and young people's best interests. As Coyne (2010) stated, "Accessing children for research purposes is a process that is governed by strict ethical guidelines and procedures which are meant to safeguard the children from potential harm or exploitation" (p. 227).

Generally, when conducting research, consent is required from participants. Given children's age and lack of legal competency status as adults, they are typically asked to give *assent* while their parents provide *consent* for them. Some important ethical issues emerge when parents may give consent for a child, but the child does not wish to participate in the study. The alternate situation may occur also, in which a child wants to participate but the parent will not provide consent. The notion behind the necessity of parental consent is that the parent is the legal guardian and custodian and viewed as responsible for making decisions in the child's best interests. There is a balancing act between the need to protect children from potential harm in the research with the need to ensure their right to informed consent or dissent is respected.

The APA ethical codes make no consideration of youth in research with regard to the consent process. However, in the section "Informed consent," the principles state: "(b) For persons who are legally incapable of giving informed consent, psychologists nevertheless (1) provide an appropriate explanation, (2) seek the individual's assent, (3) consider such persons' preferences and best interests, and (4) obtain appropriate permission from a legally authorized person, if such substitute consent is permitted or required by law." (p. 7). This dictate would apply to children in that they are legally incapable of giving consent and must rely on their parents to complete this process. Children should be provided with a form (depending on age and reading level) that outlines in age-appropriate terms what the research entails. If capable, they can sign their name to the form to indicate assent. Younger children can be read a statement and their comprehension can be determined by asking if they understand what has been shared. As is true of all forms of consent, children (and parents) have the right to withdraw at any time without penalty (see Chapter 8 for more on Informed Consent).

Parsons et al. (2016) interviewed 32 researchers who work regularly with children. All reported that they use paper and pencil assent forms (as routinely required by university research ethic boards) and most explained the importance of verbal interaction and the development of trust and rapport over time with the child participants. Some used additional attractive and child-centered methods, such as pictures, technology, comics, or images, to portray the information. Many revisited consent over time given that there were concerns about children's comprehension. Technology was recognized as potentially playing an important role in research with children by providing a means to review consent, to show what is upcoming in the research (e.g., next steps), and the use of social network sites to recruit participants. In sum, technology was seen as a way to impart information to children (e.g., tablets, videos) and support autonomous decision-making by children. Given the increased use of technology by children, incorporating this into consent may be a very viable option.

Traditionally, there is a concern about the power differential between the adults conducting research and the youth who are participants in the research. However, there has been a shift toward recognizing children as more competent than previously believed and that their voices need to be heard in research (Clavering & McLaughlin, 2010). This would translate to children having an active voice in the development of research protocols. As Coyne (2010) pointed out, it is unclear if any ethics committees may involve children as members, even though children are the subject of the studies. There may be unintended benefits to children from participation that are not fully understood at the initiation of the research. Woodgate et al. (2017) reported on how, for some youth participants in their research, telling their stories was empowering, and on some occasions therapeutic.

Research conducted with children expressing psychopathology presents even more ethical concerns because of their increased vulnerability, lessened ability to understand the research protocols, and impacted understanding of how the research might benefit them or other children in the public. Researchers need to give special attention to obtaining informed assent and assuring the children of the benign nature of the research, or that the benefits substantially outweigh the risks. Deception in research with this population should be avoided and not supported by IRBs, given their vulnerabilities.

(f) Divorce

Many children come from divorced homes. Research has consistently shown that children from divorced homes exhibit more behavioral problems and evidence greater psychological adjustment than children from intact families (Ahrons, 2004; Kelly & Lamb, 2000). Given the potential subsequent emotional or behavioral issues that may arise for a child, psychologists will have to deal with complex ethical issues in such cases. Typically, the parent with legal custody is the one to consent to treatment. However, in many cases, there is shared parental custody and both parents need to be informed and consent. While one parent may call and initiate treatment for the child, it is best practice to seek to inform (at a minimum) the other parent of the treatment. This can be done by contacting the other parent by phone. While some experts advise that the psychologist should ask for and review the custody agreement, we argue that the onus should be placed on the parent who brings the child to assist in the notification of the other parent. This assistance should come in the form of providing that parents' contact information. Clinically, it is probably best to have the involvement of both parents and every effort should be made to involve both parents. This can reduce issues of loyalty for the child (Sori & Hecker, 2015). (This recommendation is also applicable in any parenting situation, e.g., never married).

Another area of concern when working with children of divorce is the role of the psychologist. Woody (2000) described the various roles of the psychologist including custody evaluator, clinician, and mediator. It is important to not mix roles. For example, if you are the clinician for the child, you are not functioning in the role of custody evaluator, and therefore cannot make comments or recommendations regarding custody of the child. The role of the psychologist should be outlined at the outset of treatment to the parents in order to avoid confusion later on. The APA Guidelines for Child Custody Evaluations in Family Law Proceedings (American Psychological Association, 2010) discuss concepts related to the psychological best interest of the child, making the child's welfare paramount and obtaining appropriate informed consent when conducting custody evaluations. The psychologists involved in child psychopathology and divorce require extra prudence in proper evaluation of the situation and child in order to make informed decisions. For example, conducting custody evaluations in this context requires detailed knowledge of the perception of both parties of the child's status and developmental needs. This leads to the last substantive section of the chapter on ethics and law in child psychopathology.

Law and Science

Law Multiple areas in working with children expressing child psychopathology require detailed knowledge and application of ethics and law, for example, for forensic evaluations for court and working in the school system. Ackerman et al. (2021) conducted an exhaustive review of child custody evaluations (CCEs) that epitomizes the intersection of psychology and law forensically in working with children. They maintained that work in the area requires intimate knowledge of ethics codes, professional child custody and forensic guidelines, and the research literature, as well as applicable law. Work in the area is associated with a notable rate of malpractice suits and board and ethics complaints, illustrating the risk in the area and emphasizing the present authors' emphasis on the need for psychologists to be scientifically informed, for example, with respect to domestic violence, sexual abuse, substance abuse, and parental alienation and abandonment. The tests used in the assessments need to meet expected psychometric standards of reliability and validity and the scientific criteria of the SCOTUS decision *Daubert* (i.e., published and peer reviewed, known or estimable error rate, testability or falsifiability, and general acceptance; *Daubert v. Merrell Dow Pharmaceuticals, Inc.,* 1993).

For children, the Minnesota Multiphasic Personality Inventory-Adolescent (MMPI-A; Butcher et al., 2006), the Personality Assessment Inventory-Adolescent (PAI-A; Morey, 2007), the Child Behavior Checklist (CBCL; Achenbach, 1991), and the Behavior Assessment System for Children-3rd Edition (BASC-3; Reynolds & Kamphaus, 2015) are the most widely used instruments in these regards. About placement decisions (e.g., sole, joint custody), in survey research, across judges, attorneys, and psychologists, the wishes of the child become relevant at about 15 years of age.

This age is consistent with the age at which teenagers should be able to decide whether confidential information should be given to their parents by therapists, everything else being equal. However, it is our opinion that the voice/ autonomy/agency of the child could be heard earlier in decisions about custody as part of the full scope of information gathered in a child custody exam (CCE). Our emphasis for hearing the child in CCEs is consistent with how we underscore that psychologists have the ethical obligation to function from the superordinate principles of being fully responsible in their work, respect the full personhood of the developing client, and advocate for their full participation to the degree possible in decisions involving them.

That said, psychologists should determine whether any preferences in these regards are based on coercion, demand characteristics, or other biasing factors. The parents in CCEs should be assessed in depth and also with reliable and valid psychological instruments, but they should include respondent validity scales, such as the F family of tests in the Minnesota tests (Minnesota Multiphasic Personality Inventory-2; MMPI-2; Butcher et al., 1989)/Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008/2011), which are referred to as ones used frequently in CCEs by Ackerman et al. (2021). The MMPI-3 (Minnesota Multiphasic Personality Inventory-3; Ben-Porath & Tellegen, 2020) and its similar family of F scales will be making inroads in the instruments used in these regards. Ackerman et al. (2021) argued against use of projective type tests with children because of psychometric issues. In testing children for CCE, intelligence tests are used often, as well. For other work on ethics and law related to CCEs, see Geffner et al. (2018), who gave, for example, a vignette on how testing can be biased.

In these COVID times (McGee et al., 2021), remote telehealth and tele-assessment are taking place much more frequently. But the virtual environment presents multiple difficulties in the informed consent process, the quality of the medium, limitations when face-to-face testing is required, and eventual challenges in court on its reliability and validity (Brown et al., 2021; Dale & Smith, 2021; Dickinson et al., 2021; Goldenson & Josefowitz, 2021; Thibodaux et al., 2021; Young, 2022b). These difficulties would be compounded with children experiencing child psychopathology.

Science The three themes in this chapter related to being scientifically informed in working with children expressing psychopathology involve: (a) evidence-based practice; (b) reliable and valid tests in assessments; and (c) empirically supported diagnostic categories. We have examined the latter two topics in prior sections and focus here on evidence-based practice. Therapists are obligated to help and do no harm, which is especially true for children, who are vulnerable, and doubly true for children with psychopathology, who are even more vulnerable.

The American Psychological Association endorsed the value of evidence-based practice in 2006 (American Psychological Association, 2006). Blease et al. (2016) advocated that psychologists need to conduct assessments, offer diagnoses, and implement therapy with professional competence, which depends on keeping up to date with the current research and effectively evaluating the evidence involved. That said, patient values and preferences need to be considered, as well as sociocultural factors. Current science does not mean only randomized control trials, for example, as they might not be representative of the general population. Young (2022c) reviewed the literature, documenting lack of representativeness in research for race/minority status, gender, age, vulnerability, etc. These deficits would apply to children in research, as well.

Given the prevalence of emotional and behavioral disorders in children and the potential for lifelong struggles related to these conditions, psychologists need to become trained in evidenced-based practices. Evidence-based practices (EBPs) have been shown to be both efficacious and cost effective. Cook et al. (2017) reported that one of the main goals of EBP psychotherapy is to allow for patient choice about treatment options. Clinical decisions are made collaboratively with the client, thereby increasing autonomy. Blease et al. (2016) argued that in order for practice to be ethical, it is imperative that it is guided by the relevant data. Thus, the inclusion of EBPs into clinical practice and their reliance on research enables psychologists to use research-driven evidence as opposed to relying solely on personal opinion or preference. The APA evidence-based guidelines (American Psychological Association, 2006) strongly encourage including clinical expertise and judgment into applicable practice of evidence-based psychotherapies, so that a balanced approach is achieved. However, children experiencing psychopathology need special considerations in implementing any therapy.

Barnett et al. (2019), Crane et al. (2021), Dutil (2019), Jensen (2021), Pegg et al. (2021), Powell et al. (2020), and Whiteside et al. (2021) have described factors and difficulties in this regard for traumatized youth and other youth requiring psychotherapy. For example, Barnett et al. (2019) and Jensen (2021) referred to difficulties in reaching children who need treatment, while Dutil (2019) emphasized difficulty in reaching Black and Latinx youth in these regards. Pegg et al. (2021), Powell et al. (2020), and Whiteside et al. (2021) referred to the difficulties in funding and implementation, respectively.

Conclusions

Working with children experiencing psychopathology is ethically challenging and requires expert knowledge of the law for the children involved. This chapter on ethics and law in relation to working with children experiencing child psychopathology has covered topics: (a) Ethics, (b) Developmental Considerations, (c) Beneficence/Nonmaleficence, (d) Autonomy and Life Preservation (including child abuse), (e) Assessment, (f) Diagnosis, (g) Research, (h) Divorce, (i) Law, and (j) Science. Following from these topics, the areas in the chapter considered include informed consent, confidentiality, child abuse reporting, duty to warn, assessment, child custody evaluations, research, and evidence-based practice.

The APA ethics code (APA, 2017) and its principles and standards have provided the starting point in our consideration of ethics in relation to child psychopathology. However, it barely mentions children and development, so we consulted the AACAP ethics code, as well, which starts with a developmental principle. The chapter considered the professional applicable ethics code as a starting point in practice, provision of service, and research, with local jurisdictional laws as especially relevant, too. There are also practice guidelines to consider. At the same time, understanding that ethics is dynamic and changing, such that any ethics code or practice guideline does not supply pat answers to be applied in a cookbook fashion. This dictum especially relates to vulnerable children, such as those with psychopathology.

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Parental Stress in Raising a Child with Mental Health and Behavior Problems

8

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Raising a child with mental health and/or behavior problems can be challenging. Providing care for a child with mental and behavioral problems is a significant source of stress for parents and caregivers (Angold et al., 1998; Brannan & Heflinger, 2001; Taylor-Richardson et al., 2006). Furthermore, the stress associated with caring for a child with emotional and behavioral difficulties may be compounded by factors at the parent, family, and broader social and community levels. Other factors such as low socioeconomic status (and its accompanying stressors) and lower educational levels can further compact parental stress. In this chapter, we will describe the biological, physical, and mental aspects of stress; synthesize how stress may affect parenting and family functioning; and discuss the associated factors that may contribute to the development of parental stress. Intervention and policy recommendations will also be discussed.

What Is Parental Stress?

Parental stress is distinct from the stress arising from other roles and experiences—from the workplace stress, interpersonal conflict within the family, and general psychological distress. Deater-Deckard (2004) defines parental stress as "a set of processes that lead to aversive psychological and physiological reactions arising from attempts to adapt to the demands of parenthood (p. 6)." Parental stress can arise when parents encounter stressors in the parenting role and perceive them as threatening or burdensome. According to the parental stress literature (Nomaguchi & Milkie, 2020; Pearlin, 1989), parental stressors include *role overload* (i.e., parents' perceived parenting demands exceed their capacity and available resources), *interpersonal conflict* (i.e., problems and difficulties evoked between parent and child), *role captivity* (i.e., parents feel stuck with caregiving and parenting tasks), and *interrole conflict* (e.g., work interference with fulfilling parental responsibilities to meet the needs of their children).

Any parent or caregiver of a child faces these stressors and experiences parental stress to some extent at one time or another. However, raising children with mental health and behavioral needs has

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been found to add another layer of burden and challenges to parents, which often result in higher parental stress (Neece & Chan, 2017). To be specific, providing care for children with special needs imposes time, financial, and psychological burdens that are far beyond the burdens faced by those without special needs (Nomaguchi & Milkie, 2020). For example, parents of children with intellectual and developmental disabilities may experience greater caregiving demands and arrangement of care, which imposes time burdens (Miller et al., 2015). Also, having a child with a disabling health condition tends to have more unsecured debt, and the rise persists longer for those with more severe disabilities, perhaps due to the higher cost of more intensive care (Houle & Berger, 2017). Finally, parents with mental health and behavioral challenges are at increased risk of psychological distress. During daily encounters with people around the family—neighbors, friends, school officials, strangers, and health care professionals—people's stigmatizing attitudes and adverse reactions may serve as parents' psychological stressors (Farkas et al., 2019). In response to these stigmatizing or stressful daily encounters and social exchanges, parents tend to blame themselves for their child's conditions and experience increased social isolation and role captivity (Beernink et al., 2012; Moses, 2010).

Parental Stress Assessment

Although parental stress has been conceptualized in several ways in the parental stress literature (e.g., Abidin, 1992; Belsky, 1984; Crnic & Greenberg, 1990; Crnic & Low, 2002), two predominant theoretical frameworks have influenced parental stress measures. The first framework is conceptualized by the work of Abidin et al. (1992) and Belsky (1984) and is often called Parent-Child-Relationship theory (P-C-R theory; Deater-Deckard, 2004). P-C-R theory posits that parental stress arises because of stressors arising from the parent domain (e.g., depression, anxiety), child domain (e.g., behavioral problems, disabilities), and parent–child relationship domain (e.g., relationship conflict between parent and child). The other framework conceptualized by the work of Crnic and Greenberg (1990) and Crnic and Low (2002) is the Daily Hassles theory (DH theory). What makes it distinct from the P-C-R theory is that the DH theory mainly focuses on typical parental stress stemming from a broad array of minor daily stressors that most parents face daily or weekly. In contrast, P-C-R theory focuses on parental stress stemming from stressful circumstances or life events, such as parent depression, child disabilities, economic hardship, and relational problems in the family (Deater-Deckard, 2004).

One of the most widely used parental stress assessments, the parental stress Index (PSI) is grounded in the P-C-R theory. This parent self-report measure is available in a long form (101 items) and a short form (36 items). The long version consists of two general domains—the child and parent domains—and the optional life stress domain. The child domain contains six subscales (i.e., adaptability, reinforces parent, distractibility/hyperactivity, demandingness, mood, and acceptability) measuring various child-level factors that may affect parent–child relationships (Abidin, 1995). The parent domain contains seven subscales assessing various parent-level stressors (i.e., competence, isolation, attachment, health, role restriction, depression, and spouse (Abidin, 1995). The PSI short form (PSI-SF) is similar to the long form, except questionnaires are recategorized into three subscales: parental distress, parent–-child dysfunctional interaction, and difficult child (Abidin, 1995). Notably, the validity and reliability of the PSI for parents with special needs have been documented in a small body of research (Barroso et al., 2016; Tomanik et al., 2004; Zaidman-Zait et al., 2010). For example, Barroso et al. (2016) examined the psychometric properties of the English and Spanish versions of the PSI-SF among 58 mothers of 12- to 15-month-old infants with elevated levels of behavior problems from predominantly Hispanic, low-income backgrounds. Their findings provide empirical evidence that the PSI-SF may be an effective and appropriate measure to assess parental stress among parents of children with behavioral concerns from minority and disadvantaged backgrounds (Barroso et al., 2016). Tomanik and colleagues' work (2004) also supports the applicability of using the PSI-SF in parents of children with autism spectrum disorders (ASD).

Another measure grounded on the P-C-R theory is the Parental Stress Scale (PSS). The PSS is a self-report measure that captures both the joys and demands of parenting (Berry & Jones, 1995). Importantly, the PSS was designed to measure parental stress in particular by differentiating parental stress from general stress and avoiding confounding parental and marital stress (Louie et al., 2017). Example items are "I feel close to my child(ren)," "I enjoy spending time with my child(ren)," "the major source of stress in my life is my child(ren)," "having children has been a financial burden," "the behavior of my child(ren) is often embarrassing or stressful to me," and "having children has meant having too few choices and too little control over my life."

Louie et al. (2017) reviewed 21 studies in which the PSS was utilized as a parental stress measure. Their review showed that the PSS had been tested in many countries and diverse samples, including parents of children with and without ADHD, physical disabilities, behavioral problems, and clinical levels of psychopathology (Louie et al., 2017). In one study, the responses of 233 parents of children with special needs, 95% of the participants demonstrated strong internal consistency ($\alpha = 0.83$) and 6-week test-retest reliability ($r = 0.81$), as well as robust convergent validity with the Perceived Stress Scale ($r = 0.41$). In another study based on 43 parents of children with special needs, the Parental Stress Scale strongly correlated with the parental stress Index, $r = 0.75$. The PSS was also shown to correlate with constructs related to parental stress, such as loneliness, anxiety, marital satisfaction, and social support ($-0.29 < r < -0.44$) in a sample of 746 parents of children with and without special needs. Finally, discriminant validity was shown by differentiating between 116 mothers of healthy children, 51 socio-demographically matched mothers of children receiving treatment for behavioral problems, and 78 parents of children with neurodevelopmental disabilities receiving special education (Berry & Jones, 1995). Furthermore, the PSS is brief, ideal for routine use in pediatric medical clinics.

The Parenting Daily Hassles scale (PDH), on the other hand, was designed to assess the frequency, intensity, and impact of 20 typical day-to-day parenting hassles experienced by parents and caregivers of children (Crnic & Greenberg, 1990). Its subscales include challenging behavior, parenting tasks, and the burden of meeting children's expected or legitimate needs. This parent self-report measure asked parents to score each of the 20 potential hassles in terms of frequency (ranging from rarely to constantly) and intensity (1 = low to 5 = high). Potential hassles listed include "being nagged, whined at, complained to," "sibling arguments or fights require a referee," "the need to keep a constant eye on where the kids are and what they are doing," "the kids get dirty several times a day requiring changes of clothing," "having to run extra errands to meet the kids' needs," and "babysitters are hard to find."

Parental Stress and Children with Special Needs

Parental stress is greater when child care demands are higher. Parents whose children have emotional and behavioral challenges face additional care demands related to the child's symptoms. Children with chronic health conditions are more likely to experience emotional and behavioral problems than their healthy peers (Long et al., 2008). Parent–child relationship quality, parenting behavior, and family functioning are critical to healthy development (American Academy of Pediatrics, 2003). In theory, Lazarus proposes there is a reciprocal relationship between parental stress and child behavior problems, and parental stress is derived from parents' perceived ability to fulfill their parenting role (Morgan et al., 2002). Child behavior problems are thought to be a causal agent of stress, and parental stress may have detrimental effects on child well-being and affect parents' sense of parenting efficacy (Chang & Fine, 2007). Parental stress has been linked to less responsive, more authoritarian, and more neglectful parenting (Belsky et al., 1996). In turn, poor parenting has been associated with poorer developmental outcomes for the child (Deater-Deckard & Scarr, 1996). For example, children with problem behavior may elicit increasingly harsh discipline from their unskilled caregivers, and in turn, these poor parenting practices could worsen children's adverse behaviors.

A considerable body of research further supports the theory that parental stress was elevated among parents with children with emotional and behavioral problems (Crnic et al., 2005; Mackler et al., 2015; Rothbaum & Weisz, 1994). Parenting knowledge, perceived competence, and emotional and instrumental support can all influence parents' levels of parental stress. The literature suggests that sources of parental stress are multidimensional, including child characteristics, parent characteristics, qualities of the parent–child relationship, demands of parenting, and contextual life events within the parent–child system (Abidin, 1995; Deater-Deckard, 1998).

One line of research that advanced in the past decade has focused on the challenges of raising children with special health care needs or emotional and behavioral problems. For example, parents tend to find obsessive compulsive disorder (OCD) symptoms in their child distressing to observe (Amir et al., 2000; Peris et al., 2008), and so it is unsurprising that studies indicate high rates of symptom accommodation (e.g., participating in rituals, providing reassurance, changing family routines) among parents of children with OCD to reduce the child's distress and the parents' own emotional reactions toward it (Allsopp & Verduyn, 1990; Peris et al., 2008; Shafra et al., 1995; Storch et al., 2007). Family members are also motivated to engage in accommodation to avoid angry reactions from the child with OCD if they do not accommodate and reduce the duration of compulsive activity (Calvocoressi et al., 1999). It is evident that parents find themselves in a bind that is likely to affect their well-being: They report symptom accommodation to be distressing (Amir et al., 2000; Peris et al., 2008), do not believe it is helpful (Calvocoressi et al., 1999), and yet often face aggressive outbursts or distress from their child when they refuse to accommodate (Storch et al., 2007).

Accommodation is positively correlated with relatives' anxiety and depression (Amir et al., 2000). It can affect family relationships in that the burden imposed, either by engaging in accommodation or attempting to resist it, can lead to feelings of blame toward the child (Peris et al., 2008). Arranging and providing care for children with special health care needs imposes time burdens (Miller et al., 2015) as well as financial costs (Stabile & Allin, 2012) far beyond the time and money required to raise healthy children. Primary caregivers of children with special needs tend to reduce or stop paid work activities, which, in addition to children's health care costs, places these families into lifelong financial deprivation. Using the National Longitudinal Study of Youth 1979 (NLSY79), Houle and Berger (2017) found that mothers whose children had a disabling condition by age 4 were more likely than those whose children did not have disability to have unsecured debts (i.e., debts that are owed to banks, stores, hospitals, and other institutions and are not tied to an asset) that they were unable to repay for decades following the birth of a child with a disability.

Social stigma, referring to people's adverse reactions that often involve stereotypes, prejudice, and discrimination, is another major stressor. Parents raising children with physical disabilities or mental disorders must endure daily encounters with medical professionals, school officials, neighbors, strangers, and friends (Farkas et al., 2019). In response to other people's stigmatizing attitudes, parents tend to blame themselves for their children's conditions and isolate themselves and their families from social interactions (Moses, 2010). Having a child with emotional problems or aggressive behaviors increases mothers' parental stress (Vaughan et al., 2013) because it increases mothers' social isolation and role captivity (Beernink et al., 2012), and it affects the mother–child relationship negatively.

Studies investigating child symptomatology on parental stress have primarily focused on developmental disorders (Britner et al., 2003; Long et al., 2008), but they also include studies of child mental health symptoms (Anderson, 2008; Deater-Deckard, 2004; McDonald et al., 1997; Tzang et al., 2009).

Primarily, the research on parental stress has focused on the relationship between parental stress and subsequent child psychopathology (Abidin et al., 1992; Costa et al., 2006; Nelson et al., 2007) and has demonstrated that higher levels of parental stress are related to higher levels of child symptomatology. Research investigating the relationships between child symptoms and parental stress has found that child symptoms predict parental stress (Anderson, 2008; Deater-Deckard, 2004; McDonald et al., 1997; Tzang et al., 2009). For example, McDonald et al. (1997) found a direct relationship between externalizing behaviors and caregiver-reported stress. Deater-Deckard's (2004) research demonstrated increased stress among parents caring for children with anxiety and depression.

Researchers have suggested that the experience of parental stress may vary based on the specific diagnosis of disability of the child due to the associated behavioral phenotype, which are the expressions of behaviors related to a diagnostic label (e.g., intelligence, social skills, agreeableness; Dykens & Hodapp, 2001; Hodapp et al., 1998; Seltzer et al., 2004). Researchers commonly report that families of children with ASD experience more parental stress than families of typically developing children (Dabrowska & Pisula, 2010; Rao & Beidel, 2009) or those diagnosed with other disabilities. Due to the core symptoms of ASD (e.g., social interaction deficits, repetitive behaviors, and restricted interests and activities), parents raising children with ASD experience more mental health issues and more parental stress than parents with typically developing children or children with other disabilities (Gardiner & Iarocci, 2014).

One study showed associations between parental stress and severity of ASD symptoms, adaptive skills, and IQ (Rivard et al., 2014). Further, parents of children with ASD show more psychiatric disorders, more autistic symptoms, and more problems in social communication themselves (Brei et al., 2015). Particularly, among families of children with ASD compared to families of children without disabilities or with other types of disabilities, child challenging behaviors are highly predictive of parent stress (Falk et al., 2014). These challenging behaviors include self-injury, social interaction difficulties, and emotional dysregulations. In a broader context, Hayes and Watson (2013) reexamined the research using comparison groups to investigate parental stress and conducted a meta-analysis to pool results across studies. The experience of stress in families of children with ASD versus families of typically developing children resulted in a larger effect size. Comparisons between families of children with ASD and families with other disabilities also generated a large effect size. In other words, the findings of a meta-analysis suggest that parents of children with ASD experience more parental stress than those of children who have typical development or another disability (Hayes & Watson, 2013).

Consistent with the proposition that parental stress and children's disruptive behaviors are reciprocally related (Burke et al., 2008), several studies have demonstrated that elevated parental stress is associated with children's higher externalizing and internalizing problems in both clinical and nonclinical groups (Labella & Masten, 2016; Levendosky et al., 2003; Rothbaum & Weisz, 1994). Moreover, parents of children with disruptive behavior disorders (DBDs) reported experiencing considerably higher parental stress than those of children without behavior disorders (Crnic et al., 2005; Podolski & Nigg, 2001; Ward et al., 2016). When experienced in childhood, ADHD adversely impacts the family system (Johnston & Mash, 2001). In addition to experiencing significantly more parental stress than parents of typically developing children (Theule et al., 2013), parents of children with ADHD are reported to experience greater levels of parental stress than parents of children with autism (Miranda et al., 2015) and physical conditions such as HIV infection or asthma (Gupta, 2007). These data suggest either that neurodevelopmental disorders contribute to parental stress to a greater extent than other significant medical conditions or that having a child with a neurodevelopmental disorder is correlated with the tendency for increased stress. Increased parental stress is associated with numerous negative outcomes for children with ADHD and their parents, including the worsening of a child's ADHD symptoms, reduced response to intervention, reduced quality of the parent-child relationship, and decreased parental psychological well-being (Johnston & Mash, 2001; Modesto-Lowe et al., 2008; Theule et al., 2013). Parental stress may impact children via a number of pathways, including poor monitoring of children's activities and whereabouts and increased use of corporal punishment and controlling rather than supportive parenting strategies (Deater-Deckard, 2004; Rogers et al., 2009a, b).

Another factor that may contribute to the amount of parental stress is the type or severity of the child's emotional or behavioral symptoms (Angold et al., 1998; Bussing et al., 2003a, b; McDonald et al., 1997). Tang et al. (2009) investigated ADHD subtypes and parental stress in a Taiwanese sample. These authors found that parents of children with the combined subtype (inattentive and hyperactive impulsive) of ADHD reported more parental stress than those parenting children with inattentive type. Anderson (2008) investigated child, parent, and contextual predictors of parental stress and found that youth problem behaviors were related to more stress. Data from one large study showed that child behavior of preschoolers was associated with increased levels of parental stress (Williford et al., 2007). Further, parental stress was positively related to externalizing problems during preschool over time (Bayer et al., 2008) and from infancy to middle childhood (Benzies et al., 2004). Together, these studies suggest that different patterns of child symptoms may yield stress and strain in different domains and that caregivers of children with symptoms in both externalizing and internalizing domains may experience more parental stress when compared with those caregivers of children with symptoms in one domain.

Parental Stress, Family Support, and Quality of Life

Families of children with special needs experience daunting challenges and daily high workloads in parenting their children (Davis & Carter, 2008; Hu et al., 2019). Examining the outcomes of children with mental and or behavioral problems and their families' experiences are important for the broader fields of social welfare and disability-related services. Parental stress can affect family-level outcomes, such as family quality of life (FQOL). FQOL refers to "a dynamic sense of well-being of the overall family unit, collectively and subjectively defined and informed by its members, in which individual and family level needs interact" (Zuna et al., 2010, p. 262). FQOL was grounded on the family system approach and emphasizes measuring the holistic outcome of family life for children with disabilities. In the past two decades, there has been an exponential increase in international disability research focusing on FQOL of children with disabilities (e.g., Pozo et al., 2014; Schlebusch et al., 2017).

The family is a dynamic, interconnected, and interacting set of relationships, both between the members of the family and with the wider society. The overarching purpose of promoting FQOL research is to shift the focus of family support or services from the child with disabilities to the whole family as the target (Turnbull et al., 2007). Currently, FQOL has been identified by service providers and researchers internationally as one key factor and outcome measure for family and disability-related services, therefore leading to enhanced service delivery and policy development (Kober & Eggleton, 2005; Kyzar et al., 2016), because the family is the primary setting in which most children and adults with disabilities reside. Previous research has primarily focused on exploring the overall FQOL of families who have children with ASD and related disorders, as well as the possible predictors. In a study of Turkish parents with intellectual disabilities and ASD, Meral et al. (2013) indicated that high emotional support predicted better FQOL. Pozo and his colleagues (2014) found that mild ASD symptoms and better social skills are related to better FQOL.

Family support is a significant factor in reducing parental stress in raising children with disabilities. Spouse or partner support is reported as the most important source of family support (Hsiao, 2018). Poor marital relationships may contribute to increases in stress (Hall & Graff, 2011). Also, lack of extended family support can also lead to higher levels of stress (Mancil et al., 2009; Preece & Jordan, 2007). Moreover, social and governmental policy support can significantly alleviate the financial burden in caring for a child with special needs. However, in developing countries like China, current federal policies have not yet authorized formal family support programs. Informal social support to families of children with mental health and behavior problems is usually provided in three ways: counseling services and information support from the registered parent support organizations; professional support on parenting skills from special education schools; and emotional support and information sharing from self-organized parent-to-parent support groups (Zeng et al., 2020).

Parental stress can have a mediating role in family support and FQOL. In investigating the dynamic causational variables of parental stress, Abidin (1990) put forward a stress model stating that parental stress was created by a mismatch between parental roles and the available family support to meet the demands associated with parenting a child with disabilities. Family support is defined as a set of strategies directed to the family unit to ultimately benefit the family member with disabilities (Hecht et al., 2011). Conceptually, there are four types of family support: emotional support, physical support, material/instrumental support, and informational support (Kyzar et al., 2012). The parent stress model validates that parental stress is associated with the type of family support families can obtain (Deater-Deckard, 1998). Previous research demonstrated that mothers' perceptions of family support were negatively associated with parental stress. Specifically, the more family support parents obtained, the less stress they experienced, and the more likely it was that parents could provide positive parenting to their children, especially for those with ASD (Deater-Deckard, 1998; Dyson, 1997).

Using a structural equation modeling approach, Zeng and his colleagues (Zeng et al., 2020) further demonstrated that family support is critical in promoting FQOL and helps to buffer the negative effect of stress deriving from raising a child with ASD. Family support had a direct effect on parental FQOL. This finding supports the hypothesis that family support is critical in promoting FQOL, consistent with research done in the United States (Davis & Gavidia-Payne, 2009), and applies in the Chinese context. Moreover, there is a significant mediating effect of family support on parental stress and FQOL. Together, these findings support the unified theory of FQOL (Hsiao et al., 2017; Kyzar et al., 2012; Zuna et al., 2009). Although previous studies suggest raising a child with ASD can be stressful for parents and can negatively impact their FQOL, if robust family support is available to meet the demands associated with parenting a child with ASD, the stress can be mediated (Abidin, 1990).

Socioeconomic Status and Parental Stress

Parental stress is also tied to family socioeconomic status (SES) and has particular relevance to families with a child who faces mental health challenges. As noted earlier, families with children with special needs face additional financial burdens associated with the child's care and limitations on adult caregivers' ability to have a job outside the home (Stabile & Allin, 2012). When these stressors are compounded by already-low socioeconomic status, the stress becomes that much more intense. Among families struggling to meet basic needs (e.g., food, shelter, and health care), the likelihood that those families include a child with a disability is higher than families who are not materially struggling. Children with disabilities are significantly more likely to live in poverty (Parish & Cloud, 2006). For example, studies examining families who experience homelessness/housing instability have demonstrated that approximately 20–25% include a child with a medical, physical disability and overlapping learning/emotional challenges (Glendening et al., 2018; Hayes et al., 2013).

Families with lower SES may also struggle with access to adequate food, both in quality and quantity. Kursmark and Weitzman define food security as “having access, at all times, to enough food for active, healthy life, including the ready availability of nutritionally adequate and well-tolerated foods and the ability to acquire such foods in a socially acceptable way (Kursmark & Weitzman, 2009).” Food insecurity occurs “when the availability of nutritionally adequate and well-tolerated food, or the ability to acquire such foods, is limited or uncertain” (Rose & Bodor, 2006). Although more research is needed to determine exact rates of food insecurity among children with disabilities, a few things are clear: Parents often restrict their own food intake so that their children may eat (Coleman-Jensen et al., 2017); parental disability status may lead to household food insecurity (Sonik et al., 2016); and access to consistent and quality nutrition is essential to the well-being of children with disabilities, whose health is often more vulnerable and whose developmental trajectory less certain than children without disabilities (Sonik et al., 2016).

Understanding the ecology of children living in poverty is essential to supporting their overall well-being and caregivers. However, the context in which a child lives is often left out of screening and assessment processes (DeCandia et al., 2021). When this happens, key factors influencing the well-being of children—in this case, the well-being of their caregivers—may be missed, and with it, an opportunity to support the family. When considering stress among caregivers of children who have disabilities, their SES and accompanying ecology must be considered. These include housing stability, access to healthcare, caregiver well-being, food security, trauma exposure, and much more.

Gender Difference and Parental Stress

Family systems are dynamic and interconnected systems in which one family member (e.g., emotions and behaviors) is affected by other family members (Bronfenbrenner, 1979; Nelson et al., 2009; Turnbull et al., 1984). For instance, studies by Hastings et al. (2005) and Kayfitz et al. (2010) found that fathers’ level of stress with children with ASD is strongly associated with mothers’ stress levels. One parent’s failure to cope with their emotions may influence the relationship between the other parent and the child (Rodriguez et al., 2019). Parental stress may be decreased by couples sharing child-rearing responsibilities and giving more support to each other (Abidin & Brunner, 1995). Family members’ needs are also more likely to be met through couples sharing the demands and needs of children with disabilities, contributing to improved FQOL (Davis & Gavidia-Payne, 2009).

According to Bronfenbrenner’s (1979) ecological systems and Turnbull et al.’s (1984) family systems theory, the family is a dynamic and interconnected system, and the members are affected by each other. The family system emphasizes the interaction between fathers and mothers (Turnbull et al., 1984). The particularly important role of co-parenting relationships within families of children with ASD has been investigated (Thullen & Bonsall, 2017). Research suggests that fathers and mothers have interactive effects on each other and the child and family outcomes. For example, Sharabi and Marom-Golan (2018) conducted a study in which they compared mothers’ and fathers’ involvement in family support (e.g., educational services, disability-related services, health care support) and perceptions of both formal and informal social support in Israel. They reported significantly higher levels of maternal involvement and that maternal involvement was associated with higher levels of parental distress. Furthermore, they found the level of social support and parental education level as the contributing factors associated with the level of fathers’ involvement.

Similarly, Hartley and Schultz (2015) found that mothers in their study reported a higher number of needs that were unmet than did fathers, and fathers were often more satisfied than mothers with current support services. Further analysis suggests child age, co-occurring behavior problems, an intellectual disability, parent education, and household income were associated with mothers’ and fathers' different support needs. Researchers also found that fathers with low socioeconomic status perceived more basic and immediate support needs. Another study by Pozo et al. (2014) reported other contributing factors (e.g., problem behaviors) on fathers' and mothers' discrepancy of coping with children with disabilities.

Although historically, mothers have been the primary caregivers of children with disabilities and the participants in research on children with disabilities, fathers are increasingly included in research on children with disabilities (Huang et al., 2012). Additionally, research has indicated the particularly important involvement of fathers and the role of co-parenting a child with special needs (Hu et al., 2019). However, collecting data from one individual family member and studying the entire family unit is problematic because the conclusions drawn at the family level using the data collected from one individual family member might not be accurate. Therefore, it is imperative to involve both parents in research on the FQOL of children with special needs.

Most studies examining child behavior problems and parental stress have included only mothers. However, fathers can form different relationships with their children (Phares, 1996), have different opportunities to observe them (Hay et al., 1999), and have different experiences and associated outcomes of parental stress (Roggman et al., 2007). Studies using descriptive analysis suggest that mothers may experience significantly higher stress levels than fathers (Ang & Loh, 2019). Meanwhile, fathers reported fewer social interactions with family, friends, and health professionals than mothers (Hickey et al., 2018). A recent study (Pozo et al., 2014) attempted to explore how fathers' and mothers' social support and psychological well-being are related to FQOL using separate path analysis models. Findings suggest high agreement among mother and father report of behavioral problems in children ages 3 and 4 years, particularly among the parents of children with delays, and similar relationships between child behavior problems and parental stress for mothers and fathers (Baker et al., 2002, 2003).

A more recent study (Zeng et al., 2021) suggests a strong actor effect of family support on decreasing stress and improving FQOL for both mothers (total effect = 0.650) and fathers (total effect = 0.444), respectively. This study further validates this claim and indicates that both mothers and fathers may benefit from a strong family support system. Although raising a child with ASD can be stressful for both fathers and mothers (Harper et al., 2013; Rivard et al., 2014), robust family support can alleviate parental stress and change their perception of FQOL (Abidin, 1990).

When considering fathers as the actor and mothers as the partner, fathers' FQOL are positively associated with fathers' perceived support and mothers' perceived support (Kenny & Cook, 1999). That is, fathers' FQOL (Y) is associated with as much by their own perceived support (X) as with their partners' perceived support (X'). This would occur if the person were as concerned with the partner's outcomes as with his or her own outcomes (Kenny & Cook, 1999). In other words, mothers' perceived support may accurately represent fathers' priority in family support. Mothers could know better about the family needs and priorities since parenting largely falls on the mother's side (Johnson & Simpson, 2013).

In contrast, when considering mothers as the actor and fathers as the partner, mothers' FQOL are positively associated with their own perceived support but negatively associated with fathers' perceived support. This is defined as the contrast pattern (Kenny & Cook, 1999). In contrast to the couple-oriented case, where the partner's success is valued as much as one's own outcome, the contrast social comparison typically involves dissatisfaction with the partner's success. In other words, what the father perceived as the priority for family support may not accurately represent mothers' perceived priority and preferences. This discrepancy may reflect the traditional family roles. Specifically, this finding may reflect that fathers are not as involved as mothers in daily caregiving for the child with ASD. The level of services needed and specific types of support that fathers perceive as highly valuable may not be valued equally by mothers (Wang & Michaels, 2009). Yet, research has shown that fathers' involvement is essential to promote mutual support (Flippin & Crais, 2011). Therefore, it is important to use a family-centered approach and involve both fathers and mothers in the support plan and implementation process. Meanwhile, the contrasting pattern (opposite direction of the effects) suggests large discrepancies in perception, which may be a source of family conflict (Hu, 2022).

Intervention and Policy Recommendation

Parents of children with mental health and behavior problems reported a higher level of parental stress than their peers (Baker et al., 2002, 2003; Brobst et al., 2009). When parents experience stress, they may be less responsive to their child's needs and exhibit punitive or negligent parenting (Belcher et al., 2007). Major factors contributing to the parental stress of raising children with disabilities include the child's behavioral problems, parents' coping skills, and family support. Practitioners could provide parents with appropriate and applicable behavior management skills and recommendations to work with their child's problem behavior at home and in the community. Also, organizing counseling groups can be an effective way to help parents develop new and positive coping strategies and gain support from outside of their family and school, thus reducing parental stress and leading to the child's success with disabilities. Meanwhile, it is worth noting that practitioners need to cautiously consider all other factors and characteristics of the families and their children's disabilities (e.g., the negative social stigma associated with the child's disabilities, socioeconomic status of the family) when helping parents reduce their stress.

Many children and adolescents with severe emotional and behavioral challenges are served by systems of care. A system of care was first defined in 1986 by Stroul and Friedman as "a comprehensive spectrum of mental health and other necessary services which are organized into a coordinated network to meet the multiple and changing needs of children and their families." Youth with emotional and behavioral challenges present to these systems of care with various mental health diagnoses, including externalizing disorders such as oppositional defiant disorder, conduct disorder, or substance use disorders and internalizing disorders such as depression and anxiety (Liao et al., 2001). Family support (e.g., advice on problems specific to their child, help with child care) is a consistent predictor of most dimensions of parental stress (Guralnick et al., 2008). Practitioners can play an important role in helping parents of children with disabilities gain more support from outside of their families.

A systematic family support network should be provided for both mothers and fathers to enhance the overall FQOL. Research indicates that family support adequacy can significantly predict FQOL for families of children with ASD. The local government in charge of affairs for children with ASD (i.e., local association for people with disabilities) should provide formal family-centered services (i.e., information support; professional support, respite care) to prepare families in responding to stress and build resilience (Hu et al., 2019). The possible programs can include weekend respite care services, psychological counseling, mental health services, and information support on education and healthcare services for children with ASD. Respite care and parent-to-parent programs for families with ASD found promising effects in reducing parental stress. Furthermore, informal support (i.e., emotional support, parent-to-parent groups, respite care) could be a cost-effective and efficient way to help families deal with parenting challenges and meet the healthcare needs of their children with ASD (McCabe, 2008). With regard to developing informal support, government and NGOs could design and provide parent-to-parent programs, hotline services, and home visits by relatives or community members to families of children with ASD. Moreover, support providers should assist parents in realizing the potential benefits of seeking support outside of family members. Community members, friends, and relatives are sources of informal support, exerting a positive role in providing emotional support.

Teaching coping strategies to parents can help alleviate some of the parental stress (Hall & Graff, 2011; Lyons et al., 2010; Zablotsky et al., 2013). Coping refers to behavioral or cognitive efforts that individuals use to minimize their level of distress or stress (Zablotsky et al., 2013). Parents often lack strong coping skills to solve real problems: Many of them use emotional coping or avoidance-oriented coping, which lacks effectiveness and leads to higher levels of stress (Pottie & Ingram, 2008; Zablotsky et al., 2013). However, research suggests that parents with more effective coping skills experience lower levels of parental stress (Raphael et al., 2010). For example, short-duration (1–3 months) mindfulness-based interventions and cognitive behavioral therapy in clinical settings are recommended for socioeconomically disadvantaged parents to reduce stress. There are several ways that parents may adopt to cope with stress: (a) using task-oriented coping to solve problems through specific strategies that minimize the influences of problems; (b) using emotion-oriented coping by reacting to the stress or problem through emotional responses, such as self-preoccupation or performing fantasizing reactions; (c) using avoidance-oriented coping to avoid a stressful situation through escaping; and (d) using distraction by engaging in a substitute task (Lyons et al., 2010). Providing support or parental education for parents to learn more effective coping strategies is important and beneficial for families of children with disabilities (Hsiao, 2018).

Moreover, the discrepancy in fathers' and mothers' perceived priority and support is needed to improve their FQOL. On the one hand, more services should support fathers' involvement in parenting children with ASD. Also, it is important to promote mutual communication and shared understanding for the couples through marriage consultation or other services. Diverse support should be available for both fathers and mothers to choose because they shoulder different roles in parenting children with ASD. Exploring needs from both fathers and mothers will be helpful for support providers to design and develop individualized family support and services. Moreover, as parent-delivered interventions become pervasive (Clark et al., 2019), practitioners should take the distinct needs and benefits of in-home interventions from fathers and mothers into careful consideration, respectively. Also, it is important to involve both fathers and mothers in the support plan and implementation process.

Families demonstrated the lowest level of satisfaction with emotional health, consistent with past research. While this finding is likely due to the stress of caring for a child with special needs within a context with limited support for families, it points to the need to provide more services to address emotional health. One implication is that families should have greater access to mental health professionals and family support counselors. With greater access and use of these professionals for support, it is possible that emotional health would be better and support more positive outcomes for families. Furthermore, more personnel preparation is needed for educators, medical staff, and mental health professionals working with children with special needs families. In the educator preparation programs, courses on family-professional partnerships should be integrated into the curriculum to help new educators better work with families with their unique needs. While educators, medical professionals, and mental health professionals are all trained in their specific disciplines, they are often not trained in working with families with additional FQOL concerns, such as having a child with autism. Instead, we advocate that more attention should be allocated to preparing professionals working with families with children with mental health and behavior problems to address their unique needs for family support.

Conclusion

Providing care for a child with serious emotional or behavioral difficulties is a significant source of stress for parents and caregivers (Angold et al., 1998; Brannan & Heflinger, 2001; Taylor-Richardson et al., 2006). Furthermore, the stress associated with caring for a child with emotional and behavioral difficulties may be compounded by factors at the parent, family, and larger social and community levels. This chapter has synthesized the biological, physical, and mental aspects of stress and how stress may affect parenting and family functioning. We discuss the associated factors that may contribute to the development of parental stress.

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9

Parental Substance Use

Janina Dyba, Diana Moesgen, and Michael Klein

Introduction

The misuse and dependency of psychoactive substances is a worldwide phenomenon and of substantial health concern. It is estimated that 1.4% of the global population (107 million people) suffer from an alcohol use disorder (AUD) and approximately 0.9% have a drug use disorder (71 million people). Throughout the world, an estimated 271 million people had used illicit drug in the past year, especially cannabis and opioids (Dattani et al., 2021), while the global use of the socially accepted substance alcohol is of course even larger. Thus, substance use disorder (SUD) is one of the most frequently occurring mental health issues and significantly attributes to the global burden of disease (Degenhardt et al., 2018). According to the Substance Use and Mental Health Service Administration (SAMHSA) (2020), 20 million people in the United States were diagnosed with a SUD in the past year. Of these, 71.1% had a past year AUD, 40.7% had an illicit drug use disorder, and 11.8% had both an AUD and illicit drug use disorder. In the context of illicit substances, a continually high prevalence of opioid use is reported, with 4.0% of the population in North America misusing this type of substance (United Nations Office on Drugs and Crime, 2019).

While there are no precise numbers available that could determine the exact amount of children affected by parental substance misuse, it is assumed that many of the alcohol and drug using community are parents to minor children. Estimations of federal institutions in the United States report that an average of 8.7 million children under the age of 17 years lived with a substance-using parent in the past year (Lipori & Van Horn, 2017). One in 10 children (approx. 7.5 million) are living with a parent misusing alcohol, and 1 in 35 children (approx. 2.1 million) are living with a mother or father who uses illicit substances. The overall assumption that over 12% of all US children across different age groups and thus in varying developmental stages grow up with a substance using parent underlines the severity of this public health concern (Lipari & van Horn, 2017).

Parental substance use is known to impact children's development significantly, yet understanding the effects of parental substance use on families and children is a complex matter. Existing theoretical models provided in this field vary largely with regard to their specificity. Beekman and Neiderheiser (2013) point out that in the context of parental substance use, the multidimensional nature of trans-

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generational transmission and children's problematic development need to be accounted for. This includes genetic aspects, effects of prenatal substance exposure, and disruption of parenting and family processes. Hence, the following chapter will focus on the social environment and parenting practices in families affected by parent's SUD and present developmental outcomes under consideration of risk and protective factors for children growing up in these families. Additionally, support needs and existing interventions for both parents and children are outlined and discussed.

Family Environment

When families are affected by parental substance use, the psychosocial living situation tends to be unfavorable and thus the developmental setting for children is often compromised. Aspects of social marginalization, a low socioeconomic status, and high rates of unemployment are observed significantly more often than in families without problematic substance use (Serec et al., 2012). Here, the interaction between unfavorable social conditions and the substance use of the parent can result in highly dysfunctional family patterns, such as pronounced disharmony and high numbers of and intense conflicts between parents. Thus, children frequently experience domestic disputes and sometimes become involved in these themselves (Templeton et al., 2009). Affected children can develop varying emotional responses to this disharmonious setting, from aversion to the substance-involved parent up to worries and attempts to protect them (Klein, 2005). Domestic violence within the family further complicates the situation of affected children, since they are more likely to witness and become victims of family violence than children from families not affected by parental SUD (Ellis et al., 1997).

In addition, parental separation or divorce, or even the death of a parent, is experienced more frequently by children from substance-involved families than by children from unaffected families (Waldron et al., 2013). This results in higher life stress for the children through unanticipated relationship breakdowns with the caregiver. Frequent (and sometimes repeated) out-of-home placements of children by child welfare services, parental inpatient treatment(s), or incarceration(s) can further destabilize the parent-child relationship and thus promote insecure attachment patterns or even traumatization (Klein, 2006).

This situation is often aggravated by adverse family dynamics such as secrecy, denial of the substance use problem, and parental role reversal or role confusion (Kroll, 2004). Additionally, strong feelings of shame and isolation shape the children's behavior, which can lead to attempts to keep their family situation a secret from others, and eventually lying or inventing fantasy stories (Backett-Milburn et al., 2008). Tabooing the family problem of substance use is therefore a reaction in which affected children might actively participate in, without a conscious decision or alternative behavioral strategy.

It should be noted that growing up in a family with substance use problems often means an undesirable accumulation of stress for the children, which endangers their well-being in the short- and long-term. This is usually even more intense when illicit substances are involved. Here, lifestyles of parents who use drugs are more often characterized by little structure, poverty, and illegal activities (Straussner & Fewell, 2015). These living circumstances can be shaped by the drug-subculture (e.g., prostitution, delinquency, or incarceration) and volatile partner relationships within the substance-using community (Klein, 2006; Straussner & Fewell, 2015). Frequent constellations of both parents using substances and children's young age tend to complicate the situation at an early stage in child development (Klein, 2006; Straussner & Fewell, 2015). In addition, long-term drug use is often associated with poorer physical health and illnesses of the parent, the transmission of blood-borne viruses such as hepatitis C and HIV, and comorbid mental health problems (Straussner, 2011). Generally, there is a more pronounced risk social isolation and societal marginalization in these families and thus children often suffer from the consequences of stigmatization (Klein, 2006).

Parenting

In addition to problems in the overall family environment, the relationship and direct interaction between caregiver and child is often compromised by the parental misuse of alcohol or drugs. When parents suffer from a SUD, their priorities frequently shift to consumption and acquisition of the substance, while parental responsibilities are neglected. Parenting capacities, such as basic care for the child, ensuring child's safety, emotional warmth, stimulation of development, guidance and boundaries, co-regulation, as well as providing a stable environment, tend to be negatively affected by the parental substance use problem. (Cleaver et al., 2011).

With regard to parenting practices, less positive parenting behaviors have been observed in parent-child interactions (Arria et al., 2012) and parents with a SUD have been found to show less emotional engagement, encouragement, warmth, and less responsiveness with their young children (Chaplin & Sinha, 2013). On the other hand, negative parenting behaviors by parents with a substance issue are often predominant. These include more punitive and harsh practices to discipline and control children and less parental monitoring (Calhoun et al., 2015). When children approach adolescence, maternal substance use has also been linked to more authoritarian, commanding, and overinvolved parenting (Solis et al., 2012).

Generally, in the course of substance use and intoxication, parental behavior and moods tend to be erratic (Templeton et al., 2009), which further challenges the child's formation of a secure attachment pattern toward the parent. The common effects of specific substances also shape parental behavior. Mayes and Truman (2002) suggest that the type of substance primarily used by the caregiver may be associated with specific behavioral tendencies in parent-child interaction (Slesnick et al, 2014). While alcohol, marijuana, or opioids are linked to stronger withdrawal and depressed moods, stimulants such as cocaine or methamphetamine may be accompanied by behavior toward activity, impulsivity, and intrusion. Children's predominant experiences will thus differ in families affected by different substances, ranging from parental withdrawal and decreased responsiveness to unpredictable activity and agitation (Mayes & Truman, 2002).

Parental intoxication is often noticed by the child and expresses itself through different ways such as inadequate language and communication, shifts between physical proximity and rejection, or unpredictable reactions ranging from permissiveness and overreactivity. The resulting lack of continuity and age-appropriate boundaries can leave the child disoriented, overwhelmed, and insecure (Dyba et al., 2019a).

Furthermore, parents with SUD have been found to be at increased risk for inappropriate and harmful behaviors when interacting with their children (Forrester & Harwin, 2011) and lifetime substance use has been linked to tendencies toward child abuse (Ammermann et al., 1999). Here, children are at an increased risk for experiencing violence and physical abuse, sexual abuse, and neglect (Famularo et al., 1992; Walsh et al., 2002). Thus, the involvement of child welfare services in this target group is high, which can further strain the family dynamics.

The specific aspect of neglect often includes lack of provision for basic needs and care, but also the lack of adequate emotional nurturing in terms of closeness, attention, and love (Hill, 2013). When parents do not exercise their responsibilities and day-to-day tasks, children tend to take on these responsibilities. As a result, children may face tasks or are left with decisions and responsibilities that are inappropriate for their age and developmental level. The phenomenon called "parentification" describes this slowly developing role reversal and results in the children taking care of the family, for example, by providing for younger siblings, managing household chores, or even taking care of the parent (Pasternak & Schier, 2014). As parentifying behaviors become chronic, children continuously fulfill duties that the parents themselves can no longer fulfill. This leaves children tremendously overwhelmed in the long term, since they cannot adequately cope with the age-inappropriate tasks and burden (Wolfe, 2016).

The predictors and causes of parental tendencies toward a neglectful behavior in substance-affected families have been studied extensively. Dunn et al. (2002) summarize that a parental SUD is directly linked to increased neglect and that their own experiences of childhood neglect in their family of origin moderate this relationship. Thus, transgenerational transmission of parenting models and behaviors, especially in terms of neglectful parenting, needs to be assumed here. Furthermore, comorbid psychiatric parental disorders as well as drug-induced neuropsychiatric symptoms can contribute to increased neglectful behavior by the parent (Dunn et al., 2002).

The described adverse or even traumatic experiences in the family, principles of social learning, and the lack of adequate prenatal role models largely contribute to the risk of ongoing problematic cycles of transgenerational transmission of SUD and/or other mental health problems in substance-affected families.

Children Affected by Parental Substance Use

The research on particular effects on children with a substance-using parent is fairly large (for an overview see Salo & Flykt, 2013; Straussner, 2011). Parental substance use can affect a variety of developmental areas such as cognitive and academic functioning, socio-emotional development, physical development, and behavioral adjustment (Solis et al., 2012). The specific effects of the parental SUD are associated with the age of the child and can present themselves differently at specific developmental stages in life (Straussner, 2011). Furthermore, the extent of the children's exposure and the severity of the parental problem need to be considered when focusing on children's developmental risks (Velleman & Templeton, 2016). Generally, the developmental setting for children involved is more disadvantageous, the more the adversities are present in the family (Velleman & Templeton, 2016).

Prenatal Exposure to Substances

Starting even before the child's birth, maternal substance use during pregnancy is frequently related to severe consequences for children. Prenatal exposure to alcohol or drugs is linked to a variety of pre-, peri- and postnatal problems for both mothers and children, including increased numbers of miscarriages, premature child birth, children's low birth weight, smaller head circumference, increased irritability, and further developmental impairments.

Despite political attempts to reduce maternal substance use during pregnancy, numbers of infants born with prenatally acquired impairments remain high. Globally, nearly 10% of women use alcohol during pregnancy, resulting in 119.00 children born with a fetal alcohol spectrum disorder (FAS-D) each year (Popova et al., 2017). A systematic review indicates that around the world, 15 in 10.00 people suffer from a FAS-D (Popova et al., 2017). In the United States, maternal alcohol use and binge drinking during pregnancy have been rising within the past decade (Denny et al., 2020).

FAS-D manifests in severe symptoms such as craniofacial anomalies, growth retardation, neurological abnormalities, cognitive impairment, and birth defects (Wozniak et al., 2019). Resulting from the damage to the central nervous system, mental retardation can frequently occur.

Besides FAS-D, neonates may suffer from withdrawal symptoms, primarily after maternal opioid use, resulting in the critical neonatal abstinence syndrome (NAS). In the United States, the number of NAS in newborns has increased dramatically by 433% between 2004 and 2014 (Jilani et al., 2019) and is still rising (US Department of Health and Human Services, 2021). As a result, approximately every 15 seconds a child with a NAS is born in the US (Jilani et al., 2019). The NAS is characterized by hyperactivity of the central and autonomous nervous system in the newborn as well as gastrointestinal complications and requires intensive care treatment directly after birth (Sanlorenzo et al., 2018). Similar patterns of infant drug withdrawal can be observed in children affected by maternal methamphetamine during pregnancy. Newborns exhibit significantly enlarged stress levels at birth and a strong activation of the central nervous system, while also showing pronounced lethargy (Smith et al., 2008). A NAS after maternal methamphetamine use is therefore described as heterogenic, between lethargic and overstrained behavior of the newborn (Mühlig et al., 2017). Prenatal methamphetamine-exposure has also been linked to neurobiological and neuroanatomical anomalies (Kwitakowski et al., 2014) and thus is frequently associated with cognitive, social, and emotional deficits in course of the children’s development (Abar et al., 2013; Twomey et al., 2013).

Next to prenatal risks, children from substance-involved families often exhibit developmental and mental health problems, deriving from the above-described maladaptive family environment and associated problematic interactions with their caregivers. Effects of prenatal substance exposure and postnatal adverse living situations are intertwined and prenatally acquired impairments often interact with risk factors present after birth in complex ways.

Mental Health Problems

Children from substance-involved families are considered as a high-risk group for the development of an own SUD. Early substance use is the most frequently investigated subject in the research field of “children with parents with a substance use disorder“(Rossow et al., 2016). Numerous studies have demonstrated that children from substance-affected families are more likely to.

(a) start using substances at a younger age (Waldron et al., 2014),
(b) experience first intoxications earlier (Wong et al., 2006),
(c) exhibit more binge drinking (Weitzmann & Wechsler, 2000), and
(d) make a faster transition from the first substance use to substance abuse and dependency than children from unaffected families (Hussong et al., 2008a, b).

Explaining the mechanisms of transmission of parental SUD to their children is complex. In the case of alcohol problems, both genetic (Sørensen et al., 2011, Palmer et al., 2019) and psychological factors such as model learning (e.g., substance use for self-medication, coping with negative feelings) (Cleveland et al., 2014) or the transmission of positive alcohol expectancies (Smit et al., 2019; Waddell et al., 2020) are regarded as relevant factors in this context. In adulthood, coping with the adverse and/or traumatic childhood experiences through use of alcohol or drugs must also be considered (Zobel, 2017).

Apart from or in addition to the risk for the transmission of the substance use disorder, children from substance-involved families often develop other severe mental health problems (Raitasalo et al., 2019). Children from substance-involved families are at increased risk for externalizing behaviors, such as conduct disorders (Molina et al., 2010) or attention-deficit/hyperactivity disorder (ADHD) (Parvaresh et al., 2015). Externalizing tendencies can appear at all ages of childhood and adolescence or later in adulthood (Park & Schepp, 2015). Moreover, children from substance-affected families tend to exhibit higher rates of internalizing behaviors as well (Hussong et al., 2008a, b). Research findings demonstrate that there is statistically significant difference between children from alcohol-involved families and unaffected children with regard to anxiety, depression, low self-esteem, separation anxiety, social phobia, and obsessive compulsive problems (Hill et al., 2011; Fuller-Thomson et al., 2013; Omkarappa & Rentala, 2019) in childhood, adolescence, and later in adulthood (Park & Schepp, 2015). Moreover, recent studies indicate that a parental history of AUD may be associated with posttraumatic stress symptoms in their offspring children (Bender et al., 2021). Both externalizing and internalizing disorders may be regarded as risk factors for the development of a SUD in adolescence or adulthood (King & Chassin, 2008).

Health Behavior

In addition, general health behavior is often decreased in this group, especially in children from families with parental alcoholism (Forrester & Harwin, 2011). Affected children tend to spend more time with electronic media (television, smartphone, or computer), exercise less, and exhibit overall unhealthier dietary behaviors. This may on one hand serve to reduce stress in the children and on the other hand can represent model learning effects of unhealthy parental behavior. These adverse health behaviors may be regarded as predictors of later mental health problems and can lead to stigmatization (e.g., for obesity) and bullying in school and other peer contexts.

Protective Factors and Resiliency

The development of SUD or other mental health problems in children from substance-affected families cannot be explained by the parental SUD only. The development of children from substance-involved families rather depends on the extent of presence of the various risk factors mentioned above on the one hand and protective factors that can be child- or environment-related on the other. Since substance-affected families often have a high incidence and accumulation of risk factors, counteracting environmental protective factors and individual resilience are of particular importance.

Velleman and Templeton (2016) reviewed and summarized the following protective factors for children from families with a substance-using parent. Here, factors specific to the family and parenting behavior, other environmental and social factors, as well as individual traits can be distinguished.

Factors Related to Parenting and Family Environment Are

- Supporting and trusting relationship with a stable (non-substance misusing) adult (e.g., outside the primary family).
- Close positive bonds with at least one adult in a caring role (e.g., other parent, siblings, grandparents).
- Early and compensatory relationship experiences with primary caregiver(s) in first years of life.
- Low levels of separation from the primary caregiver in the first year of life.
- Affection from members of extended family.
- Parental self-efficacy and good parental self-esteem.
- Traditions and rituals (cultural, religious, familial) within the family.
- Consistency and stability in everyday family life (e.g., social life, rituals, roles, routines).
- Families spending time together.

- Openness and good communication within the family, including open and appropriate discussion of family problems.
- Child having family responsibilities.
- Small family size, larger age gaps between siblings.
- Adequate finances, employment opportunities/income; physical home environment.
- Constructive coping styles and deliberate parental actions to minimize adversity for children.
- Knowledge of protective factors.
- Strong family norms and morality.
- Characteristics and positive parenting style of parents (a balance between ‘care’ (parental support, warmth, nurturance, attachment, acceptance, cohesion, and love) and ‘control’ (supervision, monitoring, clarity about family rules and boundaries, parental discipline, punishment)).
- Parents having high expectations of the child, and clear and open communication of both expectations (about alcohol use/nonuse and also generally) and potential disapproval, if expectations are not met.
- Parental modeling of the behaviors expected of or wished for from their children.
- Absence of domestic violence/abuse, family breakdown, and associated losses.

In direct relation to the parental substance use disorder, Velleman and Templeton (2016) point out that parental SUD of low intensity and shorter duration as well the parent receiving treatment may also serve as important protective factor for affected children. Furthermore, children are less likely to be affected by a parental SUD, if drug paraphernalia and substance use behaviors are kept away from children and outside the home. In addition, the presence of one non-substance-using parent is essential here.

With regard to the social environment and community, factors of relationships outside the family, a supporting community, and culture are especially relevant.

Protective Community/Environmental Factors Are

- Cultural connectedness, values, and identity.
- Support from an adult/adult role model (e.g., teacher, neighbor).
- Strong friendships and relationships with peers with opportunities to talk to about the problems at home.
- Living in a community where there is a sense of caring, mutual protection.
- Community engagement and supportive social networks; strong bonds with local community/community involvement.
- Positive school experiences and influences; opportunities through education and employment – out-of-school/community activities.
- Attendance at school, achievement, monitoring of progress, and acknowledgment of success.
- Teachers’ expectations and discipline.
- Positive opportunities at times of life transition.
- Support from key community services such as healthcare.

Furthermore, each child’s individuality attributes to his or her specific resilience to the adverse family circumstances.

Individual Resilience Factors Are

- Internal locus of control – a sense that they can make a difference to their circumstances and have the power to change their situation.
- 'Active agency' in adopting coping strategies, seeking support and choosing what to share about their circumstances and with whom
- Personal qualities and social skills (e.g., expression of feelings, knowledge, life choices, self-reflection, easy individual temperament/disposition, emotional regulation, self-efficacy).
- Having a hobby or a creative talent or engagement in outside activities or interests (e.g., sport, singing, dancing, writing, drama, painting) – anything that can provide an experience of success and/or approbation from others for the child's efforts.
- Self-monitoring skills and self-control.
- Coping and problem-solving skills – ability to think about and make decisions about coping.
- Plans for the future/yearning for a better future.
- Intellectual capacity.
- Sense of humor.
- Sense of self-strength with regard to the parent's problem (i.e., resisting overidentification with, and maintaining psychological separation from parental problem).
- Perceptions of 'substance misuse' behavior, good knowledge, and understanding of the parental problem(s).
- Not taking drugs or drinking.
- Achieving a balance between supporting the parent(s) and looking after themselves.
- Religion or faith in God.

Wlodarczyk et al. (2017) also conducted a systematic review on protective mental health factors in children of parents with alcohol and drug use disorders and were able to replicate and specify the findings from Velleman and Templeton (2016). According to their study, the following child-related, family and parental, and environmental factors can be confirmed as protective factors for children at risk: The child's ability to engage with adults, secure parent-child attachment, strong family cohesion and adaptability, low parenting stress, an accepting mother, and high social support for the child. Wlodarczyk et al. (2017) were also able to identify biological protective factors, that is, increased activation in the orbital frontal gyrus and left insula as well as blunted activation of the mesolimbic reward circuitry.

It should be noted, though, that resilience factors are not related to individual only, but the family system as a whole. First approaches to systematize family resilience factors were conducted by Walsh (2003), characterizing family resilience by shared belief systems, organizational patterns, and communication/problem solving within the family. Walsh's model has been supported in the context of parental alcohol use and higher family resilience has been associated with more positive parenting behavior (Coyle et al., 2009) and reduced parenting stress in high-risk families (Kim et al., 2020).

The identification of risk and resilience factors is essential and serves the conceptualization of preventive and therapeutic measures for children.

Interventions and Support

The illustrated impact of parental substance use on families and children calls for systematic approaches to improve the living situation and developmental setting for children involved, foster protective factors, and strengthen parental child-rearing competencies. Repeating cycles of transgenerational transmissions of maladaptive parenting, adverse family dynamics, and substance use disorders need to be interrupted permanently. Promising approaches include targeted preventive measures and interventions for both substance using mothers and fathers and their offspring children.

Interventions for Parents

Primary support for substance-using parents generally focuses on the individual and prioritizes treatment of the SUD. So far, the issue of parenting does not appear to be frequently integrated into the treatment of parental SUD, despite a documented need for tailored services for this group and a variety of existing trainings (Arria et al., 2013). Especially in the US, the range of existing interventions for parents with SUD is significantly broader than in other countries. Several systematic reviews have discussed issues of conceptualization, methodology, and outcomes in recent years (Heimdahl & Karlsson, 2016, Moreland & MacRae-Clark, 2018, Neger & Prinz, 2015, Peisch et al., 2018). The existing programs have been demonstrated to be effective with regard to reduction of substance use, improvement of parenting practices, decrease in child maladjustment, and improvement of psychosocial outcomes and parent-child-interactions among others (Moreland & McRae-Clark, 2018, Neger & Prinz, 2015). The most recent systematic reviews on parenting intervention integrated in substance use treatment by Moreland and McRae-Clark (2018), who identified seven interventions with effectives validated through randomized controlled trials, are presented below.

- Mothering from the Inside Out (formerly known as “The mothers and toddlers program”) [MIO]: The individual, outpatient intervention for females consists of 12 sessions and follows a mentalization-based approach. Results indicated an increase in reflective functioning and representational coherence and mother-child interaction was improved in terms of sensitivity and reciprocity (Suchman et al., 2017) after participation.
- Focus on Families [FOF; now known as “Families Facing the Future”] is an outpatient group intervention with 53 sessions for parents in methadone maintenance treatment and addresses the entire family, including children. The extensive family-focused intervention had positive long-term outcomes, especially with regard to parenting skills, parental drug use, or family management (Catalano et al., 2002).
- Engaging Moms Program [EMP] is tailored for mothers involved with family drug court and enhanced the probability of positive child welfare dispositions 18 months after drug court enrollment (Dakof et al., 2010).
- Relational Psychotherapy Mothers Group [RPMG] is an outpatient supportive group intervention for females with substance abuse and is comprised of 14 sessions. Results indicated short-term effectiveness in children’s emotional adjustment and reduction of depression as well as mothers’ reduction of substance use and child maltreatment (Luthar et al., 2007).
- Parent Skills and Behavioral Couples Therapy [PSBCT] addresses males entering outpatient alcohol treatment and their female partners. It includes topics of parenting, substance use, and relationship conflict within 24 outpatient sessions. Evaluation results revealed significant improvement with regard to substance use, parenting, and the involvement of child protective services (Lam et al., 2009).
- Attachment and Biobehavioral Catch-Up [ABC] is tailored for mothers in residential substance use treatment and follows an attachment-based approach. After completion of the 10 sessions, supportive parenting behaviors were significantly improved (Berlin et al., 2014).
- Family Behavior Therapy [FBT] addresses in mothers referred with drug abuse and / or involvement with child protective services. After 20 in-home sessions, results revealed reduction of child maltreatment and hard substance use (Donohue et al., 2014).

Even though some of the effects found in the experimental studies were small, they are of potentially great importance for the target group of substance using parents. A systematic promotion of parenting skills and family processes can prevent children's out-of-home placement, enhance parental sensitivity for children's needs, and strengthen confidence in mothers and fathers in their parental role.

Yet further research on the efficacy and feasibility of appropriate interventions remains necessary, especially in countries outside the United States. While the existing parenting programs can certainly help to shape interventions in other countries, language barriers, cultural specificities, and variations in organizational and financial structures of the welfare system might complicate a direct adaption outside North America. Furthermore, current parenting interventions integrated into substance use treatments are aimed primarily at mothers, and thus fathers with SUD are largely ignored (Heimdahl & Karlsson, 2016). Yet, from a developmental perspective, the father plays an essential role in the healthy upbringing of children. This concerns all phases of the children's development and includes aspects of emotional development and attachment, motor skills, promotion of autonomy, or the stimulation of cognitive development (Seiffge-Krenke, 2016). Hence, the involvement of fathers in parenting and family-oriented trainings should be considered regularly and evidence for this target group needs to be generated. Father-specific programs include "Dads too" (MacMahon, 2013) or "Fathering for Change" (Stover et al., 2018). The latter was able to achieve promising effects regarding emotion regulation, anger and aggression, and co-parenting relationships and was highly accepted among the participants. Once again, this underscores the need for opportunities inherent to father-specific approaches in prevention and treatment for men with SUD. In addition, existing evidence-based interventions focus primarily on alcohol and opioids, while other drugs remain largely unattended. Hence, there is a need for interventions tailored to the characteristics of parents using cannabis or stimulants, since substance-specific parenting characteristics need to be assumed. Following this approach, the German SHIFT-Parent Training for mothers and fathers using methamphetamines can be mentioned. The resource-oriented intervention is the first to address the substance specificity and foster parenting and family resilience (Dyba et al., 2019a, b).

Since functional parenting behavior is one of the greatest deficits in families with substance use problems, the offer of suitable interventions for substance using parents and their children urgently needs to be strengthened and established as a regular offer of substance use treatment and child welfare services. With regard to exposed children, this can be an important and effective preventive measure. The topic of parenting and children's needs should be integrated more strongly into the treatment of parents with SUD since it can represent, on one hand, an everyday-challenge for mothers and fathers. On the other hand, it can serve as an essential motivation for abstinence and treatment.

Interventions for Children

Procedures that encourage parents to enter substance use treatment and consider their parenting role as a part of their recovery process help to reduce the effects of parental substance use disorders on their children (Lipari & van Horn, 2017). However, there is also a substantial need for services that are targeted directly at children from substance-involved families and that address their psychological and developmental needs. Approaches include primarily school-based trainings, community-based trainings, and family-based interventions across different age groups.

A comprehensive systematic review conducted by Bröning et al. (2012) identified and summarized the outcomes and evaluation results of nine selective preventive interventions in childhood and adolescence targeted at children from substance-involved families. These programs were researched in 13 studies; that is, seven randomized-controlled trials, two controlled or quasi-experimental studies, three descriptive studies, and one qualitative study. Of these nine programs, the following eight exist in English:

School-Based Interventions

- The Stress Management and Alcohol Awareness Program [SMAAP] is a group program for 4th-, 5th-, and sixth-grade students with problem-drinking parents. Focus is set on self-esteem, coping behaviors, alcohol expectancies, problem solving, and social support. After the training, participants showed improved emotions-focused coping, problem solving skills, and social competency. (Short et al., 1995).
- Friends in Need addresses primary school students from drug-involved families. The program focuses on self-esteem, coping behavior, perception of emotions, group affiliation, and the "4 C's" ("you didn't cause it, you can't control it; you can't cure it, you can be okay"). Findings demonstrate reduced physical aggression for the intervention group compared to controls. (Dore et al., 1999).
- School-Based-Support-Groups [SBSG] are offered for students from grades 9 through 12 and focus on knowledge on substance abuse, family relations, and coping strategies. Results were able to demonstrate improved addiction-related knowledge in the study group as well as improved coping strategies and social integration in female participants (Gance-Cleveland, 2004; Gance-Cleveland & Mays, 2008).
- Children Having Opportunities in Courage, Esteem and Success (CHOICES) is a three-component program for 3rd- and fourth-grade students and included the following components: 1. "School Support Group": group meetings. 2. "Healthy Lifestyle Peer Mentors": ongoing mentoring program for participants; peer mentors received training and attended group meeting. 3. private lessons / homework assistance. Focus was put on emotions, identity and family, and coping strategies. Significant results for participants were increased self-esteem when the group program was combined with peer mentor training and increased social skills when the program was combined with peer matching. Attitudes toward substance use also improved significantly. Moreover, improvement in isolation, loneliness, coping skills, school, performance, and social behavior was observed (Horn & Kolbo, 2000a, b).

Community-Based Intervention

- Teen-Club is aimed at female teenagers from drug-involved families with a lack of social and family support. Contents of the program include problem solving, health education, social behavior, and home visits for crisis intervention. As a result, the study group went to school significantly longer, had a better chance of getting a job, showed fewer depressive symptoms, and had fewer unwanted pregnancies (Tuttle et al., 2000).

Family-Based Interventions

- Focus on Families [FOF see above as part of parenting intervention] is a family-based program for families with methadone-treated parents and contains sessions with family members and children. After the training, improved family behavior could be observed in the study group. For male participants, there was a reduced risk of developing substance use problems (Catalano et al., 1999, 2002).
- Strengthening Families Program [SFP, Utah Version] is a Canadian adaption of the SFP 6–12-year family-based program developed by Kumpfer & DeMarsh (1983) and was tested with children aged 9 to 12 with at least one parent addicted to alcohol in Ontario and Buffalo, NY. The program focuses on strengthening individuals as well as family structures. After the training, there was a

reduction in Oppositional Defiant Disorder Symptoms in the study group (Maguin & Safyer, 2003).

- Save Haven Program is an adaptation of the SFP (Utah version) for inner city African-American substance-using families with children aged 6 to 12. Focus is put on parenting training and children's and family skills training. In the high drug use group, improvements were observed with regard to both internalizing and externalizing behaviors. In the low drug use group, fewer school problems were reported for children. The total sample exhibited improved family cohesion and less parental drug use (Aktan, et al., 1999).

Intervention duration and intensity of these eight programs do not vary much. Most programs last between 8 and 14 weeks, including weekly sessions of approximately 60–90 minutes. Group sizes are not always reported, but mostly range from 8 to 12 children. As described above, findings suggest that these eight evidence-based interventions may be effective in reducing high-risk children's problems and improving positive behaviors, coping skills, and feelings.

It is up to future work to broaden the body of research on programs for children from substance-affected families. Besides testing new approaches for prevention across different age groups and settings, researching low-threshold and cost-effective methods such as web-based programs and counseling can be promising. Online support for this target group can increase the range of children and adolescents reached through anonymous ways, which might serve to reduce isolation and shame in them.

Generally, the support for children affected by parental substance is aimed at reducing the outlined risk factors and at fostering resilience and protective factors for each individual child. This includes measures of psychoeducation on substance and health education. Also, the promotion of self-esteem, coping skills, problem solving, and emotion perception and regulation are frequently considered as part of targeted interventions. Here, it is important to underline the need for non-stigmatizing approaches that are tailored to the age and developmental level of each child or adolescent.

Apart from evidence-based group programs, many more resources are available to help children when a parent uses substances or has an SUD. For example, SAMHSA (2021) provides online resources for professionals, including information for policy and practitioners, trainings and webinars, and local and state examples and projects.

Conclusion

Parental substance use disorders can have serious effects on children at any age and can lead to severe developmental issues in the short- and long-term, such as decreased cognitive and academic functioning, impaired socio-emotional and physical development, or restricted behavioral adjustment and social skills (Solis et al., 2012). The difficult situations within substance-affected families call for an implementation of systematic support for both parents and children. When a parent has an SUD, every family member should be involved in the recovery process and might need support himself. (Lipari & van Horn, 2017).

Here, early identification and timely engagement with substance use treatment services should be emphasized, potentially even before the birth of a child. It appears necessary, yet challenging, to develop routes to reach parents with limited or no history of service engagement. Low-threshold support should be made available to this group, while associated professions need to be educated on issues related to parental substance use.

In order to buffer the problematic influences for the children in the best possible way, individual and family protective factors should be promoted, especially when there is an accumulation risk factors within the family. A wide range of preventive measures, which should be offered as early as possible, can reduce the risks for the children. Yet, if these interventions are unsuccessful and a threat to the welfare of the child is imminent or already exists, child protection measures should be taken promptly and in coordinated ways.

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10

Parental Separation and Divorce: Risk and Protective Factors and Their Implications for Children's Adjustment

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Parental separation/divorce is a significant life stressor for many children. In this chapter, we review the prevalence and public health impact of parental separation and divorce, as well as their associated consequences for children. We highlight the heterogeneity of post-separation/divorce outcomes for children and discuss how nonmodifiable and modifiable factors explain differences in children's adjustment. We end with a brief overview of how clinicians can support children after parental separation/divorce.

Prevalence of Parental Separation/Divorce

A large number of children in the United States and around the world experience the divorce of their parents. Recent estimates indicate that in the United States more than 20 million children under the age of 21 live with a custodial parent while their other parent lives elsewhere (Grall, 2020) and that roughly one million children have experienced parental divorce every year since the 1970s (Kreider & Ellis, 2011). A review of national prevalence statistics of adverse childhood events placed parental divorce as the second most common for children in the United States, following economic hardship (Sacks et al., 2014). In addition to children who experience their parents' legal divorce, many more experience the separation of their parents who never married. Research from the Fragile Families study showed that children were five times more likely to experience parental separation if their parents were cohabitating instead of married at the time of their birth (Osborne et al., 2007). Regardless of parents' marital status, children's experience of family disruption, whether it be separation or divorce, is likely to be a stressful life event that confers risk for the development of problems across multiple domains.

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There are some documented differences related to income, education level, and race/ethnicity in the prevalence of parental separation/divorce. Researchers have documented that women from economically disadvantaged backgrounds are more likely to divorce and also experience reductions in income as a result of divorce (McLanahan & Percheski, 2008). Women with less education are also more likely to divorce (Martin, 2006) and a recent study found that divorce exacerbated economic inequalities related to education, especially for mothers, even after accounting for child support (Hogendoorn et al., 2020). Divorce was unrelated to poverty for fathers. Race/ethnicity is related to parental separation, with Black and Hispanic children being more likely to experience parental separation during childhood than White children (Kennedy & Bumpass, 2008). Thus, given the institutional inequality existing in the United States, the difference in separation/divorce distribution suggests that divorce may be one mechanism through which racial economic inequality is maintained and exacerbated (McLanahan & Percheski, 2008).

Consequences of Parental Separation/Divorce in Childhood, Adolescence, and Adulthood

Decades of research have shown that parental separation/divorce puts children at risk for a host of negative outcomes. Researchers have shown that parental separation/divorce confers risk for the development of children's mental health and substance use problems (Amato, 2000, 2001; Barrett & Turner, 2006; Furstenberg Jr. & Teitler, 1994; Hoffmann & Johnson, 1998; Jackson et al., 2016; Kasen et al., 1996; Strohschein, 2005; Tebeka et al., 2016), poor physical health (Bzostek & Beck, 2011; Schmeer, 2012; Troxel & Matthews, 2004; Yannakoulia et al., 2008), difficulties with social relationships (Amato, 2001; Kunz, 2018; Vandewater & Lansford, 1998), and academic underachievement (Amato & Anthony, 2014; Strohschein et al., 2009). Further, compared to those whose parents remain married, youth who experience their parents' separation/divorce demonstrate lower levels of subjective well-being and academic success in adolescence (Cherlin et al., 1991; Lansford et al., 2006; Størksen et al., 2006). They are also more likely to leave home prior to age 16 (Goldscheider & Goldscheider, 1998) and have children during adolescence (McLanahan, 1999). The two meta-analyses, which together reviewed more than 150 studies conducted through the 1990s (Amato, 2001; Amato & Keith, 1991b) on outcomes associated with parental separation/divorce, found small but reliable effect sizes (i.e., children from separated/divorced families scored about ¼ standard deviation lower than children from married families, on average, across outcomes).

The risks associated with parental separation/divorce in childhood can persist for many years, conferring higher rates of negative outcomes into adulthood. Adults who experienced parental separation/divorce in childhood or adolescence are more likely to report mental health problems (e.g., depression, anxiety, suicidality; Afifi et al., 2009; Alonzo et al., 2014; Amato & Sobolewski, 2001; Auersperg et al., 2019; Chase-Lansdale et al., 1995; Cherlin et al., 1998; Kessler et al., 1997; Rodgers et al., 1997; Zill et al., 1993), physical health problems (Amato & Keith, 1991a; Kraft & Luecken, 2009; Lacey et al., 2013; Maier & Lachman, 2000; Schwartz et al., 1995), substance use problems (Barrett & Turner, 2006; Huurre et al., 2006), and marital instability and dissatisfaction (Amato & Cheadle, 2005; Amato & Sobolewski, 2001; Tallman et al., 1999). They also report lower well-being (Sobolewski & Amato, 2007), have lower levels of educational, economic, and occupational success (Amato & Cheadle, 2005; Biblarz & Gottainer, 2000; Hetherington, 1999; Sun & Li, 2008; Zill et al., 1993), and report worse relationships with their parents, siblings, and romantic partners (Hetherington, 1999; Webster & Herzog, 1995; Webster et al., 1995; Zill et al., 1993). Further, they have higher early mortality (Martin et al., 2005; Schwartz et al., 1995). Two recent meta-analyses (Auersperg et al., 2019; Sands et al., 2017) that documented the outcomes in adulthood associated with parental separation/divorce in childhood showed small, reliable effect sizes (OR's ranging between 1.12 and 1.64, depending on the outcome).

Public Health Burden Associated with Parental Separation/Divorce

Given the high prevalence of parental separation/divorce in the United States and the wide range of negative outcomes associated with it, this family disruption has significant societal costs. As discussed above, parental separation/divorce puts individuals at higher risk for a wide range of problematic outcomes like depression, anxiety, teen pregnancy, conduct problems, and substance use. These problems translate into costs to society related to involvement in the juvenile and criminal justice systems, unemployment and lost productivity, and use of medical, mental health, and social services (Herman et al., 2015). Illustratively, the treatment of depression, a well-documented outcome related to parental separation/divorce, costs the U.S. more than $83 billion annually (Greenberg et al., 2003). Similarly, problematic substance use is associated with over $740 billion annually in costs related to crime, lost work productivity, and health care expenditures (NIH: National Institute on Drug Abuse, 2021).

Wolchik and colleagues (2006) explored the public health burden of parental separation/divorce by applying the concept of population attributable fraction (PAF), an index that can be translated to show the percent of cases that could be prevented by removing a risk factor and its consequences. They examined the impact of reducing the negative consequences associated with separation/divorce, such as mental health problems, academic underachievement, substance use, and teenage pregnancy in the United States. Based on relative risk and odds ratios calculated from national probability samples (Furstenberg Jr. & Teitler, 1994; Kessler et al., 1997; Zill et al., 1993), researchers found that 36% of mental health problems in young adulthood, 30% of teen pregnancies, 23% of school dropouts, and 20% of drug dependence could be prevented by eliminating the risk associated with parental separation/divorce (Wolchik et al., 2006).

Putting the Consequences of Parental Separation/Divorce in Perspective

Although experiencing parental separation/divorce increases risk of deleterious outcomes that can persist from childhood through adolescence and adulthood, it is important to note that the vast majority of children do *not* develop long-term problems. In fact, most children show incredible resilience after a one- or two-year adjustment period (Amato, 2001; Amato & Keith, 1991b). One longitudinal study documented that only 25% of children who experienced parental divorce developed serious, long-lasting behavioral and mental health problems (Hetherington & Kelly, 2002). In other words, nearly three quarters of children did *not* experience serious mental health problems. However, the rate of significant problems for children who experienced parental divorce was significantly higher than the rate for children whose parents remained married (25% vs. 10%). Similarly, a large epidemiologic study of adults found that the prevalence of psychiatric disorders in the group of adults who experienced parental divorce in childhood was significantly higher than in the group that did not experience parental divorce (66.2% vs. 51.3%; Tebeka et al., 2016). Because of this heterogeneity in outcomes, researchers have put much effort toward studying how, why, and for whom parental separation/divorce confers increased risk for multiple deleterious outcomes.

Theoretical Perspectives of the Effects of Parental Separation/Divorce on Children

A few prominent models have emerged as theoretical frameworks for understanding children's post-separation/divorce adjustment. Amato's (2000) divorce-stress-adjustment model has a few key features. First, parental separation/divorce is viewed as a process that involves events and interactions among family members that happen before, during, and after the decision to separate or divorce. Second, separation/divorce often involves a host of stressful changes (e.g., moving to a different home, changing schools, decreasing economic resources, having less contact with one or both parents) and emotions (e.g., feeling scared or uncertain about the future, blaming oneself for the divorce). Third, the number and nature of stressful events, the quality of the child's relationships, and the nature of the interactions among family members that occur during the process of separation/divorce are seen as influencing one's risk for adjustment problems in the short- and long-term. For example, children exposed to high levels of interparental conflict after the separation/divorce are at the highest risk for developing mental health and related problems (Kalmijn, 2016; Long et al., 1988; O'Hara et al., 2019a). Conversely, high-quality parenting is a robust factor that protects against mental health problems and promotes well-being (Sandler et al., 2012; Wolchik et al., 2000).

In Sameroff's person-environment transactional model (Sameroff, 1987), the features of stressful events and children's access to protective resources are also important determinants of post-divorce adjustment. This model highlights the role of children's perceptions of divorce-related changes and events and posits that whether children experience the divorce-related events and interactions as stressful or benign depends on both specifics of the situation and the individual's personal history and characteristics. For example, children who are prone to experiencing strong, negative emotions may feel particularly overwhelmed when the parent whom they do not live with cancels a visit for the third time in a row. On the other hand, children who are dispositionally calm and have strong coping skills may feel disappointed about canceled visits but quickly recover to think about how to spend the afternoon with the parent with whom they live.

Understanding Variability in Children's Post-divorce Outcomes

Understanding which children are at greatest risk for negative outcomes associated with parental separation/divorce requires a comprehensive look at both modifiable and nonmodifiable factors. In the following sections, we first review the research on how historical and demographic factors, including children's pre-existing problems, gender, age, and race/ethnicity, relate to risk for maladjustment after separation/divorce. Next, we will focus on modifiable risk and protective factors, such as individual resources (e.g., coping) and family processes (e.g., parenting quality, interparental conflict), that influence children's adjustment after separation/divorce. Importantly, children often have unique combinations of these risk and protective factors that must be understood in context with one another. Thus, we discuss studies that have jointly examined risk and protective factors to better understand how they may interact to influence childrens's adjustment.

Nonmodifiable Risk and Protective Factors

Pre-existing Problems A number of prospective studies that followed children from pre- to post-separation/divorce provide evidence on whether mental health problems that predate the separation/divorce account for the higher incidence of children's post-divorce problems (e.g., Block et al., 1986;

Cherlin et al., 1991, 1998; Morrison & Cherlin, 1995). For example, Cherlin et al. (1991) demonstrated that controlling for pre-divorce adjustment at age seven significantly reduced the negative effects of a divorce on behavior problems and academic achievement at age 11; this effect was particularly strong for boys. Similarly, another study showed that for boys who evidenced post-divorce behavior problems, the problems observed at age 18 were detectible up to 11 years earlier (Block et al., 1986). A later study by Cherlin et al. (1998) examined trajectories of emotional problems of children from both divorced and continuously married families from age seven through age 33. They found that children whose parents were divorced had elevated emotional problems prior to the divorce. However, the emotional problems of children whose parents divorced increased from childhood to early adulthood, whereas they did not for those in the continuously married group (Cherlin et al., 1998), indicating that post-divorce emotional problems were not solely attributed to pre-existing problems.

Several other studies showed that the effect of divorce was significant above and beyond pre-divorce child problems (Chase-Lansdale et al., 1995; Furstenberg Jr. & Teitler, 1994; Needle et al., 1990). Illustratively, Chase-Lansdale et al. (1995) found that young adults were more likely to show clinically significant psychological problems at age 23 if their parents divorced in childhood, and accounting for their problems prior to the divorce at age seven only negligibly reduced the effect of divorce (i.e., 48% vs. 39% increased odds). Another study by Strohschein (2005) found that children whose parents would later divorce demonstrated higher levels of anxiety/depression and antisocial behavior prior to the divorce than children whose parents would remain together. However, the divorce itself was associated with increases in anxiety and depression. There was also a significant interactive effect between parental divorce and pre-divorce family dysfunction on children's antisocial behavior; divorce was associated with a decrease in antisocial behaviors if the marriage was highly dysfunctional. Taken together, these studies suggest that pre-existing problems place children at a disadvantage but do not fully account for the effects of separation/divorce on children's problems. In other words, pre-existing problems are likely a vulnerability factor rather than a full explanation.

Other scholars have examined whether dysfunctional processes that predate the separation/divorce, most notably interparental conflict and parent-child relationship problems, account for the development of children's problems after the separation/divorce. Multiple studies have found that youth's post-divorce depression (Aseltine, 1996; Cooney & Kurz, 1996), behavior problems (Tschann et al., 1990), school-related problems, and delinquency (Hanson, 1999) can be partially explained by pre-divorce levels of family conflict. In contrast Booth and Amato (2001) found that high pre-divorce conflict was *positively* associated with post-divorce child-well-being (i.e., composite of general happiness, life satisfaction, and self-esteem). Other researchers have found that children who experience high levels of interparental conflict before the divorce do better on average after the divorce compared to children who live with highly conflictual married parents as well as children whose parents had low marital conflict prior to divorce (Amato et al., 1995; Booth & Amato, 2001; Jekielek, 1998). Examining longer-term outcomes, a longitudinal study showed that young adults who experienced high levels of interparental conflict in childhood were less likely to divorce if their parents divorced rather than stayed married (Gager et al., 2016). These studies support the notion that ending a high-conflict marriage can result in benefits for children.

Other researchers have examined whether post-divorce adjustment can be explained by pre-existing parenting problems (Block et al., 1988; Shaw et al., 1993; Strohschein, 2012). Shaw and colleagues found that pre-divorce maternal rejection in early childhood was related to boys' post-divorce adjustment problems in adolescence and early adulthood (1993). For girls, inconsistent discipline prior to the divorce was related to post-divorce adjustment problems in adolescence (Shaw et al., 1993). Similarly, a more recent, large longitudinal study found that the effects of parental divorce on children's mental health problems were attributable to higher levels of family dysfunction (i.e., problems with trust, communication, and support) assessed prior to the divorce (Strohschein, 2012). These findings align with another study indicating that post-divorce parent-child relationship problems are in part related to parenting problems present prior to the divorce (Amato & Booth, 1996). Given that post-divorce parenting is a robust predictor of children's adjustment, it may be the case that many pre-divorce parenting problems remain stable after the divorce and thus, children miss out on an important protective factor.

Genetic Influences A few studies have investigated how genetic influences may play a role in explaining children's post-divorce adjustment. Amato and Cheadle (2008) used data from a national survey to compare outcomes between adopted and biological children from the same families. They found that parental divorce and marital conflict were similarly associated with behavior problems for both biological and adopted children. These data support what they called the "standard family environment" model where interparental conflict and divorce explain children's increased problems, as opposed to a model where genetic transmission explains the associations. Robbers and colleagues (2012) found that the impact of environmental influences on child internalizing and externalizing problems was higher in children from divorced families than children from married families, and that heritability of genetic influences was lower in the divorce sample. These findings align with those of other studies supporting the changes that occur during the divorce experience, not genes, as the primary explanation for the association between parental divorce and adjustment problems (e.g., Burt et al., 2008).

Another large study found that genetics may play a differential role depending on the outcome being studied. The results of this study indicated that shared genes accounted for increased risk of internalizing problems, whereas the divorce itself accounted for increased risk in substance use problems (D'Onofrio et al., 2007). Similarly, results from a study by O'Connor and colleagues suggest that genetics explained post-divorce academic and social problems, whereas the divorce explained increased psychopathology (O'Connor et al., 2000). One study found that the oxytocin polymorphism, which is related to empathy, attachment, and nurturance, in children whose parents had divorced significantly moderated the relation between parental divorce and depression in young adulthood. Young adults with the oxytocin genotype experienced twice as many depressive symptoms as those with other genotypes (Windle & Mrug, 2015). Finally, using data from the Fragile Families and Child Wellbeing Study of unmarried parents, researchers found that boys with genetic sensitivity (i.e., composite of dopamine and serotonin system polymorphisms) had worse behavior problems after separation than boys with less sensitive genes (Mitchell et al., 2015). Taken together, these findings suggest that although genetics affect offspring's post-divorce adjustment, they do not tell the whole story.

Demographic Factors – Child Sex, Age, Race/Ethnicity

Sex Multiple meta-analyses conclude that both boys and girls are negatively affected by separation/divorce (Amato, 2001, 2010; Amato & Keith, 1991a, b). However, there is some evidence that gender effects differ depending on the particular domain of maladjustment and the developmental period being studied. For example, results of meta-analyses showed that the effect of divorce was larger in magnitude for boys versus girls with regard to social functioning (Amato & Keith, 1991a), conduct problems (Amato, 2001), and major depressive disorder (Kasen et al., 1996). On the other hand, researchers studying adolescents and young adults who had experienced parental divorce found that females were more likely to drop out of high school than males and although they were similarly likely to have children in their teenage years, females were more likely to experience adverse effects of single parenthood (Hetherington et al., 1998; McLanahan & Sandefur, 1994). Another study found that parental divorce in childhood was associated with decreased intimate relationship quality in adulthood for women, but not for men. Further, women from divorced families had lower satisfaction with social support and lower self-esteem than women from married families; this association was not observed for men (Mustonen et al., 2011).

Age Although parental separation/divorce negatively affects both younger and older children (Amato, 2001), some age differences occur for specific domains of adjustment. One meta-analysis found that the effects of separation/divorce on academic achievement varied by age; more negative impact on school functioning occurred for children in elementary and high school compared to preschool or post-high school youth (Amato & Keith, 1991b). Another meta-analysis showed that post-separation/divorce academic and parent-child relationship problems were most prevalent in middle childhood, whereas adolescents showed more mental health problems (Amato, 2001).

Although some aspects of post-divorce adjustment differ as a function of children's age or sex, most of these effects are not large in magnitude. Further, one study found that when children's age and sex were considered in the same model with life events, parenting, and interparental conflict, these environmental and familial factors were stronger predictors of post-divorce adjustment than age and sex (Stolberg et al., 1987).

Race/Ethnicity Very few scholars have examined how race and ethnicity affect how children adjust to parental separation/divorce. Some studies have shown no meaningful differences in the relation between family structure[1] and children's outcomes based on race or ethnicity (e.g., Broman et al., 2008; Heard et al., 2008), whereas others show significant differences (e.g., Heard, 2007; Sun & Li, 2008). For example, in a large, longitudinal study of adolescents, Heard (2007) found that negative consequences on academic achievement of living for more years in a family structure other than with two biological parents were weaker for minoritized youth (i.e., Black and Non-white Hispanic). However, Black youth suffered a larger drop in grades than White youth if they experienced a recent change (i.e., in the last year). The author theorized that racial/ethnic-specific social resources and family practices that were developed, in part, as adaptations to a long history of structural inequalities, such as extended family social support and strong connections to community institutions, as well as less stigma associated with non-two-biological parent families, may buffer stress related to changes in family structure. Sun and Li (2008) found that parental separation/divorce between 10th and 12th grade predicted negative outcomes in several domains of functioning (e.g., test scores, education aspiration, homework completion, locus of control, behavior problems, teacher-reported problems) for White, Asian, and Black/African American youth. However, White youth experienced negative effects of parental/separation divorce in more domains of functioning compared to Asian and Black/African American youth. In contrast, Hispanic youth showed no negative effects of parental separation/divorce on any outcome. In fact, Hispanic youth who experienced parental separation/divorce showed a higher level of academic readiness than their peers residing with continuously married parents. The authors conclude that the results support the theory that because children from minoritized groups face many societal inequities and disadvantages, parental separation/divorce may only come at minimal additional cost to their well-being. Given the small number of studies, it is difficult to draw conclusions about the relations between race/ethnicity and post-divorce adjustment.

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[1] Note that some studies examined racial/ethnic differences related to family structure more broadly (i.e., two biological parents, single parents, parent and step-parent), as opposed to parental separation/divorce per se.

Modifiable Risk and Protective Factors

A large body of work has focused on modifiable individual- and family-level risk factors, such as stressful events, and protective factors, such as high-quality parenting, as determinants of adjustment to parental separation/divorce. Given that children are likely to have both risk and protective factors, examining these factors together sheds light on important contextual nuances in understanding post-separation/divorce adjustment.

Separation/Divorce-Related Stressors Many of the changes that occur in the family after a separation/divorce are stressful for children. Some of the most common stressors are moving to a different home, changing schools, having fewer economic resources, having less contact with one or both parents, witnessing one or both parents' emotional difficulties, and being exposed to frequent interparental conflict. A study examining the stressfulness of various divorce-related events found high agreement that the most stressful events from the children's perspective include being exposed to interparental conflict and being blamed for the divorce (Wolchik et al., 1986). Other researchers have demonstrated that the number of negative events or degree of environmental change occurring in the child's environment predicts post-divorce adjustment problems (Kurdek & Blisk, 1983; Stolberg et al., 1987; Walsh & Stolberg, 1989). Research by Sandler et al. (1991) illuminated two main factors that influence how events are experienced by children and influence their adjustment: (1) the valence of the divorce-related events (i.e., positive versus negative), and (2) the stability of the events (i.e., no change, change for the worse, change for the better) (Sandler et al., 1991). Stable positive events were associated with positive outcomes for children, whereas negative events or events that changed for the worse were related to poor outcomes for children.

Consistent with children's perception of interparental conflict being one of the most stressful divorce-related events, research has shown that it is the most well-documented stressor that confers risk for children's adjustment problems (Amato, 1993; Amato & Keith, 1991b; Grych, 2005; Hetherington & Kelly, 2002; Shaw & Emery, 1987; Vandewater & Lansford, 1998). Exposure to high levels of interparental conflict has been associated with a range of negative outcomes, including mental health problems (Elam et al., 2019; Kalmijn, 2016; Long et al., 1988; Noller et al., 2008; O'Hara et al., 2019a, 2021), maladaptive coping and low self-esteem (Bing et al., 2009; Noller et al., 2008), academic and social problems (Forehand et al., 1994; Long et al., 1988; Vandewater & Lansford, 1998), risky behavior (O'Hara et al., 2019a; Orgilés et al., 2015), and physical health problems (Fabricius & Luecken, 2007). The negative effects of conflict can be exacerbated if it is frequent, intense, and involves child-centered topics (e.g., child support, children's academic, or extracurricular activities) or if the child is put in the middle of the conflict (Buchanan et al., 1991; Cummings & Davies, 2010; Johnston et al., 1987).

Parenting High-quality parenting (i.e., high warmth, low coercion, consistent and effective discipline, positive communication, supportiveness) by mothers and fathers is consistently associated with positive outcomes in separated/divorce families (Adamsons, 2018; Adamsons & Johnson, 2013; Amato & Gilbreth, 1999; Forgatch et al., 1988; Kelly & Emery, 2003; O'Hara et al., 2019b; Sandler et al., 2012; Simons et al., 1999; Wolchik et al., 2007). The limited research that has considered both parenting by mothers and parenting by fathers has found that they each independently predicted lower levels of children's post-divorce mental health problems (Buchanan et al., 1991; King & Sobolewski, 2006). Importantly, research has found that children benefit from high-quality parenting only when they have sufficient time with that parent (e.g., approximately 10 overnights per month; Sandler et al., 2013).

Several programs have focused on promoting children's mental health and well-being after parental separation/divorce through parenting interventions (Cookston et al., 2007; DeGarmo & Jones, 2019; Forgatch & Degarmo, 1999; Tein et al., 2004; Wolchik et al., 1993). Studies of one intervention, the New Beginnings Program, have shown that bolstering the quality of the parent-child relationship confers benefit for children across many domains of adjustment, including mental health and substance use problems (Tein et al., 2004; Wolchik et al., 2016; Zhou et al., 2008), academic and occupational functioning (Sigal et al., 2012), and adaptive coping (Vélez et al., 2011). Demonstrating the lasting power of improving parenting, the benefits of this 10-week intervention delivered during middle childhood lasted into subsequent developmental stages (Wolchik et al., 2002a; Wolchik et al., 2009, 2013). Using a developmental cascades perspective (Masten & Cicchetti, 2010), which posits that program-induced changes can initiate positive and compounding effects over time, Wolchik and colleagues assessed their sample in middle childhood, adolescence, and early adulthood. They found that intervention-induced improvement in the parent-child relationship reduced children's mental health problems in middle childhood, which led to reductions in mental health and substance use problems as well as increases in self-esteem and school performance in adolescence, which in turn reduced mental health and substance use problems in young adulthood (Wolchik et al., 2016).

In addition to improving positive parenting, decreasing negative parenting behaviors after separation/divorce is especially important. A recent meta-analysis (van Dijk et al., 2020) found that negative parenting behaviors, such as hostility and parentification, were more strongly predictive of children's post-divorce adjustment than positive parenting behaviors.

There is also some evidence that the quality of coparenting after divorce predicts children's post-divorce adjustment (Lamela & Figueiredo, 2016). Coparenting is often defined as a multidimensional construct comprising concepts such as respect, cooperation, communication, trust, valuing, agreement, and conflict (Macie & Stolberg, 2003; Saini et al., 2019; Teubert & Pinquart, 2010). There are very few studies that have examined unique effects of coparenting dimensions, making it difficult to parse out how much of the general effect of coparenting is accounted for by interparental conflict or quality of parenting by mothers or fathers. However, a few studies have found that different dimensions of coparenting predict different outcomes. For example, one study that included young adult from both married and divorce families found that after accounting for the effects of mother and father parenting, parental hostility predicted overall mental health whereas parental cooperation predicted problems with intimacy and work ethic (Gasper et al., 2008). Another study used cluster analysis to examine differences in adjustment for children in "cooperative parenting," "parallel parenting," and "single parenting" families. Comparing "cooperative parenting" and "single parenting" – both relatively low on interparental conflict – the results indicated that children with cooperative coparents had the lowest level of behavior problems in adolescence and the highest level of perceived closeness to fathers in young adulthood (Amato et al., 2011). It is important that future studies assess the unique effects of positive coparenting (e.g., cooperation), above and beyond the well-documented effects of interparental conflict on children's post-divorce adjustment.

Children who experience high-quality parenting are less negatively impacted by separation/divorce-related stressors. For example, one study found that children whose mothers provided high levels of consistent discipline and/or high acceptance/warmth were less likely to be negatively impacted by divorce-related stressors, measured by a composite of events such as witnessing interparental conflict, a parent missing visits, and losing important possessions, such as pets and toys (Wolchik et al., 2000). The opposite was true for those children whose mothers provided inconsistent discipline combined with high levels of rejection; for these children, the association between divorce-related stressors and mental health problems was magnified (Wolchik et al., 2000). However, a couple of studies have found that high-quality parenting does not buffer (i.e., reduce or mitigate an otherwise negative impact; protective against) the negative impact of *all* separation/divorce-related stressors. Lutzke and colleagues found that although high-quality parenting and interparental conflict both had independent relations to child mental health problems; high-quality parenting did not mitigate the deleterious impact of interparental conflict on children's post-divorce mental health problems (Lutzke et al., 1996). In a larger and more diverse sample of children from separating/divorcing families, high-quality parent-child relationships similarly did not buffer the deleterious effects of interparental conflict on children's fears of abandonment (O'Hara et al., 2021).

Findings of studies that included the quality of parenting by both parents demonstrate the complexity of the associations between parenting and divorce-related stressors. For example, Sandler and colleagues (Sandler et al., 2008, 2013) observed a "compensation effect" in families with high levels of conflict; high-quality parenting by one parent protected against child internalizing problems when the other parent provided low-quality but not high-quality parenting. On the other hand, families with low levels of conflict showed a "facilitation effect;" high-quality parenting by one parent enhanced the positive effect of high-quality parenting by the other parent (Sandler et al., 2008).

Social Support Supportive relationships with important people in a child's life, other than their parents, can also serve as a protective factor against negative outcomes. One study showed a protective, stress-buffering effect of supportive nonfamily adults on children's adjustment problems after divorce (Wolchik et al., 1989). Results of another study showed that children's social support from peers was associated with positive post-divorce adjustment (Teja & Stolberg, 1994). In one study, the relation between peer support and children's outcomes was moderated by age; older children benefitted from peer support, whereas younger children did not (Lustig et al., 1992).

Individual Resources Children's individual characteristics and capacities can increase or decrease their risk for adjustment problems. Researchers have examined how these factors relate to their post-divorce outcomes as well as how they interact with other risk and protective factors.

Studies have shown that the way children appraise (i.e., perceive, think about) divorce-related stressors is associated with their post-separation/divorce adjustment. In one study, threat appraisals (e.g., harm to others, negative self-appraisal) of divorce-related stressful events predicted mental health problems both cross-sectionally and 5 months later (Sheets et al., 1996). Wolchik and colleagues (2002a, b) found that fear of abandonment, a common divorce-related threat appraisal, mediated the associations between divorce-related stressors and children's mental health problems. In another sample, researchers showed that interparental conflict predicted fear of abandonment, which in turn predicted children's mental health problems 10 months later (O'Hara et al., 2021). Another study asked children to rate the likelihood of having different kinds of thoughts in response to hypothetical divorce-related stressful events. Children's reports of positive thoughts (e.g., "I know my dad loves me") predicted lower mental health problems, whereas negative thoughts (e.g., "My mom does not want to spend time with me") predicted higher mental health problems (Mazur et al., 1992). Generally, problematic beliefs related to parental separation have been shown to be related to child maladjustment (Kurdek & Berg, 1987). Other researchers have shown that children's positive appraisals about their self-worth (Sandler et al., 2000a, b) and the extent to which they think they can control events in their life (Fogas et al., 1992; Sandler et al., 2000a, b) are positively related to their mental health after parental separation/divorce.

Children's coping is also an important predictor of post-separation/divorce adjustment. Avoidant coping (i.e., avoidant actions, cognitive avoidance) predicts higher mental health problems (Armistead et al., 1990; Sandler et al., 1994), whereas more active coping (i.e., problem solving, positive reappraisal) predicts lower mental health problems (Sandler et al., 1994, 2000a, b). Several researchers have studied associations between coping and adjustment in the context of other child characteristics. For example, Lengua and Sandler (1996) found that for children higher in self-regulation, active coping predicted lower anxiety, whereas for children lower in self-regulation, avoidant coping predicted higher anxiety. Understanding the role of coping efficacy is particularly important for understanding children's post-divorce adjustment. Coping efficacy, or the child's general belief that they can handle stressful situations, has been shown to mediate the effect of adaptive coping behaviors on mental health problems (Sandler et al., 2000a, b). In other words, the positive effects of active coping (e.g., cognitive restructuring, problem solving) occurred by increasing coping efficacy, which in turn, led to mental health benefits.

There is some research demonstrating that coping behaviors interact with divorce-related stressors to affect children's post-divorce adjustment. For example, one study found that children who reported positive interpretations (e.g., "I know my parent loves me") of divorce-specific vignettes were protected against the negative effects of the divorce-related stressful events they had experienced with regard to their self-reported depression and mother-reported externalizing problems (Mazur et al., 1999). On the other hand, older children who reported negative interpretations (e.g., "It's my fault that my parents are fighting") showed stronger associations between stressful events and both self- and mother-reported internalizing and externalizing problems. Another study found that divorce-related stressors and conduct problems were positively associated only for children who reported low active coping (Sandler et al., 1994). A later study found that although positive cognitive coping and coping efficacy were beneficial for all children with regard to protecting against post-separation/divorce internalizing and externalizing problems, positive cognitive coping was especially important in protecting children exposed to high levels of interparental conflict from marijuana use in adolescence (O'Hara et al., 2019a, b). Problem-focused coping protected children exposed to high interparental conflict from internalizing problems. On the other hand, avoidant coping was especially problematic for increasing the risk of externalizing problems in adolescence for youth exposed to high levels of chronic interparental conflict (O'Hara et al., 2019a, b).

Children's general tendencies toward emotional experiences, conceptualized broadly as temperament, are also implicated in their post-separation/divorce adjustment. Hetherington (1989) found children with difficult temperament (rated by nurses when the children were between 6 months and 2 years old) were more likely to have post-divorce behavior problems. Similarly, a study found that children who had higher levels of emotional intensity were more likely to have higher internalizing problems after parental divorce (Kurdek, 1988). Another study of children from divorce families found that children higher in negative emotionality were more likely to endorse threat appraisals, which in turn increased the likelihood of engaging in higher levels of coping (both active and avoidant coping behaviors) and reporting higher levels of internalizing and externalizing problems (Lengua et al., 1999). In the same study, children higher in positive emotionality perceived lower threat in response to stressful events, engaged in more active coping behaviors, and had lower levels of internalizing and externalizing problems (Lengua et al., 1999). One study that focused on the interaction between children's temperament and post-divorce parenting found that positive emotionality and low impulsivity were protective against adjustment problems associated with harsh or ineffective parenting (i.e., high rejection, inconsistent discipline) (Lengua et al., 2000).

Conclusion and Implications for Clinical Practice

In this chapter, we reviewed the prevalence and public health impact of parental separation/divorce. This change in family structure occurs in one million children in the United States each year. The public health impact of parental separation/divorce on healthcare and criminal justice systems is substantial (Herman et al., 2015). We also reviewed the consequences of divorce for children's adjustment. The majority of children do *not* develop significant problems after their parents' separation/divorce. However, a sizeable subgroup experiences higher levels of problems in multiple domains of adjustment, including mental health problems, physical health problems, and decreases in well-being. For some children, these effects persist into adulthood. Risks for developing short- and long-term problems vary as a function of nonmodifiable characteristics, such as age and gender, as well as modifiable risk factors, such as interparental conflict, and protective factors, such as positive parenting and effective coping. There is compelling evidence that interparental conflict is damaging to children's post-divorce adjustment and that positive parenting has the power to protect children from post-divorce adjustment problems. Although less well-researched, there is growing evidence to support the role of individual resources, such as effective coping strategies and adaptive appraisals, in promoting positive adaption to parental separation/divorce. A growing body of literature has demonstrated that modifiable factors, as opposed to nonmodifiable factors like genetics and child sex, have the largest impact on children's post-separation/divorce adjustment. Of course, environmental, genetic, individual, interpersonal, and demographic factors interact in complex ways to impact children's post-divorce adjustment.

It is important that clinicians working with separating and divorcing families remember that divorce is a process that occurs within a family system. Children do not live their lives in laboratory conditions; understanding their experiences in context is vital. Thus, gathering information about many aspects of a child's context, including changes brought on by the separation/divorce and the nature of the family environment, will help clinicians formulate effective treatment plans. The most effective ways to promote children's adaptation to parental separation/divorce include working with parents to improve aspects of positive parenting (i.e., warmth, communication, effective discipline) and decrease interparental conflict, while working with children to enhance individual resources, such as effective coping.

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Irritability

11

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Pediatric irritability is a transdiagnostic symptom associated with significant functional impairment that results in a large proportion of child mental health referrals (Carlson & Dyson, 2012; Peterson et al., 1996; Vidal-Ribas et al., 2016). Though no formal definition exists, irritability is typically conceptualized as a proneness to anger and low tolerance for frustration that contribute to tonic (i.e., cranky mood, touchiness) and phasic (i.e., temper outbursts) components. Over the past 20 years, there has been a dramatic rise in empirical interest in pediatric irritability, which has led to significant advances in neurocognitive models and the development of improved assessments and interventions. The aim of the present chapter is to provide the reader with a summary of the historical context behind this increase as well as the current state of the field in six sections: (1) Brief History, (2) Irritability in Normative Development, (3) Etiology and Neurobiology, (4) Diagnostic Considerations, (5) Assessment, and (6) Treatment.

Brief History of Current Conceptualizations of Pediatric Irritability

Irritability has received increased clinical and empirical attention in recent years, mostly as a result of the controversy surrounding pediatric bipolar disorder (BD) in the late 1990s and early 2000s (Leibenluft, 2011). During this time, there was a 40-fold increase in pediatric BD diagnoses in outpatient settings, and a four-fold increase in inpatient settings (Blader & Carlson, 2007; Moreno et al., 2007) along with a dramatic rise in the use of psychotropic medications, particularly antipsychotics (Comer et al., 2010; Moreno et al., 2007; Olfson et al., 2006). Given that risk factors for pediatric BD did not change and this escalation only occurred in the United States, the sharp increase was likely due to changes in the clinical conceptualization of pediatric BD, in which irritability played a critical role (Brotman et al., 2017a; Leibenluft, 2011; Roy & Comer, 2020; Roy et al., 2014). Specifically, this marked increase in diagnoses coincided with the idea that pediatric BD may be characterized by chronic and continuous irritability (Biederman et al., 2004; Wozniak et al., 1995), which conflicted with traditional adult definitions of mania as reflected by acute and episodic euphoria or irritability as well as the criterion of bipolar disorder found in the Diagnostic and Statistical Manual of Mental

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Disorders, Fourth Edition (DSM-IV), which required a “distinct period” of a change in mood (American Psychiatric Association [APA], 1994). Notably, while DSM-IV included irritability as a criterion or associated feature of several psychiatric diagnoses, it did not include any that specifically captured severe non-episodic irritability.

To address the bipolar disorder controversy and facilitate research on severe non-episodic irritability, researchers at the National Institute of Mental Health (NIMH) developed criteria for a broad phenotype of pediatric BD, which became known as severe mood dysregulation (SMD) (Leibenluft, 2011; Leibenluft et al., 2003). The hallmark symptom of SMD was irritability, which was operationally defined by two components: severe temper outbursts and a negatively valenced mood between outbursts. Hyperarousal was also included as a symptom of SMD to fully capture youth who were receiving BD diagnoses (Leibenluft, 2011; Leibenluft et al., 2003). Longitudinal, family history/heritability, and neuroimaging studies provided clear evidence that SMD and DSM-IV BD were distinct phenotypes and that chronic irritability did not comprise a developmental presentation of BD (Leibenluft, 2011).

The need to address the overdiagnosis of pediatric BD and related increase of antipsychotic medication use, coupled with data supporting SMD as a unique syndrome, led to the addition of disruptive mood dysregulation disorder (DMDD) in the fifth edition of the DSM (DSM-5; American Psychiatric Association [APA], 2013). Discussed in more detail below, DMDD is characterized by severe irritable mood and recurrent temper outbursts and is included in the Depressive Disorders section of DSM-5, highlighting its conceptualization as a mood disorder and distinction from BD. However, the diagnosis of DMDD brought additional controversy. First, when adapting SMD to DMDD, changes were made to the criteria, including the removal of the hyperarousal symptom; thus, research findings related to SMD were not directly applicable to the new diagnosis. Moreover, DSM field trials, analyses of retrospective data, and prospective studies showed that the diagnosis of DMDD had limited reliability, lack of psychiatric consensus, significant overlap with other psychiatric conditions, and limited longitudinal stability (Axelson et al., 2012; Freeman et al., 2016; Mayes et al., 2015a; Regier et al., 2013).

While investigations of SMD were underway, researchers were also considering an irritable dimension of oppositional defiant disorder (ODD). Though several models of ODD have been evaluated, varying in the number of dimensions and the items that comprise them, researchers have consistently identified an irritable dimension that is differentiated from the other dimensions through its robust association with anxiety and depression (Burke et al., 2014; Evans et al., 2017; Stringaris & Goodman, 2009a, b). This research informed the organization of ODD within the DSM-5 whereby ODD symptoms are subdivided into three dimensions, including an “Angry/Irritable Mood” one (APA, 2013), which consists of the symptoms: often loses temper, often touchy or easily annoyed, and often angry and resentful.

Growing concerns about the diagnosis of DMDD, increased attention to the irritable dimension of ODD, and research showing that DMDD has no incremental validity or utility beyond a diagnosis of ODD (Axelson et al., 2012; Freeman et al., 2016) led some to argue that youth with irritability be captured by an ODD specifier rather than a standalone DMDD diagnosis (Evans et al., 2017; Lochman et al., 2015). Indeed, in its Eleventh Revision of the International Classification of Diseases and Related Disorders (ICD-11), the World Health Organization (WHO) chose not to include the DSM-5 DMDD diagnosis and instead added a specifier of “with chronic irritability-anger” to ODD (World Health Organization, 2019). However, proponents of the DMDD diagnosis have argued that such specifiers are often not used by clinicians, so do not add clinical utility (Brotman et al., 2017a; Stringaris et al., 2018). Further, DMDD captures youth with the most severe levels of irritability who are more impaired and require more services than youth with ODD; thus, there were concerns that an ODD diagnosis with a specifier would not adequately address this level of severity (Brotman et al., 2017a).

These controversies have led to a surge of research on pediatric irritability, including its developmental presentations, underlying mechanisms, diagnostic classification, assessment, and treatment, all of which are discussed in the following sections of this chapter.

Irritability in Normative Development

A major challenge associated with the diagnosis and treatment of childhood irritability is distinguishing between developmentally appropriate and clinically significant presentations. Since irritability, primarily in the form of temper tantrums or outbursts, is a hallmark feature of typical development in early childhood, it can be difficult for parents, teachers, and clinicians to know when children's behaviors are of clinical concern and would benefit from intervention (Wakschlag et al., 2012). Indeed, pursuing treatment early in development is critical, given that atypical levels of irritability can be indicative of risk for future psychopathology (Eyre et al., 2017; Savage et al., 2015; Stringaris et al., 2009, 2018; Vidal-Ribas et al., 2016). Additionally, what constitutes normative irritability changes across development, further contributing to difficulty in identification, diagnosis, and treatment of atypical presentations (Copeland et al., 2015; Potegal, 2019). To better understand clinically significant irritability and potential links to psychopathology, it is important to consider the behavioral profile of irritability in normative development.

One of the most common manifestations of irritability in typically developing children is temper tantrums, also known as temper outbursts, which can be defined as verbal and physical outbursts of anger, often precipitated by frustration or when an expected reward is not attainable (Potegal, 2019). In a study of nearly 1500 3- to 5-year-olds, Wakschlag et al. (2012) found that more than 80% experienced at least one temper outburst in the past 30 days. While temper tantrums may seem inappropriate or maladaptive, they provide young children with the opportunity to learn how to regulate emotions, a key developmental task of early childhood (Cole et al., 1994; Kopp, 1989). When toddlers exhibit temper tantrums, they are overwhelmed by their natural, emotional reaction to a frustrating or uncomfortable situation and do not yet have the emotion regulation or executive control skills to sufficiently inhibit maladaptive responses (Kopp, 1989). Over time, children learn to inhibit these responses and find other ways to achieve their goals as they realize that responding to frustration with a temper tantrum does not lead to goal attainment (Brotman et al., 2017b).

Successful mastery of emotion regulation leads to decreased occurrence of temper tantrums and irritability, allowing young children to move on to other advanced developmental tasks. In middle childhood and adolescence, the prevalence of both tonic and phasic irritability generally decreases (Copeland et al., 2015). At the same time, adolescent episodes of tonic irritability occur for significantly longer durations than younger children's, further indicating a change in the behavioral profile of irritability from childhood to adolescence (Copeland et al., 2015). These prolonged periods of tonic irritability may be particularly salient as adolescence is a time when internalizing disorders often onset (e.g., mood and anxiety; Kessler et al., 2007). Thus, while adolescents do not experience temper tantrums to the extent or frequency that toddlers do, they still may experience episodes of frustration and anger, often colloquially referred to as "moodiness," that are normative.

In summary, normative developmental shifts in phasic and tonic irritability can provide a guide for determining typical versus atypical behavior. For example, daily temper outbursts in toddlers may be normative but are of clinical concern in adolescents. Conversely, prolonged episodes of low levels of tonic irritability may be observed frequently in teenagers but would not be expected in younger children. Thus, to understand irritability as it relates to psychopathology, it is crucial to consider these various developmental contexts.

Etiology and Neurobiology

Over the past decade, there has been a dramatic increase in research examining etiological and neurobiological factors that contribute to pediatric irritability (Roy & Comer, 2020). Both genetic and environmental factors have been implicated. For example, heritability estimates have been found to range from 30% to 40% (Coccaro et al., 1997). Parent psychopathology is also associated with child irritability (Dougherty et al., 2013; Wiggins et al., 2014), which may point to genetic or environmental influences. Parents also play a key role in their child's development of effective emotion regulation by modeling and supporting adaptive emotion coping and through operant conditioning processes (Cole et al., 1994; Patterson, 1982). For instance, parents may inadvertently reinforce displays of irritability such as tantrums by providing something rewarding (e.g., attention or a desired object) or allowing the child to avoid or escape something aversive (e.g., by reducing demands) in order to reduce the child's distress. This increases the likelihood that the child will display such a response in the future (Patterson, 1982; Stringaris et al., 2018). Adverse life events and exposure to trauma may also contribute to irritability. Indeed, following exposure to trauma, children may exhibit increased anger as a result of increased activation of a "survival mode" of functioning, which facilitates a threat response (Chemtob et al., 1997). This is consistent with the view that irritability reflects an aberrant response to threat (Brotman et al., 2017b), as described below. Trauma in childhood also disrupts the development of emotion regulation capacities (Dvir et al., 2014), which may increase the risk of irritability.

The current, most widely accepted pathophysiological conceptualization of pediatric irritability identifies aberrant reward and threat processing as the core neural components of severe irritability (Brotman et al., 2017b). The key element that links aberrant reward processing to irritability is frustrative non-reward (FNR), which posits that when an expected reward is not attained, organisms respond with increased motor activity and aggression (Amsel, 1958). FNR is particularly relevant to irritability, as temper outbursts are commonly an explicit reaction of anger and frustration to a blocked goal or reward. Evidence suggests that frustration is associated with altered responding in cortical, regulatory regions as well as subcortical, emotion generation regions of the brain. For example, the dorsolateral prefrontal cortex (DLPFC) shows altered responding to frustration in children with normative levels of elevated irritability as well as in clinically irritable samples. Studies using functional near infrared spectroscopy (fNIRS) suggest that in preschoolers, the DLPFC response follows an inverted U curve, with low and clinically elevated levels of irritability associated with lower activation and moderate levels of irritability associated with greater activation (Grabell et al., 2018; Perlman et al., 2014). Alternatively, a recent functional magnetic resonance imaging (fMRI) study of older children (ages 8–18) from various diagnostic groups as well as healthy controls found positive associations between irritability levels and frustration-related activation in the DLPFC (Tseng et al., 2019). The anterior cingulate cortex (ACC), a region implicated in error processing and emotion regulation, also shows irritability-related alterations in reward- and frustration-related activity as well as functional connectivity. For instance, irritable children have been shown to exhibit reduced activation in the ACC and middle frontal gyrus during frustration but increased activation in these two regions during reward compared to their non-irritable peers (Perlman et al., 2015). Using resting state fMRI, Roy et al. (2018) found reduced intrinsic functional connectivity (iFC) of the anterior midcingulate cortex (aMCC) with surrounding areas of the ACC and increased iFC with the precuneus in children with severe irritability as compared to healthy controls and non-irritable children with ADHD. Together, these findings of alterations in DLPFC and ACC activation and functional connectivity associated with clinical irritability support the putative role of atypical top-down emotion regulation.

Due to its role in processing reward (Delgado, 2007), the striatum has also been a focus of neuroimaging studies of pediatric irritability. In clinically irritable children (ages 6–9), activation in the striatum during frustration has been shown to be negatively correlated with parent-reported levels of irritability (Perlman et al., 2015). Contrary to these findings, a study of adolescents (ages 9–19) found a positive association between irritability and striatal activation, during both reward anticipation and feedback conditions of a monetary incentive delay task (Kryza-Lacombe et al., 2021). In this study, irritability was also associated with decreased functional connectivity between the left striatum and ACC. In a study of healthy preschoolers using the same task, the opposite association was found between irritability and functional connectivity between the left ventral striatum and several posterior cortical regions during successful versus unsuccessful trials, regardless of the presence of a reward (Dougherty et al., 2018). Together, these studies suggest that pediatric irritability is associated with disruptions in activity and connectivity of the striatum; however, such disruptions may vary depending on age.

The second aspect of the pathophysiological model of irritability, aberrant threat processing, is characterized by increased orienting to threat, hostile attribution bias, and deficits in emotion face processing (Brotman et al., 2017b). This model theorizes that clinically irritable individuals have a tendency to overestimate threat in their environments and subsequently react to that threat with anger and rage (Brotman et al., 2017b; Carver & Harmon-Jones, 2009). Behavioral and EEG studies provide evidence for aberrant threat processing in clinically irritable children and adolescents. For example, irritable youth demonstrate an increased attention bias towards threatening facial stimuli (Hommer et al., 2014; Salum et al., 2017) as well as atypical profiles of emotion recognition and labeling (Guyer et al., 2007; Rich et al., 2008). Recent studies using event-related potentials (ERP) demonstrate positive associations between irritability and heightened attention to threat as well as to emotional stimuli, more broadly (Deveney et al., 2020; Martin et al., 2021). These studies suggest that irritable youth attend to emotional stimuli more quickly than their non-irritable peers and then may have difficulty shifting their attention away from these stimuli and towards task-relevant information.

Neuroimaging studies of aberrant threat processing in irritability have focused primarily on the amygdala due to its role in threat perception. Adolescents with SMD exhibit greater amygdala activity in response to angry, fearful, and neutral faces as compared to healthy controls (Thomas et al., 2013) as well as decreased amygdala activation when rating their fear levels to neutral faces compared to healthy control, ADHD, and BD groups (Brotman et al., 2010). Irritability has also been associated with decreased functional connectivity between the amygdala and prefrontal cortex during passive viewing of angry faces (Stoddard et al., 2017). A resting state fMRI study of adolescents with ADHD found higher parent-reported emotional lability, a construct similar to irritability, to be positively associated with amygdala- rostral ACC iFC, but negatively associated with iFC between the amygdala and posterior insula/superior temporal gyrus (Hulvershorn et al., 2014).

In summary, significant advances have been made regarding the etiological and neurobiological mechanisms underlying pediatric irritability. There is clear evidence of genetic and environmental contributions, as well as of disruptions in cortical and subcortical regions involved in reward, frustration, and threat processing.

Diagnostic Considerations

As mentioned above, irritability is a transdiagnostic symptom found in both internalizing and externalizing disorders. In the DSM-5 (APA, 2013), tonic and/or phasic irritability is included as a diagnostic criterion, associated feature, and functional consequence of many psychiatric conditions that present in children and adolescents. Irritability is considered a primary symptom of DMDD, ODD, and intermittent explosive disorder (IED). Other psychiatric conditions include irritability as one of many possible symptoms, or are associated with, or lead to, irritability. Examples include BD, major depressive disorder (MDD), persistent depressive disorder, Anxiety Disorders, Trauma- and Stressor-

Related Disorders, attention-deficit/hyperactivity disorder (ADHD), and autism spectrum disorder (ASD). This section briefly reviews the presentation of irritability in psychiatric conditions common to children and adolescents, starting with disorders in which irritability is a defining feature followed by those in which irritability is either one of many symptoms, an associated feature, or a functional consequence of the core symptoms. Of note, irritability is also associated with many disorders not discussed here, such as obsessive compulsive disorder (Storch et al., 2012), Tourette's disorder (Ashurova et al., 2021), conduct disorder, and anorexia nervosa (APA, 2013).

Disorders Characterized by Irritability

Disruptive Mood Dysregulation Disorder As discussed above, DMDD was added to the DSM-5 to address concerns about the overdiagnosis of pediatric BD. The core feature of DMDD is irritability, and a diagnosis requires chronic irritable mood as well as severe recurrent temper outbursts that occur at least three times a week and are out of proportion to the situation and developmental level. The irritable mood and temper outbursts must be present for at least one year and across at least two settings, and their onset must occur before age 10. The diagnosis of DMDD cannot be given to individuals younger than 6 years of age or older than 18 years of age, or to those with a diagnosis of ODD, IED, or BD (APA, 2013). Notably, evidence suggests that DMDD can be observed in children younger than 6 years if one considers different features of irritability and symptom thresholds in this age range (Wiggins et al., 2021). Some have argued for the need for more precise and objective criteria that vary by developmental level as the current criteria depend on subjective judgement (Laporte et al., 2021; Wiggins et al., 2021).

In an early study, compared to youth with other psychiatric conditions, youth who met criteria for DMDD were more likely to have continued comorbidity, increased risk for anxiety and depressive disorders, and poorer health, educational, legal, financial, and social outcomes in adulthood (Copeland et al., 2014). It could not be determined whether these outcomes were specific to DMDD or simply resulted from greater symptom severity and/or higher rates of comorbidity. However, in a more recent study, Dougherty et al. (2016) found that DMDD at age 6 was predictive of psychopathology and functional impairment at age 9, even after controlling for demographic variables and baseline diagnoses, suggesting that the poor outcomes of DMDD are not simply due to comorbid conditions.

As mentioned above, there are concerns surrounding the reliability and validity of DMDD (Axelson et al., 2012; Freeman et al., 2016; Mayes et al., 2015a; Regier et al., 2013), which in part, stem from the high comorbidity with other psychiatric diagnoses (Althoff et al., 2016; Copeland et al., 2013, 2014) and lack of diagnostic specificity, leading some to suggest that DMDD has no symptoms that are unique to it (Axelson et al., 2011). For example, there was poor agreement between clinicians on DMDD diagnoses in the DSM-5 field trials (Regier et al., 2013), and a study of children aged 6–12 showed that DMDD had low longitudinal stability and could not be differentiated from ODD and conduct disorder (Axelson et al., 2012). There are also concerns about the treatment of DMDD. Specifically, some have noted that DMDD's exclusion criteria and placement in the Depressive Disorders section may keep youth with externalizing problems from receiving the services they need (Evans et al., 2017). Further, there have been concerns that DMDD will simply replace pediatric BD, with clinicians overutilizing antipsychotics and other psychotropic medications (Axelson et al., 2011; Evans et al., 2017; Lochman et al., 2015).

Oppositional Defiant Disorder ODD is a heterogeneous disorder characterized by a pattern of irritable mood, argumentative and defiant behaviors, and vindictiveness (APA, 2013). To meet diagnostic criteria for ODD, children must exhibit four of eight symptoms for at least six months during interactions with at least one individual who is not a sibling. Except for the spiteful/vindictive symptom, symptoms should occur most days for children under the age of 5 years, and at least once a week for children age 5 years or older (APA, 2013). Relevant to the current review, three of the ODD symptoms (often loses temper, often touchy or easily annoyed, and often angry and resentful) comprise an Angry/Irritable Mood dimension. While it is possible for youth to meet diagnostic criteria for ODD without demonstrating irritability, this is relatively rare, and most youth with ODD have at least one of these symptoms (Rowe et al., 2010). Thus, many children with ODD demonstrate a pattern of both tonic and phasic irritability, similar to DMDD, making differential diagnosis a challenge. As a result, many youth with DMDD symptoms also meet criteria for ODD (Mayes et al., 2016), although according to the DSM-5, if a child meets criteria for both ODD and DMDD, only a diagnosis of DMDD should be given (APA, 2013). This stipulation has been somewhat problematic because a DMDD diagnosis does not convey other important symptoms that children with ODD may have, such as oppositionality and noncompliance.

The irritability symptoms of ODD are predictive of unique developmental trajectories. For example, in a longitudinal study of youth with ODD from early to middle childhood, those with high-persistent and increasing irritability had a poorer prognosis than those with decreasing irritability (Ezpeleta et al., 2016). Specifically, those with high-persistent and increasing irritability showed a greater continuity and severity of ODD, greater comorbidity, a higher prevalence of additional disruptive behavior disorders, more internalizing and externalizing problems, and increased difficulties with emotion regulation. Finally, as mentioned above, studies examining the irritable dimension of ODD have found that it most strongly predicts internalizing problems as well as greater difficulties with emotion regulation and more severe symptomatology (Drabick & Gadow, 2012), while the other dimensions of ODD more strongly predict ADHD and conduct problems (Burke et al., 2014; Evans et al., 2017; Stringaris & Goodman, 2009a, b).

Intermittent Explosive Disorder IED is characterized by phasic irritability, namely, recurrent behavioral outbursts that are out of proportion to the provocation or precipitating psychosocial stressor and are not premeditated or exhibited to achieve a tangible objective (APA, 2013). These outbursts are manifested by either verbal or physical aggression around two times per week for approximately three months that does not result in damage, destruction, or physical injury; or three outbursts within a 12-month period that result in damage, destruction, or injury. As such, outbursts in IED generally involve greater levels of aggression than those seen in ODD. Like DMDD, IED cannot be diagnosed in children under the age of 6 years (APA, 2013). IED is differentiated from DMDD in that it does not include symptoms of tonic irritability, as supported by a study that showed that adults with IED spent less than 50% of their time between outbursts feeling angry (Coccaro, 2018). Further, IED has different frequency and duration thresholds and can be diagnosed in those who display symptoms after the age of 10 years and in adulthood. If children meet criteria for both IED and DMDD, only a diagnosis of DMDD is given.

IED is significantly understudied in youth (McLaughlin et al., 2012), likely because it was rarely applied to children prior to DSM-5. However, a study in adolescents found that IED is persistent and highly impairing, co-occurs with many psychiatric conditions, and is significantly undertreated (McLaughlin et al., 2012). Further, a study of large samples of adolescents and adults suggests that individuals with IED and a comorbid externalizing disorder (i.e., ADHD, ODD, CD) have the greatest levels of aggression, followed by those with IED alone, those with other psychiatric disorders, and healthy controls (Radwan & Coccaro, 2020). This suggests that the presence of IED is particularly associated with elevated aggression, with or without a comorbid externalizing disorder.

Disorders Associated with Irritability

Here, we discuss several disorders in which irritability is one of many symptoms or may be an associated feature or consequence of core symptoms.

Bipolar Disorder As described earlier, the role of irritability in pediatric BD has been the focus of significant controversy and research. According to the DSM-5, youth with BD may present with irritability both during manic or hypomanic episodes and major depressive episodes. Manic (lasting at least one week) or hypomanic (lasting at least four consecutive days) episodes are characterized by a distinct period of abnormally and persistently elevated, expansive, or irritable mood as well as increased activity or energy. If these episodes are primarily irritable rather than elevated or expansive in nature, individuals must meet criteria for four rather than three additional symptoms (APA, 2013). For the major depressive episode, youth must experience a depressed or irritable mood, or loss of interest or pleasure in activities, as well as an additional four symptoms that are present during the same two-week period and represent a change from previous functioning. Importantly, in the DSM-5, irritability in BD, whether in children or adults, is episodic rather than chronic in nature (APA, 2013). This stands in contrast with the previous notion, described above, that pediatric BD may be characterized by chronic and continuous irritability.

Major Depressive Disorder and Persistent Depressive Disorder Depressive disorders are characterized by sad, empty, or irritable mood along with somatic and cognitive changes (APA, 2013). While symptoms of depressed mood or loss of interest are required for adults, the DSM-5 specifies that children and adolescents may exhibit irritable instead of depressed mood. However, a study of youth ages 9–16 with depression suggests that irritability rarely occurs without low mood in this population and thus, may not be a developmental presentation of depression (Stringaris et al., 2013). Rather, evidence suggests that irritability in depressed youth may be indicative of comorbid disruptive behavior disorders, especially in males (Stringaris et al., 2013). In addition to being a symptom of depression, irritability in childhood is also predictive of the development of depression in adolescence and adulthood (Vidal-Ribas & Stringaris, 2021). As such, several models suggest that irritability and depression are related due to shared risk factors, including genetic liability, family history of depression, temperamental and personality characteristics, and negative parenting styles (Ezpeleta et al., 2019; Stringaris et al., 2012b; Vidal-Ribas et al., 2016; Vidal-Ribas & Stringaris, 2021; Whelan et al., 2015; Wiggins et al., 2014).

Anxiety Disorders The DSM-5 lists irritability as one of six symptoms of generalized anxiety disorder (GAD) and indicates that children with specific phobia or social anxiety disorder may exhibit tantrums when feeling anxious or afraid (APA, 2013). Indeed, evidence suggests that such anxiety-related outbursts may be reinforced over time when, in response to outbursts, others help anxious youth avoid distress or provide support and attention (Walkup et al., 2021). There is clear empirical support for irritability in a wide range of anxiety disorders. For example, youth with GAD, separation anxiety disorder, and specific phobia have higher levels of self- and parent-reported irritability compared to those without any psychiatric conditions (Stoddard et al., 2014), and among youth with anxiety disorders, irritability is associated with anxiety severity, even after controlling for comorbid depressive disorders and ODD (Cornacchio et al., 2016). Compared to children with anxiety who are not irritable, those with both anxiety and irritability have greater symptom severity and functional impairment (Shimshoni et al., 2020) as well as different neural connectivity patterns (Stoddard et al., 2017). Longitudinal work showing that irritability in childhood predicts anxiety disorders in adulthood also supports a link between irritability and anxiety (Savage et al., 2015; Stringaris et al., 2009; Vidal-Ribas et al., 2016).

Trauma- and Stressor-Related Disorders Irritability is a symptom of several Trauma- and Stressor-Related Disorders in the DSM-5, including posttraumatic stress disorder (PTSD), acute stress disorder, and reactive attachment disorder (APA, 2013). In addition, patterns of comorbidity further demonstrate the association between irritability and trauma. For example, youth with DMDD are more likely to have a Trauma- and Stressor-Related Disorder diagnosis than youth with MDD or persistent depressive disorder (Benarous et al., 2020). Likewise, justice-involved youth with DMDD are more likely to meet criteria for PTSD than justice-involved youth with disruptive behavior disorders (Mroczkowski et al., 2018). Other research suggests links between irritability and trauma history, even in the absence of a formal trauma-related diagnosis. For example, exposure to trauma in childhood has been associated with the development of IED in adulthood (Nickerson et al., 2012). Also, youth with ASD who have a history of trauma have been shown to have higher levels of irritability and a greater likelihood of aggression and temper outbursts compared to those without trauma histories (Brenner et al., 2018; McDonnell et al., 2019). These associations are consistent with etiological models described above.

Attention-Deficit/Hyperactivity Disorder DSM-5 lists irritability as an associated feature of ADHD, reflecting its prevalence in this population and association with greater comorbidity and impairment (Ambrosini et al., 2013; Eyre et al., 2017; Galera et al., 2021). The high co-occurrence between ADHD and irritability has led to the proposal that irritability should be considered a core feature of ADHD (Riglin et al., 2017; Shaw et al., 2014) or that it may represent a distinct subtype of ADHD (Karalunas et al., 2019). Further, some have suggested that the presence of irritability in ADHD may be a marker of future depression risk (Eyre et al., 2017, 2019). Evidence indicates that irritability may be higher in children with ADHD, Combined Presentation compared to those with ADHD, Predominantly Inattentive Presentation (Mayes et al., 2015b). Further, highly irritable youth with high levels of ADHD symptoms exhibit greater phasic irritability than those with moderate ADHD symptoms, with no group differences in tonic irritability (Cardinale et al., 2021), suggesting that phasic irritability may be especially relevant to ADHD.

The co-occurrence of ADHD and irritability may result from shared risk factors, such as alterations in underlying neural circuitry, genetic liability, temperament, environmental variables (e.g., parenting), and deficits in emotion regulation (Faraone et al., 2019; Nigg et al., 2020; Riglin et al., 2017; Shaw et al., 2014; Steinberg & Drabick, 2015). For example, deficits in self-regulation and executive functioning often observed in children with ADHD are also associated with emotional impulsivity, low self-control, and poor behavioral inhibition, which may contribute to emotion regulation deficits and increase risk for irritability (Faraone et al., 2019; Shaw et al., 2014). Irritability may also be a consequence of ADHD whereby symptoms of ADHD evoke negative feedback from the environment, leading to irritability (Deault, 2010; Patterson, 1982; Steinberg & Drabick, 2015). Or, alternatively, irritability may influence the development of ADHD as supported by research showing that irritability predicts subsequent ADHD, even after controlling for baseline ADHD symptoms (Dougherty et al., 2016; Leibenluft et al., 2006).

Autism Spectrum Disorder Although it is not a symptom of ASD, irritability, especially temper outbursts, is common in those with ASD (Keluskar et al., 2021; Mayes et al., 2011). In line with this, Mayes et al. (2015b) found that youth with ASD had significantly higher levels of DMDD symptoms compared to youth with other psychiatric conditions. In fact, irritability is so problematic in youth with ASD that they are the only population for which the United States Food and Drug Administration has approved medications to treat irritability (Fung et al., 2016). Children with ASD have high baseline levels of negative affect and demonstrate difficulties regulating their emotions, which may partially explain high rates of irritability (Keluskar et al., 2021; Mazefsky et al., 2013). Alternatively, elevated irritability may result from specific challenges faced by these children. For example, temper outbursts frequently occur in response to environmental stimuli that are related to the core symptoms of ASD, such as rigidity and sensory sensitivities (Keluskar et al., 2021; Mayes et al., 2015b). Children with ASD may also exhibit outbursts due to difficulties communicating effectively (Manning et al., 2019); however, empirical support for this is mixed (Mayes et al., 2017). Research suggests that non-compliance in youth with ASD, which often arises in instances of perceived or real blocked goals, is strongly related to irritability (Kalvin et al., 2021). In addition, youth with ASD are at an elevated risk for psychosocial stressors, such as victimization and parent stress, which may contribute to irritability (McGuire et al., 2016).

Summary

In sum, irritability plays a role in many psychiatric conditions. For some, it is a core feature, and these disorders can be differentiated by the presence of tonic versus phasic irritability as well as frequency, duration, and pervasiveness criteria. For others, it is one of many symptoms, an associated feature, or functional consequence of the core symptoms. Importantly, irritability's prominence in the DSM-5 highlights its transdiagnostic nature and the continued struggle to adequately conceptualize this construct.

Assessment

Historically, irritability was traditionally assessed as a single symptom of psychiatric illness rather than as a multidimensional construct. Thus, initial research on childhood irritability examined individual items from disruptive behavior, mood, and anxiety disorders sections of diagnostic interviews or used them to derive irritability scales. Over the past 20 years, irritability has become a focus of growing empirical and clinical interest leading to the development of measures that specifically aim to assess irritability in youth. This section describes the most widely used measures of childhood irritability. Some assess irritability exclusively, while others are more broad assessments of child psychopathology or disruptive behavior with subscales that specifically assess irritability.

Clinical Interviews

Preschool Age Psychiatric Assessment and Kiddie Schedule for Affective Disorders and Schizophrenia The Preschool Age Psychiatric Assessment (PAPA; Egger et al., 2006) and Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS; Kaufman et al., 1997) are diagnostic interviews that aim to identify the presence of a range of disorders based on DSM criteria and have been used to assess irritability-related constructs in preschool- and school-age children (Copeland et al., 2015; Eyre et al., 2017) and adolescents (Melvin et al., 2018). Prior to the development of irritability-specific measures, researchers created ad hoc irritability scales utilizing items from relevant psychiatric disorders (depression, ODD, DMDD) derived from these interviews. This allowed for initial studies of irritability in preexisting cohorts that examined diagnostic comorbidities, associated impairments, and developmental trajectories, laying the foundation for future work. Of note, in a recent item response theory analysis, Dougherty et al. (2021) found that the PAPA was unable to produce reliable assessments of childhood irritability at all severity levels, but the K-SADS provided sufficient measures of severe irritability in early adolescence.

The Early Childhood Irritability-Related Impairment Interview The Early Childhood Irritability-Related Impairment Interview (E-CRI; Wakschlag et al., 2020) is a semi-structured clinical interview that assesses irritability's impact on typical social functioning from infancy to toddler-aged children. Clinicians ask parents a series of open-ended probe questions to ascertain the presence of irritability and associated impairment over the past three months; if applicable, clinicians then follow up with a series of more comprehensive probes linking irritability to functional impairment and its variation across six contexts, including home, with peers, and in school or daycare. Ratings of impairment severity are determined by the examiner based on multiple variables including frequency, intensity, and duration as well as consideration of how irritable mood/behaviors disturb typical activities and routines. While many assessments of pediatric irritability have been developed, this is the only one that includes a robust measure of functional impairment.

Wakschlag et al. (2020) tested the E-CRI's validity and reliability in early childhood using a multitrait-multimethod (MTMM) framework to account for the variation of individual items by trait and context. A two-factor model was identified with separate tantrum and irritable mood impairment factors. When examined individually, tantrum- and mood-related impairment were significantly associated with measures of internalizing and externalizing psychopathology. However, when entered into a model together, tantrum-related impairment continued to be associated with both domains of psychopathology, while mood-related impairment was only associated with internalizing problems.

Rating Scales

Child Behavior Checklist Many researchers have assessed irritability using select subscales or items from the Child Behavior Checklist (CBCL; Achenbach & Ruffle, 2000), a well-established measure of child psychopathology. The CBCL is available for three different informants (child self-report, parent report, and teacher report) and in school-age and preschool versions (CBCL/6-18; Achenbach & Rescorla, 2001; CBCL/1.5-5; Achenbach & Ruffle, 2000). The versions differ slightly in length (ranging from 100 to 118 items) but share the same eight syndrome subscales. Respondents answer a series of items evaluating the child's behaviors over the past six months using a 3-point Likert scale. Items are totaled and converted to standardized T scores derived from normative samples.

Researchers using select subscales of the CBCL to measure irritability have primarily used the CBCL Dysregulation Profile (CBCL-DP), which was initially developed to assess pediatric BD (e.g., Diler et al., 2009; Mbekou et al., 2014) and has been found to be an effective tool for evaluating dysregulation and irritability in children and adolescents (Aitken et al., 2019; Papachristou et al., 2016). The CBCL-DP is a composite of T-scores from three CBCL syndrome subscales: Anxious/Depressed, Attention Problems, and Aggressive Behavior (Althoff et al., 2010). In nonclinical samples, children with composite T-scores ≥180 demonstrate more depressive and ODD symptoms, greater temperamental negative affectivity, and lower effortful control than children with composite scores below 180 (Kim et al., 2012). Similarly, a composite T-score ≥180 predicted the development of DMDD in childhood in a large community sample of young children (Dougherty et al., 2014). In clinical samples, a composite T-score ≥210 indicates severe dysregulation as evidenced by increased risk for the development of ADHD and mood disorders in adolescence (Masi et al., 2015), although some have proposed more stringent criteria in which each of the three subscale T-scores must be ≥70 to signify severity (Aitken et al., 2019). Moreover, Deutz et al. (2016) found the CBCL-DP to fit a bifactor model with a general factor of Dysregulation that predicted self-harm and suicidal ideation better than the individual subscales.

To examine childhood irritability more efficiently, others have made use of just three individual items from the CBCL ("temper tantrums or hot temper," "stubborn, sullen or irritable," and "sudden changes in mood or feelings") (Stringaris et al., 2012b; Tseng et al., 2017; Wiggins et al., 2014). The raw scores of these items are summed to create a total irritability score, which has a single-factor structure with strong internal consistency (Stringaris et al., 2012b; Wiggins et al., 2014). This scale also demonstrates strong construct and external validity, being associated with concurrent anxiety and depression and predicting future depression, attention problems, and delinquency (Aebi et al., 2013).

Affective Reactivity Index The Affective Reactivity Index (ARI; Stringaris et al., 2012a) was developed to assess irritability without inclusion of aggressive or antisocial behaviors found in previous measures (e.g., Burney & Kromrey, 2001; Snaith & Taylor, 1985). Specifically, the ARI is a brief measure, completed by either the parent (ARI-P) or child (ARI-S), that assesses the threshold for an angry reaction, frequency of angry feelings/behaviors, and duration of feelings/behaviors over the past six months. The scale further distinguishes itself for its brevity, using just six items related to symptomatology and one assessing impairment due to irritability. Items are rated on a 3-point Likert scale, and ratings of the six symptomatology items are summed for a possible score of 0–12. The ARI demonstrates strong internal consistency and a single-factor structure in both parent and self-report versions across clinical and community samples (Stringaris et al., 2012a). Further, the ARI maintains strong validity as evidenced by increased irritability scores in children and adolescents with SMD as compared to BD and healthy controls (Stringaris et al., 2012a). Since the initial development and psychometric evaluation of the ARI, investigators have evaluated its use across age groups, cultures, and informants. For example, the ARI is validated for a wide variety of ages, ranging from preschool to adulthood (Mulraney et al., 2014; Sugaya et al., 2021) and translated versions of the ARI have been developed and validated for use in both clinical and research settings worldwide (DeSousa et al., 2013; Pan & Yeh, 2019). Evidence shows the ARI may also be effective when teachers serve as reporters (Ezpeleta et al., 2020), and a clinician version of the ARI, the CL-ARI, has been developed, showing strong psychometric properties (Haller et al., 2020).

Multidimensional Assessment of Preschool Disruptive Behavior As indicated earlier in this chapter, assessing disruptive behaviors in preschool-aged children is made difficult by the need to differentiate between normative temper outbursts and atypical ones indicative of psychopathology (Wakschlag et al., 2012). The Multidimensional Assessment of Preschool Disruptive Behavior (MAP-DB; Wakschlag et al., 2014) addresses this issue by examining preschool disruptive behavior with greater acuity for behavior frequency, quality, and context. This 111-item, primary caregiver-reported assessment evaluates behavior frequency over the past month using a detailed 6-point Likert scale with objective frequency ratings (e.g., "some [1–3] days/week"), improving on previous ambiguity resulting from subjective measures of frequency ratings (e.g., "sometimes," "often,") and allowing for more accurate assessment and identification of children with atypical levels of outbursts. The MAP-DB assesses behavioral context across two categories: interactional (e.g., with parents, other children) and situational (e.g., "to get something they wanted," "for no reason or out of the blue"). Finally, items vary across the four-dimensional spectrums of preschool disruptive behaviors of interest: (1) Temper Loss, ranging from normative tantrums in response to distress to frequent, dysregulated tantrums; (2) Noncompliance, ranging from refusal to follow directions to provocative disobedience; (3) Aggression, ranging from reactive aggression to hostile aggression; and (4) Low Concern for Others. Since its development, the MAP-DB has been adapted for use with various age groups, ranging from infancy to adolescence (Biedzio & Wakschlag, 2018).

Wiggins et al. (2018) identified two items from the Temper Loss scale of the MAP-DB that best predicted functional impairment in a clinical sample of preschool- age children at high risk for persistent and future DSM disorders: “become frustrated easily” and “break or destroy things during a temper tantrum, fall-out, or meltdown.” The investigators then determined that a sum score of 3 points on these combined items serves as an effective cutoff for behaviors to be deemed clinical, with strong sensitivity (73%) and specificity (83%). Preschool-aged children (mean = 4.66 years) meeting the irritability cutoff had a higher probability of irritability-related DSM disorders at early school age (mean = 7.08 years).

Behavioral Observations

Disruptive Behavior Diagnostic Observation Schedule Clinician-administered assessments of disruptive behaviors in children often suffer from inadequate ecological validity because the clinical environment lacks specific stimuli that trigger problem behaviors in the child’s daily life. The Disruptive Behavior Diagnostic Observation Schedule (DB-DOS; Wakschlag et al., 2005), a clinical assessment of early childhood disruptive behaviors, addresses these concerns by observing behaviors with the examiner alone and with the parent. By including parent-child interactions, clinicians are more likely to observe disruptive behaviors triggered by parental behaviors. Observing children’s behaviors without parents present allows clinicians to account for variation in parents’ proficiency in de-escalating their child’s emotions or their tendency to exacerbate their child’s oppositional behaviors (Biedzio & Wakschlag, 2018). Accordingly, the DB-DOS is split into three modules, each of which includes compliance, cleanup, and frustration tasks: two with the examiner (Module 1 & 2) and one with the parent (Module 3) (Wakschlag et al., 2005). In Module 1 (Examiner Present), the child’s behaviors are observed while the examiner remains engaged and involved in all tasks. In Module 2 (Examiner Busy), the child is provided with a series of independent tasks to complete with minimal engagement from the examiner. During both modules, the examiner allows full expressions of disruptive behaviors to occur and systematically provides scaffolds (e.g., prompts, redirections) for the child to modulate behavior. This allows the examiner to observe disruptive behaviors and assess the threshold of support needed for the child. In contrast, during Module 3 (Parent Present), the examiner provides no prompts or redirections to the child; instead, parents are encouraged to respond to their child’s behaviors as usual. The demands of the task are changed to provoke disruptive behaviors while observing the child’s response to parental behaviors.

After the observation, each observed behavior is coded on a 0–3 scale ranging from normative, regularly occurring behaviors to clinically relevant, less common ones. More severe behaviors are weighted more heavily, even if they occur at the same rate as less severe ones. Behaviors are coded using 21 total codes organized into two domains, anger modulation and behavioral regulation, in all three observational contexts for a total of six scores (Wakschlag et al., 2008b). The DB-DOS has strong internal consistency and is well validated for identifying disruptive behavior in young children (Wakschlag et al., 2008a, b). The anger modulation domain demonstrates clinical and predictive utility for assessing pediatric irritability (Massey et al., 2020; Wiggins et al., 2018), and anger modulation scores are associated with low morning cortisol in children, which is an indicator of increased risk for the development of emotion regulation difficulties (Frost et al., 2018).

Summary

In sum, several recently developed assessment tools have greatly improved the measurement of pediatric irritability. These include brief measures, such as the ARI, as well as more comprehensive ones, such as the MAP-DB or DB-DOS. These new tools have had a direct impact on irritability research, allowing for reliable assessment and consistency of measures across studies. They have also directly impacted clinical practice by providing a more thorough understanding of irritability and its impact, which in turn, informs treatment planning and assists in the evaluation of outcomes.

Treatment

As with assessment measures, treatments aimed specifically at reducing irritability are relatively new. Traditional interventions such as parent management training (PMT)/ behavioral parent training (BPT) were designed to reduce disruptive behaviors by targeting maladaptive parenting strategies through parental education. See Chap. 36 for an overview. Alternatively, cognitive-behavioral therapies (CBT) were developed to address children's emotion regulation difficulties, typically within the context of anxiety or mood disorders. See Chap. 3 for a comprehensive review of CBT. Thus, while these interventions likely reduced irritability, it was not the specific target of treatment. Recently, intervention models have been developed to directly treat irritability rather than disruptive behaviors or internalizing problems more broadly, utilizing PMT/BPT and CBT components in tandem. Other interventions, such as dialectical behavior therapy (DBT) and transdiagnostic treatments, have also been tested with irritable youth or have undergone adaptations to address the unique needs of these children. This section outlines contemporary treatment practices and their empirical support and provides a brief overview of pharmacological treatments.

Psychotherapy

While CBT has traditionally been used to treat emotion regulation difficulties in the context of anxiety or mood disorders, it has since been adapted for the treatment of anger outbursts and aggression, which makes it germane to the treatment of pediatric irritability. CBT for anger and aggression typically targets relevant difficulties, such as inappropriate expression of anger, hostile attribution bias, and social issues (Sukhodolsky et al., 2016). It also includes a parenting component, teaching parents how to support skill generalization and use parent management techniques to increase adaptive behaviors and decrease maladaptive behaviors. CBT has been found to be effective in treating anger and aggression in youth (Sukhodolsky et al., 2016) and is therefore a promising treatment for irritability.

Cognitive-behavioral treatments have also been adapted to directly target irritability. Two group treatment programs that incorporated CBT and PMT were found to reduce parent-reported irritability in youth with comorbid SMD and ADHD (Waxmonsky et al., 2016) and in youth with chronic irritability (Derella et al., 2020). Another adaptation of CBT for youth with irritability places a stronger emphasis on exposure therapy techniques. This treatment is based on the pathophysiological model of the development and maintenance of pediatric irritability discussed earlier (Brotman et al., 2017b; Kircanski et al., 2019). In alignment with this model, the intervention utilizes graded in vivo and imaginal exposures to non-reward and/or threatening stimuli with the aim of teaching children that non-reward and threat stimuli can be tolerated or are not as adverse as predicted (Kircanski et al., 2019). In turn, biases towards expected adverse outcomes are reduced. The intervention also includes parent training to reduce parents' reinforcement of their child's bias towards expected adverse outcomes (Brotman et al., 2018). Preliminary data for this exposure-based CBT in youth with a DMDD diagnosis are promising (Linke et al., 2020), but randomized controlled trials (RCTs) are needed to demonstrate efficacy.

In addition to CBT and PMT, other treatments, such as DBT, have also been used to treat pediatric irritability. DBT is a comprehensive evidence-based treatment that balances behavioral change and acceptance strategies and specifically targets emotional and behavioral dysregulation (Linehan, 1993). Perepletchikova et al. (2017) adapted DBT for use with preadolescents (DBT-C) with irritability and behavior outbursts associated with DMDD. Like standard DBT, DBT-C consists of individual therapy, group skills training, telephone coaching, and therapist team consultation. However, it also includes caregivers in these modes and introduces a parent training component. A randomized trial comparing DBT-C to treatment as usual found that those who received DBT-C demonstrated lower dropout rates, higher treatment satisfaction, greater symptom improvement, and greater remission rates that were sustained three months after treatment (Perepletchikova et al., 2017).

Recently, transdiagnostic treatments, which were initially developed to accommodate the heterogeneity, comorbidity, and tendency of symptoms to shift across settings in children and adolescents, have been applied to youth with clinical irritability. These include the Modular Approach to Therapy with Children with Anxiety, Depression, Trauma, and Conduct Problems (MATCH; Chorpita & Weisz, 2009) and the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders in Children (UP-C; Ehrenreich-May et al., 2018). MATCH is a modular treatment that includes evidence-based practices organized within 33 treatment modules that can be delivered flexibly and tailored to the needs of individual clients. These include 12 BPT modules (e.g., Active ignoring, Time-out, Giving effective instructions) in tandem with eight CBT strategies (e.g., Graded exposure, Addressing unhelpful thoughts, Problem-solving) that are particularly relevant to irritability (Evans & Santucci, 2021). Following an initial evaluation, clinicians provide these modules flexibly in accordance with developed flowcharts based on presenting problems and modify the time dedicated to each module in response to the patient's progress. For example, a child with comorbid irritability and depressive mood might first complete behavioral activation or problem-solving modules to address depressive mood prior to BPT modules to address irritability-related difficulties such as temper tantrums and oppositionality (Evans & Santucci, 2021). In a recent clinical trial, MATCH outperformed standard manualized treatments and usual care in the reduction of irritability symptoms and predicted fewer posttreatment DSM diagnoses in youth with severe irritability and mood dysregulation, supporting its efficacy as a treatment for chronic irritability (Evans et al., 2020).

UP-C is a transdiagnostic intervention that addresses the underlying mechanisms contributing to the development and maintenance of internalizing disorders. Skills are presented in a group format to parents and children, targeting children's difficulties with neuroticism, emotion regulation, information processing, cognitive flexibility, distress tolerance, and ineffective behaviors (Ehrenreich-May et al., 2018). A modified version of UP-C adapted for use with clinically irritable youth teaches these skills with a particular emphasis on irritability, anger, low frustration tolerance, and aggression (Hawks et al., 2020). The parent component involves PMT strategies that are especially relevant to pediatric irritability, including consistent command-punishment procedures and modeling of healthy emotional coping. Finally, each session contains a joint parent-child experiential activity that involves a series of frustrating or anger-inducing stimuli to provide parents and children time to practice the skills taught in their respective groups while receiving therapist coaching. In a small sample of children with irritability and/or disruptive behaviors, Hawks et al. (2020) reported significantly low dropout rates and a decrease in parent-reported irritability, lending credence to this intervention's use for the treatment of chronic irritability.

Pharmacology

Currently, the only FDA-approved medications for the treatment of irritability are the antipsychotics risperidone and aripiprazole, which are approved exclusively for use with children with ASD (Fung et al., 2016). There are no medications with an indication for use with non-ASD youth with clinically elevated irritability. Several studies have examined the efficacy of other medications, including mood stabilizers and stimulants, to reduce irritability in pediatric samples. One RCT exploring lithium's efficacy in treating irritability demonstrated no clear benefit of lithium over placebo (Dickstein et al., 2009). For children with ADHD, there is evidence that stimulants reduce symptoms of emotion dysregulation, including irritability (Shaw et al., 2014). Reanalysis of data from the Multimodal Treatment Study of Children with ADHD (MTA Study) showed that youth who received a combination of behavioral therapy and stimulants had a greater reduction in irritability than those who received community care or behavioral therapy alone (Fernandez de la Cruz et al., 2015). Likewise, in children with ADHD and SMD, treatment with a stimulant and behavioral therapy resulted in a reduction in externalizing symptoms (Waxmonsky et al., 2016). Moreover, in an open-label study, the combination of aripiprazole and methylphenidate significantly improved irritability, externalizing symptoms, depression, anxiety, attention, social problems, and reaction time variability in a clinical sample of children and adolescents with comorbid ADHD and DMDD (Pan et al., 2018). In adults, selective serotonin reuptake inhibitors (SSRIs) have been found to reduce aggression and explosive outbursts in the context of depression, IED, and premenstrual syndrome (Coccaro et al., 2009; Dimmock et al., 2000; Fava & Rosenbaum, 1999). Although a systematic review demonstrated some improvement in irritability symptoms with antidepressants (Kim & Boylan, 2016), more RCTs are necessary to determine SSRI's efficacy on irritability in children and adolescents, and in fact, data suggest that they may increase irritability in youth with mood disorders (Leibenluft, 2011; McClellan et al., 2007).

Summary

In sum, psychotherapeutic treatments are currently being developed for youth with irritability with promising results, but there has been less research on psychopharmacological treatments to specifically treat irritability in children without developmental disorders.

Conclusions

In recent years, there have been significant advances both in our understanding of irritability–including its developmental presentation, etiology and neurobiology, and role in psychopathology–and in the development of assessments and treatments that specifically address it. It has become clear that irritability is associated with functional impairment and predictive of negative outcomes even when taking other comorbid symptoms into account. Thus, there is a need to continue empirical investigations of irritability in order to understand its presentation across diagnoses and developmental periods with the ultimate aim of improving the nosology, and consequently the treatment of these impaired youth.

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12

A Crisis in the Opportunity to Learn: Addressing the Causes and Consequences of Missing School

J. Jacob Kirksey and Joseph Elefante

Absenteeism and Accountability

Definitions of Chronic Absenteeism and Truancy

Each state in the U.S. constructs its own definition of chronic absenteeism, although they are mostly similar across states. The overwhelming majority of states and the District of Columbia define it as a student missing 10% or more of a given school year. Montana's threshold is 5%. Arizona, Arkansas, and Hawaii follow the U.S. Department of Education's (U.S. Department of Education, 2019) delineation of a student missing least 15 days over the course of one school year. By their definition, 16% – about 1 in 6 students nationwide – was chronically absent in the 2015–2016 school year (U.S. Department of Education, 2019). States' individual chronic absenteeism rates in that same year ranged from as low as 9.5% in North Dakota up to 26.9% in Washington (U.S. Department of Education, n.d.).

Although stakeholders often conflate chronic absenteeism with truancy, the terms differ. Where absenteeism applies to students missing school for any reason, excused or unexcused, truancy refers to unexcused absences only. As with chronic absenteeism, each state devises its own definition of truancy. In California, for example, truancy means a student has missed or is at least 30 minutes late to class three times without a valid excuse. Maryland uses the term "habitual truancy" for students who miss 20% or more of the school year (Attendance Works, 2016). Further, truancy carries legal consequences, sometimes resulting in suspensions for students and fines or even jail time for parents (Attendance Works, 2016).

History of Attendance and Accountability

Over time, schools have assumed an increasing responsibility over whether students show up for school. Newmann (1981) argues that schools have a responsibility to keep students engaged through

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stimulating coursework, opportunities for leadership, and strong relationships with faculty. Finn (1989) illustrates this phenomenon via the participation-identification model, writing that from the first years of schooling students should be encouraged to participate in a wide variety of activities such as extracurricular opportunities, school decision-making, responses to educational needs, and other initiatives.

Attendance has been of concern to school leaders and policy makers from the beginning of the common school era. As early as 1838, Horace Mann argued that collecting accurate attendance data should be one of Massachusetts's chief responsibilities (Hutt, 2018). This idea grew more popular with the establishment of compulsory schooling in the U.S., at which point schools became more than just places of learning. Since that time, schools have also provided broad-based social services and helped to ensure children's safety and well-being. Absent students do not just miss academic curriculum, but basic services like food and medical care. Average Daily Attendance (ADA) became one of the earliest measures of school quality and accountability. Accordingly, school leaders put a high priority on getting kids into school (Hutt, 2018).

The federal government began using attendance as a marker of school accountability nationwide with the passage of No Child Left Behind (NCLB), the 2002 reauthorization of the Elementary and Secondary Education Act (ESEA). Specifically, NCLB identified attendance as an indicator in Adequate Yearly Progress (AYP) for elementary and middle schools (Spencer, 2009). Additionally, the passage of the Every Student Succeeds Act (ESSA), the 2015 reauthorization of ESEA, has pushed the issue of attendance to even greater prominence, as ESSA identifies absenteeism as one possible measure of school quality in state accountability systems (Every Student Succeeds Act, 2015). ADA remains an important metric to this day, as it factors into many states' school funding formulas (Dayhoff, n.d.).

Current Context of Attendance and Accountability

School Funding Formulas

Attendance often plays a significant role in how schools are funded. States usually use either total student enrollment from the previous year or ADA to calculate funding proportional to the number of students a school serves (Blagg et al., 2021). Seven states – California, Idaho, Kentucky, Mississippi, Missouri, New York, and Texas – use ADA, or the average number of students attending a given school per day over a predetermined period. These time periods are determined at the state-level (Dayhoff, n.d.). As poor attendance rates obviously have a negative effect on ADA calculations, it behooves school leaders to focus on improving student attendance.

Absenteeism and ESSA

In the United States, states are required to report their chronic absenteeism rates to the federal government (Jordan, 2019). The Office for Civil Rights of the Department of Education (ED) collects this information annually, then reports it every two years as a part of the Civil Rights Data Collection release. States must also include chronic absenteeism on their annual school report cards (Attendance Works, 2020). As of its passage in 2015, the Every Student Succeeds Act (ESSA) mandates that states choose at least one nonacademic metric with which to measure school quality in their state accountability systems (Every Student Succeeds Act, 2015). To date, 37 states and the District of Columbia have selected chronic absenteeism as one of their School Quality Student Success (SQSS) indicators (Jordan, 2019).

Out of these 37 states and D.C. come different models for incorporating absenteeism into state accountability systems. The California Department of Education employs an interactive School

Dashboard designed "to help parents and educators identify strengths and areas for improvement." The Dashboard includes a K-8 Chronic Absenteeism Indicator (CA Department of Education, 2019). Connecticut incorporates a K-12 chronic absenteeism accountability measure which includes a goal of reducing all chronic absence rates statewide to 5% or lower, with an emphasis on early prevention. Indiana includes an indicator in its state accountability system for students who have improved their attendance. Additionally, it rewards schools based on their percentage of "model attendees." These can be either students with with exemplary attendance or who have significantly improved their attendance. In Virginia, where the pre-ESSA chronic absenteeism rate was 18.3%, chronic absenteeism is now an SQSS indicator in all grade levels. The state has set a long-term goal of reducing the chronic absenteeism rate for all students and all subgroups to 10% or lower by 2024 (Kostyo et al., 2018).

Importance of Regular School Attendance

Absenteeism from school is a crisis having considerable negative consequences on the development of children and adolescents. Until recently, the assumption that typical students—those who are not suffering from illness or experiencing extreme circumstances—were attending class regularly was so widespread that most school districts and principals could not identify how many students were chronically absent (Balfanz & Byrnes, 2012). Recently, organizations like Attendance Works have worked to equip school districts with the necessary data tools to better understand, address, and prevent high rates of chronically absent students (Attendance Works, n.d.).

Conversations about school absenteeism have been largely centered around the academic implications, as students miss out on the opportunity to learn from their teachers and peers. For many students, these opportunities are not replaced in the home, and missing academic content in the formal school settings may disrupt students' engagement with their academics and learning environments. One explanation for this established link between absences and achievement might be that by receiving fewer hours of instruction over the course of the school year, absent students receive unequal opportunities to learn and do not perform as well on exams (Chen & Stevenson, 1995; Connell et al., 1994; Finn, 1993; Nichols, 2003). Instructional time has shown to positively predict student achievement for various student populations. For example in analyzing the Early Childhood Longitudinal Study – Kindergarten cohort, Bodovski and Farkas (2007) and Georges (2009) illustrate that greater time spent on procedural mathematics instruction associated with higher math performance of students. Additionally, Heatly et al. (2015) found that a combination of procedural and conceptual instruction led to higher math achievement for fifth graders. Thus, missing school, and thus instructional time, might limit the opportunity to learn for students, and as a result, students suffer academically.

Who Is Missing the Most School?

With better data being collected on student attendance as well as better tools to evaluate common patterns and trends, researchers and policymakers have identified several groups of students considered to be of greater risk of missing school. Students in poverty, for example, are two to three times more likely to be chronically absent from school compared to their peers (Attendance Works, n.d.). Students of color and students with disabilities are also more likely to experience greater absenteeism from school.

Additionally, it is well-established that children with health problems also struggle to maintain regular school attendance. Students can be absent due to seasonal or short-term illness (i.e., cold, flu, etc.), and schools consider these absences excused absences who are sick (i.e., cold, flu, etc.). There are other aspects of students' health that have been linked to greater frequency of missing school. McConnell et al. (2010) examined traffic and pollution data from parents of kindergarteners and first grade students to illustrate its connection to childhood asthma, which has a well-documented relationship to absenteeism from school (Doull et al., 1996; Fowler et al., 1985, 1992; Silverstein et al., 2001; Taras & Potts-Datema, 2005). Other research has concluded that physical health issues are also related to student absenteeism, including obesity, oral health, daily hygiene habits, and nutrition (Basch, 2010; Geier et al., 2007; Nandrup-Bus, 2011).

Whether children miss school for excused or unexcused reasons, the research is clear that both forms of absence can result in academic and nonacademic consequences for students. Next, we review some of this large body of literature illustrating the various declines associated with not being in school.

Consequences of Missing School

Many would argue that absenteeism has garnered so much local, state, and national attention given the large and growing body of research that links missing school to wide ranging short and long-run consequences for students. Missing school has been tied to numerous academic and nonacademic consequences across the grade span. Much like other education risk factors, absenteeism has been shown to put students at serious risk for lower achievement rates, disengagement from schools, and increased risk for dropout (Chang & Romero, 2008; Epstein & Sheldon, 2002).

Direct Effects to Academic Performance

Unsurprisingly, researchers have unveiled several ways in which absenteeism affects students' academic performance. The most direct and frequent measure of academic declines is evident through declines in standardized test scores. Focused on elementary and middle school grades in Philadelphia, Gottfried (2010) shows that students missing school more frequently experience declines in math and reading achievement. Specifically, Gottfried (2011) compares attendance rates among siblings and shows that, even after controlling for family-level factors, siblings who were more absent tended to perform worse on standardized exams compared to their peers. Kirksey (2019) extends this analysis into high school grades and finds that missing school is tied to poorer academic performance in both standardized testing and class grades.

Some researchers have begun to explore the extent to which missing school may only be a problem if students miss a significant amount. Gershenson et al. (2017) and Kirksey (2019) examine the cumulative effect of absenteeism and finds that the academic harm for every one day of school missed is the same for students with higher and lower rates of absence. This suggests that schools should focus on promoting positive attendance behaviors for all students, as every day matters with respect to promoting student learning. Gershenson et al. (2017) also note that, while both excused and unexcused absences can be linked to achievement declines, unexcused absences are nearly twice as harmful as excused absences. The authors also found that low-income students and English learners were disproportionately affected academically when they missed school.

Non-testing Outcomes

Students with higher rates of absences tend to face a higher risk of grade retention (Neild & Balfanz, 2006), and they are also more likely to drop out of school (Rumberger & Thomas, 2000). Kirksey (2019) examines how high school absenteeism links to the probability that students drop out of school and demonstrates that absenteeism in every high school grade increases students' probability of dropping out. The author shows that absenteeism in eleventh and twelfth grade was most directly linked to school dropout.

These effects from excessive absenteeism on school dropout are not only observed for high school students, but several longitudinal studies have also linked early attendance patterns from elementary school to school dropout. For example, Barrington and Hendricks (2013) found that even as early as elementary school, it was possible to identify high school dropouts by their previous absence patterns: students who dropped out were twice as absent in fifth grade and three times as absent in ninth grade. Hess et al. (1989) found that 90% of school dropouts in the Chicago Public School system could be identified by their absence patterns in the second, third, and fourth grades.

Beyond putting students at risk of dropping out of high school, researchers have linked excessive school absenteeism to future social and economic declines. Students who miss school frequently are more likely to experience declines in their social-emotional development (Gottfried, 2014). They are also more likely to be unemployed once they are in the workforce (Alexander et al., 1997; Broadhurst et al., 2005; Kane, 2006). In their recent study, Liu et al. (2021) showed that having 10 absences across all subjects in ninth grade reduced the probability of on-time graduation as well as ever enrolling in college by 2%.

The research is clear. Missing school results in serious learning loss for students that can have a profound impact on students' academic, social, and economic well-being. While some absenteeism is unavoidable when considering illness (Basch, 2010; Geier et al., 2007; Nandrup-Bus, 2011) or traumatic household or community events (Gershenson & Tekin, 2018; Kirksey, 2020; Kirksey et al., 2020; Kirksey & Sattin-Bajaj, 2021), districts and educators can help bridge the home-to-school gap and promote positive attendance behaviors by considering malleable push and pull factors that research suggests drive student absenteeism.

The Role of the School: Considering Push and Pull Factors Driving Student Absenteeism

Policy initiatives and resources are meant to strengthen the impact schools have on known factors that affect student attendance. Yet underlying these policies and resources geared toward reducing absenteeism, there is a theoretical assumption that schools play a significant role in whether a student is present. Newman (1981) designates schools as having a role to keep students engaged via relevant curriculum, student participation in management-decisions, and strong student-staff relationships. Finn (1989) encompasses this obligation of school engagement in the participation-identification model, illustrating that from the first years of schooling students should be engaged in a variety of participatory activities such as after-school activities, decision-making within schools, class-related initiatives, and responses to educational needs. This participation then leads to successful outcomes for students and a stronger school-going identity. Additional policy-driven frameworks of school attendance include classifying absences as being caused by push or pull factors; "push" factors indicate school-level factors that force students out of school and "pull" factors are community or home-based factors that keep students from attending (Youth Justice Board, 2013). Moreover, Kearney and Graczyk (2014) and AttendanceWorks (n.d.) advocate for the adoption of a Response to Intervention (RtI) model for addressing absenteeism in schools, where there exists a hierarchy of evidence-based strategies for keeping students in schools that ranges from universal support to targeted efforts.

There are several commonalities among these various models for understanding how to keep students in school. One is that there are contextual factors that impact student attendance. Contextual factors are defined as characteristics that relate to the demographic composition of schools and classrooms, the quality of the education being delivered, and the learning environment for students. These influences include but are not limited to teacher, peer, and school-level factors, all of which have been thoroughly discussed in the empirical research on school attendance.

Yet the way researchers conceive of absenteeism in elementary school is vastly different than the conceptions of secondary school attendance. For example, elementary students are usually not solely responsible for physically getting themselves to schools, they do not have the same transitions between classes, and they are often in self-contained classrooms with the same teacher(s) and the same peers for the entire school day. Moreover, as Corville-Smith (1998) notes, patterns of absenteeism start early in elementary school but tend to be exacerbated by the same contextual factors as students transition into secondary schools. Thus, a comprehensive discussion of these contextual factors and how they exist differently in elementary and secondary schools is necessary. As such, this review focuses on teacher, peer, and school-level factors that appear to drive student absenteeism for elementary and secondary students.

Elementary Absenteeism

Considering that in the U.S. most students spend a vast majority of their time in the same classroom with the same teacher, the teacher qualities that influence whether a student attends school are important to consider. Teachers establish the meaning and culture of school attendance for their students (Chang & Romero, 2008), and there is an underlying importance in how teachers respond to students who are absent from school. Bruner et al. (2011) discuss how often teachers take inaccurate roll of their elementary classes, which makes it difficult to respond to absenteeism if teachers are not aware of frequently absent students. Ken Reid has established a line of research documenting the necessity for preparing teachers (and school staff more generally) for appropriately reengaging students in school (Reid, 1983, 2003a, b, 2007, 2008, 2012). The discussed characteristics include ways to handle students returning to classrooms after missing schools as well as identifying patterns of absenteeism using data. Teachers should possess accurate data on absenteeism and have the capacity to use data-driven strategies, because unresponsiveness to absenteeism sends a signal to students and parents that missing school is acceptable (Chang & Romero, 2008). This is a key contextual characteristic of teachers that has a significant influence on student attendance. Moreover in regards to teacher-related context, it should be noted that a decline in academic engagement- a potential result from unresponsive teachers- is directly tied to absenteeism (Bealing, 1990; Broadhurst et al., 2005; Reid, 1983; Southworth, 1992). This implies that if teachers are not academically engaging their students, these students might begin to exhibit lower attendance rates.

Second, while elementary students spend a great amount of time with their teachers in schools, they arguably spend an even greater proportion with their peers. Current research has documented several key characteristics of peers that tend to associate with better or worse school attendance. First, there is a body of research illustrating potential negative outcomes that occur when a student has certain peers. Using urban district data from Philadelphia, Gottfried (2013) found that having a greater percentage of peers who were retained in the previous school year was associated with higher rates of unexcused absences for other students in the present year. Similarly, Gottfried et al. (2016) used nationally representative data (ECLS-K) to investigate whether having classmates with behavior disabilities influenced student absenteeism. They found that students who had a classmate with an emotional and behavioral disability were more frequently absent, aligning with prior research that students with disruptive classmates are more likely to experience school disengagement (Juvonen et al., 2003) and miss school (Bealing, 1990; Broadhurst et al., 2005; Giallo et al., 2010; Gottfried et al., 2016; Harte, 1995; Lehr et al., 2003; Reid, 1983; Southworth, 1992). It should also be noted that students who feel socially alienated from their classmates are more likely to be absent (Ekstrom et al., 1986; Finn, 1989; Johnson, 2005; Newmann, 1981).

There is also research to suggest that peers can have a positive impact on student attendance. Kirksey and Gottfried (2018) examined district-level data from California to determine whether having consistent peers associated with better attendance for students. They found that students who had classmates carry over from the previous school year tended to have fewer unexcused absences that year and were less likely to be chronically absent. Kirksey and Elefante (2020) also found that students who shared classrooms with more familiar peers were less likely to miss those classes. More generally and qualitatively, (Barth, 1984) discusses specific intervention strategies and notes how students with poor attendance can improve their attendance with the encouragement and persuasion of peers in their classrooms. These findings seem to suggest that peers clearly factor into students' capacity for attending school.

Finally, in addition to each student's general classroom experience, there is an added layer of school-level factors that relate to elementary student absenteeism. Musser (2011) examined the academic performance and attendance of over 64,000 students in New York and concluded that schools that perform lower academically often have higher rates of absenteeism among their students. Nauer et al. (2014) followed 87,000 students from kindergarten to third grade in New York and concluded that there were several qualities that were consistent among schools with high rates of absenteeism: scores on standardized exams in math and reading were below city averages and most students in the schools were living in high-poverty areas with high rates of crime, homelessness, and unemployment. Finally, Kerr et al. (2012) found that the presence of school nurses reduced absenteeism for elementary students. While there are certain aspects of school nurses that do not directly relate to school context, it is logical that having school nurses might promote a healthy school culture (i.e., students wash their hands regularly), which is certainly a contextual characteristic. These studies suggest that the compositional effects of schools matter for student attendance. From this, it can be concluded that students have better attendance when schools have a student body that exhibits more positive school behaviors.

Secondary Absenteeism

While much research has been dedicated to what teacher characteristics associate with secondary student achievement, very little empirical work has examined which teacher factors impact absenteeism in secondary schools. De Wit et al. (2010) explored a large sample of ninth to tenth grade students for determinants of absenteeism, and the authors find that as students progress through high school, they received less and less support from their teachers. This lack of support associated with lower rates of attendance. In a study of eight schools, García-Gracia (2008) examined the holistic pedagogical approach for addressing absenteeism in schools among different teaching staffs. There were several findings of this study that relate to teaching staff characteristics influencing student attendance. First, schools with higher rates of absences among students had higher rates of turnover among their teaching staff. Additionally, teachers who were seen as pedagogically responsive to diverse student needs experienced less absences from students.

There are also several qualitative studies that guide current research on the teacher-related contextual factors of absenteeism. Reid (1983) conducted interviews with secondary students from 1977 to 1980 and established a baseline of factors at the teacher and school levels that aided more recent empirical efforts to establish quantifiable relationships. First, students who were frequently absent from school claimed to have little authoritative support within the schools when dealing with problems with school curriculum, peer relations, and personal issues affecting their ability to be in attendance. Specifically, when discussing problems that students had with their respective schools, teachers and schools were used interchangeably, highlighting the vital role of the student-teacher relationship as a contextual factor for school attendance. Marvul (2012) assessed the impacts of a small-scale intervention at a high school with 40 students. After conducting interviews with students, the author concluded that negative outlooks and relationships from teachers likely influenced students' decisions not to come to school. Additionally, other studies have qualitatively assessed that having strong teacher support and years of experience positively associates with better attendance patterns and a lower likelihood of dropping out of school (Blue & Cooke, 2004; Dalton et al., 2009; Hébert & Reis, 1999).

At the peer level, research suggests that secondary students may perceive the peer culture of their school as antagonistic. In the aforementioned study from De Wit et al. (2010), the authors found that students who perceived their peers as more hostile were less likely to attend school. Similarly, Gastic (2008) utilizes a sample of tenth graders from the Educational Longitudinal Study of 2002 to examine the impact of bullying on student attendance and finds that students who were victims of bullying were more likely to miss school. Conversely, support from peers in secondary schools has shown to positively associate with school attendance. Specifically, peer acceptance, or peers' willingness to engage with a student, is correlated with greater levels of academic readiness, engagement, positive school perceptions, and sense of belonging at school; this acceptance is negatively correlated with school avoidance and dropout (Adelabu, 2007; Espelage et al., 2013; Ladd et al., 1997; Royer et al., 2008; Vandell & Hembree, 1994). It is clear that even during secondary schooling, peers play a crucial role in supporting student attendance.

At the school level, Wagner et al., (2004) examined a sample of eighth to tenth grade student for trends related to absenteeism in Germany, and the authors conclude that the most significant correlation between school practices and absenteeism was grade retention. That is, students who were held back a grade during high school were more likely to be absent from school. Additional school contextual factors that tend to influence student attendance relate to school violence, school size, and overall school climate. Using nationally representative data from Israel, Astor et al. (2002) found that student-reported fear of attending school due to prevalent school violence related to higher rates of absenteeism for the student body. Brookmeyer et al. (2006) used data from the National Longitudinal Study of Adolescent Health to determine what school-level factors contributed to absenteeism from school. The authors find that large class and school sizes were inversely correlated to school attendance. The authors also used a scale for school climate to establish a relationship between the general school context for students and absenteeism. Unsurprisingly, the authors find a strong correlation between school climate and school attendance.

Given the clear consensus that school climate is related to absenteeism, the disciplinary policy and practices within a school certainly influence the overall climate. In fact, several studies have shown strong associations between more punitive disciplinary policies and absenteeism. For instance, Flannery et al. (2012) used data from 31 states in the U.S. to examine the role of out-of-school suspensions on the likelihood of truancy. The authors used survival analysis and hierarchical linear modeling techniques to conclude that consistent exposure to out-of-school suspensions was associated with higher rates of truancy among ninth grade students. It should be noted that this was the only statistically significant relationship found in the study- race, school percent minority, class sizes, urbanicity, student-teacher ratios, and all other controls become statistically irrelevant when including out-of-school suspensions.

Possible mechanisms of this relationship between disciplinary action and absenteeism have been posited by qualitative researchers. Namely, Torrens Armstrong et al. (2011) interviewed school staff and nurse personnel and found that these authority figures in the schools made qualitative distinctions between "sick absences." For students with lower locus of control, less demonstrated parental awareness and parental control and more victimization were designated as "school phobics" or "frequent fliers," and disciplinary actions were more frequently taken against these students. Other qualitative studies have similarly illustrated how perspectives of school staff on student discipline is harsher for certain groups of students, and these students tend to be more absent from school (Jonasson, 2011;

Strand & Cedersund, 2013). Unfortunately, when students are subjected to perceived unfair rates of disciplinary actions in schools, it is unsurprising that these students tend to view school as a hostile environment, and as a result, they do not attend (Elliott, 1999; Evans, 2000). This body of empirical work on school climate and school climate furthers the notion that the environment in which students receive their education is fundamental to their decisions of whether to attend school.

Strategies to Reduce Absenteeism

Although school absenteeism is certainly a cause for concern, research points to strategies that have been successful at improving students' attendance. These strategies, typically implemented by individual schools or districts, can work on the school, classroom, or family level. Below are examples of each that have proven effective in recent years.

School Level

Research has shown that schools can take measures to meaningfully improve student attendance. Effective interventions can be as simple as supplying a second meal within the school day. Kirksey and Gottfried (2021), examining administrative data from Colorado and Nevada schools, discovered that serving breakfast after the school day began reduced chronic absenteeism rates by 3% in elementary and middle school and 7% in high school.

Successful interventions are often broader-based. Balfanz and Byrnes (2018) researched a pilot program established in 2010 to improve attendance in 100 New York City schools and found that one aspect, the NYC Success Mentor Corps, was particularly effective at improving chronic absence rates among the participating students. These mentors came from existing school staff, partners like AmeriCorps, social work students, retirees, and twelfth-grade peer leaders. The success of this program relied on one-on-one communication with students struggling with attendance, including greeting them at school, calling home, regularly meeting with them individually or in small groups, diagnosing the causes of their absenteeism, connecting students and families to external resources if necessary, and celebrating when students achieve success in attendance or otherwise.

The authors of the above study were careful to point out that this mentoring program was part of a larger effort that included careful tracking of absenteeism, diagnosing reasons for poor attendance and making efforts to address them, relationship-building with students with low attendance and their families, reward and recognition of good attendance, and a commitment to continually assess and modify the program. Moreover, this program used existing school staff and resources and required only a modest financial investment.

Overall school quality, even in seemingly unrelated factors, plays a role in getting students to school more often. Studying 165 traditional and public charter schools in Detroit, Lenhoff and Pogodzinski (2018) determined that schools that scored higher on the 5Essentials surveys of organizational effectiveness had substantially lower chronic absenteeism rates. Specifically, the survey measures that most correlated with reduced chronic absenteeism were expectations for postsecondary education, safety, parent influence on decision-making in schools, parent involvement in school, teacher-parent trust, academic press, quality of student discussions, program coherence, teacher influence, teacher-principal trust, classroom disruptions, classroom rigor, reflective dialogue, school safety, socialization of new teachers, student responsibility, teacher safety, collective responsibility, school commitment, and teacher-teacher trust.

Classroom Level

There are also strategies at the individual classroom level that have helped improve student attendance. In addition to increasingly sophisticated data on teachers and students, access to period-level attendance data is revolutionizing how researchers analyze school absenteeism. For one thing, it is becoming clear that attendance at the middle and high school level often varies throughout the day. Half the time secondary students miss a given class, they attend other classes that same day (Whitney & Liu, 2017). These granular data also allow researchers to look at specific characteristics of teachers and students that predict attendance.

One factor that researchers increasingly look at is demographic representation. There is evidence that students are more likely to enjoy success in school – including attendance – if they attend classes with teachers that look like them. Gottfried et al. (2021), studying administrative data from a high school district in California, found that students were 10% less likely to miss a class taught by a teacher of the same race as them. This effect was most profound for Latinx students. Holt and Gershenson (2019) looked at administrative data from students in Kindergarten through grade 5 in North Carolina and found that students with other race teachers were 4% more likely to be absent and 6% more likely to have an unexcused absence from that class.

Teachers can have other characteristics that improve their students' attendance. Studying 11 years of longitudinal administrative data from a medium-sized urban school district in California, Liu and Loeb (2019) determined that, much like value-added to student academic achievement, teachers can have a similar effect on attendance. The most successful teachers in this regard engage students in class content and motivate the students to achieve academically. Teachers' value-added to student attendance tends to remain consistent over multiple years and classrooms. The effect is more pronounced for students with previously high rates of absenteeism, chronic absenteeism, and dropout.

Researchers have studied peer factors as well. One such factor is the concept of "familiar faces," or peer consistency across multiple years. Kirksey and Gottfried (2018) explored this connection using four years of administrative data from a small urban district in California. In this instance, they estimated an elementary student who had 100% familiar faces from the previous year in their current year's classroom would have −1.08 fewer unexcused absences. Further, that student would be 73% less likely to be chronically absent.

Kirksey and Elefante (2021) conducted a similar analysis of high school data, where period-level attendance data allowed them to look at the association of absences and familiar faces in individual classes. In this study, an increase of 20% familiar faces in a course resulted in 0.84 percentage point decrease in a student's absence rate for that course. Substantially increasing the number of familiar faces in those classes is a workable intervention. For 26% of the students in this study, each classroom consisted of less than half familiar faces.

Family Level

Targeting attendance improvement efforts at families has also proved effective. Aware that families prioritize school attendance differently, Robinson et al. (2018) sent mailers to over 10,000 families of medium- and high-absence elementary students in California. Drawing on the expectancy-value model (Eccles & Wigfield, 2002), the authors assumed that families would value attendance more if they perceived it having a tangible benefit later in life. They sent six mailers home to students' families between November and May. The personalized mailers highlighted the value of attendance in early grades and detailed how many days the families' children had been absent. In addition, some mailers included an insert that encouraged families to communicate with "attendance supporters," which can be friends, family, or school or community members who can help parents with attendance issues. The students whose families received the mailers with the insert missed an average of −0.535 fewer days of school than those who did not. Further, those students' chronic absenteeism rate decreased by 15% (Robinson et al., 2018).

Aiming to reduce chronic absenteeism and improve attendance among kindergarteners in a Pittsburgh school, Smythe-Leistico and Page (2018) designed a program called Connect-Text, a two-way text-messaging system connecting the school and families. About once a week, the school sent preprogrammed, personalized messages to the students' families. The school created messages intended to increase awareness of the importance of attendance, address obstacles to attendance, and provide families with resources to help them improve their children's attendance. Individualized messages provided families with specific feedback on their children's attendance. Importantly, the tone of these messages was always positive.

The program proved successful. By the end of the year, the chronic absence rate at the targeted school declined to 13.3%, compared to 24.4% in a synthetic control group of other Pittsburgh public schools. Overall absence rates improved as well, with target school students missing 5.9% of school days, compared to 7.6% in the synthetic control group. The Spanish language messages were especially effective, reducing the absenteeism rate of students from Spanish-speaking families to that of non-Spanish-speaking families, which was not the case for the control group (Smythe-Leistico & Page, 2018).

Conclusion

This chapter brings the problem of excessive school absenteeism in the U.S. into stark relief. It also points the way forward by highlighting measures that have been successful in recent years at mitigating the problem of absenteeism. To be sure, future research on the causes of and, hopefully, solutions to excessive absenteeism will equip education stakeholders with even more tools to manage this growing crisis.

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Part II

Cognition and Clinical Child Psychopathology

13

Executive Function in Children and Adolescents: A Concept in Need of Clarity

Gillian England-Mason and Deborah Dewey

Conceptualization of Executive Function During Childhood

In developmental psychology, "executive function" (EF) is an umbrella term used to refer to a broad range of cognitive processes that are required for the conscious control of actions, thoughts, and emotions. Although definitions of EF vary, there is a general consensus that the psychological construct of EF refers to higher-order cognitive processes that are coordinated by the prefrontal cortex (Best & Miller, 2010; Zelazo & Müller, 2010). The field of EF suffers from some terminological inconsistencies, as different terms are often used interchangeably to refer to the construct of EF (e.g., executive control, central executive, executive attention). These terminological inconsistences are further obscured by the conceptual overlap between EF and some other broad psychological constructs, such as self-regulation (i.e., a general term referring to the management and modulation of physiological, attentional, emotional, behavioural, cognitive, interpersonal, and social processes) and effortful control (i.e., the intentional management and modulation of thoughts, attention, emotions, and behaviour; particularly in emotionally salient contexts) (Müller & Kerns, 2015). To better appreciate the current conceptual and methodological strengths and challenges in the study of EF as they pertain to the practice of clinical child psychology, it is first helpful to understand its historical underpinnings.

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Brief History

Converging evidence from primate research and clinical observations led to the current conception of EF as the controlled (or "non-routine") processing of mental processes by the prefrontal cortex. Perhaps the most well-known clinical vignette associated with EF is that of Phineas Gage, a railroad worker who was impaled by an iron bar and suffered severe damage to one of his frontal lobes, with documented resultant changes in personality and behaviour (Harlow, 1868). Although medical reports of other patients from the same era did not definitively link lesions in the frontal lobes to any personality changes (Welt, 1888), the difficulties with inhibition (e.g., impulsivity, loss of social responsibility) often found in individuals with damage to the prefrontal cortex prompted researchers to further investigate the role of the frontal lobes in cognitive processes. In the early twentieth century, primatology research noted that lesions in the frontal lobes were associated with memory deficits (Jacobsen, 1936). The concept of EF was not introduced until the 1970s, with seminal work describing the prefrontal cortex in primates as the "executive" of the brain (Pribram, 1973). In the following decades, there was an explosion of theoretical and empirical work, leading to a better understanding of the different components considered to be "executive functions", the neural architecture supporting EF, factors that bolster or hinder the development of EF, and the associations between impairments in EF and different clinical manifestations. It is noteworthy that these historical origins in neuropsychology and frontal lobe injury are likely contributors to the conflation between the term EF and the functions of the prefrontal cortex (Barkley, 2012).

Theoretical Considerations

The concept of EF has received increasing attention over the past four decades and is a cross-disciplinary construct investigated by various disciplines, including psychology, developmental science, neuroscience, and psychiatry. Across disciplines, development of EF is defined as progressive improvements in domain-general components (i.e., cognitive abilities that influence performance over a range of tasks and contexts such as working memory), which in turn are supported by development of the prefrontal cortex (Diamond, 2013; Miyake et al., 2000). However, it is important to acknowledge that there are several divergent ideas regarding the conceptualization and operationalization of EF that make this construct particularly challenging to define and measure. Herein, to provide a comprehensive review of the current state of knowledge on EF as it pertains to child clinical psychology, we discuss and synthesize the following: models of EF; development of EF from infancy through to adolescence; neural underpinnings of EF; the influence of genetics and the prenatal and postnatal environment on EF development; associated impairments in EF in children with neurodevelopmental, behavioural, and mental disorders; assessment of EF; clinical interventions to address EF deficits; and future directions for research that focus on the promotion of healthy development of EF from the prenatal period through to early adulthood.

Models of Executive Function

Executive function is commonly described as consisting of the following three core domain-general components: (i) working memory (also referred to as "updating"; updating and monitoring information), (ii) inhibitory control (also referred to as "inhibition"; inhibition of a prepotent response), and (iii) cognitive flexibility (also referred to as "shifting"; mental set-shifting) (Best & Miller, 2010; Miyake et al., 2000). These core components were delineated in seminal work by Miyake et al. (2000);

they examined the structure of EF using latent variable analysis, a statistical approach that uses multiple observed measures to infer a mathematical model of a latent variable, which is thought to tap into the underlying construct of EF. This work identified three separate factors that mapped onto distinct experimental tasks (i.e., "updating" on the Operation Span Task, "shifting" on the Wisconsin Card Sorting Test (WCST), and "inhibition" on the Tower of Hanoi) and a common underlying construct (Miyake et al., 2000). Thus, individual differences in EF assessed by simple laboratory tasks were recognized to demonstrate both "diversity" (i.e., separability of components) and "unity" (i.e., correlations between components indicative of a shared construct); reflect significant genetic heritability; relate to various clinically significant behaviours and diagnoses; and show developmental stability (Miyake & Friedman, 2012). At about the same time, the child development literature identified three analogous components of EF: "working memory" (updating), "inhibitory control" (inhibition), and "cognitive flexibility" (shifting) (Diamond, 2006). Although similar, this model did not hypothesize that these components contributed to a common underlying construct and instead hypothesized that these core components worked together to build "higher-order" EFs (e.g., reasoning, problem-solving, planning/organizing) (Diamond, 2006, 2013). Tri-component models that define working memory (updating), inhibitory control (inhibition), and cognitive flexibility (shifting), as the core components of EF are the most commonly examined models applied to research with preschool children, school-age children, adolescents, and adults. Further, there is moderate support in the research literature for the existence of these three separable components of EF, which appear to become more differentiated with age (Karr et al., 2018).

Despite the common acceptance of the tri-component view of EF, current conceptual and operational inconsistencies raise questions as to whether EF should be reduced to these three processes. For example, the tri-component view has been criticized due to reports that laboratory tasks of EF do not consistently correlate with self-regulation measures; the limited evidence that training targeting one or more of these components improves EF in non-targeted components; and limited research showing that performance on simple EF tasks correlates with other outcomes that are thought to be associated with EF (e.g., theory of mind) (Doebel, 2020). In addition, neuroimaging research has reported that performance on tasks of working memory, inhibitory control, and cognitive flexibility is associated with activation of shared frontal and parietal areas, but also unique frontal and/or posterior areas, supporting both the "unity" and "diversity" of these three components of EF (Collette et al., 2005). Further, the results of a systematic review, which analysed 106 studies published between 2008 and 2015, found 39 different components or processes described as EFs (Baggetta & Alexander, 2016). The authors noted that the most frequently examined component of EF was inhibitory control (68% of studies), followed by working memory (35% of studies), then cognitive flexibility (31%); other components such as "planning" (12% of studies) and "attention" (10%) were studied less frequently (Baggetta & Alexander, 2016). A brief, but not exhaustive, overview of additional components often identified as EFs includes: reasoning, problem-solving, planning/organizing, decision-making, emotional control, delay gratification, and verbal measures of EF (e.g., verbal fluency) (Diamond, 2013; Eslinger, 1996). Taken together, it appears that the tri-component view of EF that has greatly shaped the field warrants reconsideration.

In addition to the tri-component view of EF, other models are being investigated. One classifies EF into "hot" affective processes that are associated with the ventral medial prefrontal cortex (VM-PFC) and anterior cingulate cortex (ACC) and "cool" cognitive control processes associated with the dorsolateral prefrontal cortex (DL-PFC) (Zelazo et al., 1997, 2005). This model differentiates hot EF based on the emotionally and/or motivationally significant consequences (i.e., meaningful rewards or losses) of the problem or event. Hot EFs are required for problems or events that involve the regulation of basic functions of the limbic system (i.e., affect and motivation), including those related to the self and social understanding (Zelazo et al., 1997, 2005). Thus, hot tasks involve stimuli, decisions, and outcomes that are motivationally salient (e.g., delay gratification), compared to the cool aspects of EF, which involve more abstract, decontextualized problems or events (e.g., shifting between sorting rules on the WCST) (Zelazo & Carlson, 2012). The distinction between hot and cool EFs is developmentally meaningful, as there are relatively consistent correlations between performance on measures of cool EFs (e.g., working memory, cognitive flexibility) during childhood and adolescence, and this performance shows significant improvements with age. In contrast, for hot EFs (e.g., delay gratification, affective decision-making), the associations between measures are more complex, as these measures are not consistently correlated and age-related improvements are more gradual and occur at later ages (O'Toole et al., 2018; Prencipe et al., 2011).

Another model, the bidirectional model, is becoming increasingly used in the field of EF. It attempts to provide a more reciprocal account of the regulatory skills important for school readiness and other positive outcomes during childhood and throughout the lifespan. This model of EF describes how the parallel development of brain areas that underlie EF reciprocally interacts with those associated with the automatic aspects of self-regulation, such as executive attention, the regulation of emotion, and the stress response system (Blair & Ursache, 2011). Within this bidirectional model, the ACC plays a critical role. The ACC is associated with executive attention (i.e., which registers conflict between stimuli or between stimulus and response options). It sends signals to the prefrontal cortex to initiate activity in the dorsal and ventrolateral regions associated with EF, as well as linking limbic areas associated with emotional processing, which in turn can trigger a stress response and increase neuroendocrine activity in areas such as the hypothalamic-pituitary-adrenal (HPA) axis (Blair & Ursache, 2011). In brief, the processes of EF and self-regulation interact in an adaptive feedback loop in response to the environment and are highly influenced by experience. Further, in this model, EFs are thought to serve as a critical higher-level, or top-down, mechanism in regulating the automatic aspects of self-regulation (Blair & Ursache, 2011). Research, which has examined the development of the bidirectional processes of EF and self-regulation, suggests that children may be "early developers" (i.e., show high initial levels of self-regulation and earlier gains), "intermediate developers" (i.e., show low initial levels of self-regular on followed by rapid gains), or "late developers" (i.e., show low initial levels of self-regulation followed by slow gains), with this heterogeneity in developmental trajectories pinpointing a need for individualized intervention options (Montroy et al., 2016).

Development of Executive Function

In this section, we briefly review research on the development of EF beginning in infancy and then progress into toddlerhood, the preschool years, middle childhood, and through to late childhood and adolescence. Although a variety of biological, environmental, cultural, and lifestyle factors shape EF development across the life span (Wiebe & Karbach, 2017), herein, we focus on a few select factors that are particularly pertinent to each stage of development.

Infancy

The rudiments of EF begin to emerge in the first year of life. From birth, infants will preferentially attend to human faces over other visual stimuli (Farroni et al., 2002). Between 6 and 9 months of age, the cognitive capacities supporting attentional allocation develop to allow infants to participate in dyadic face-to-face social interactions and engage in joint attention (i.e., monitoring another person's focus of attention in order to coordinate one's own focus of attention toward the same external object or event) (Morales et al., 2005; Striano et al., 2006). Also, around 6 months of age, infants begin to demonstrate rudimentary response inhibition (e.g., an ability to not touch something), which is followed at 8 and 12 months of age by the ability to maintain focus on a task despite brief distractions and the emergence of detour reaching (i.e., reaching around physical barriers, which requires inhibiting the tendency to reach straight for a desired object) (Diamond, 1991, 2006). The antecedents of working memory first become evident around 7–9 months of age through capacities such as object permanence (i.e., the ability to understand and remember than unseen people and objects are still there), which is followed by the ability to perform simple means-to-ends tasks and two-step tasks around 9–10 months of age (Diamond, 1991, 2002). These burgeoning attention, inhibitory control, and working memory capacities also converge to support more complex abilities, such as the ability to hold in mind where a desired object has been hidden for progressively longer periods of time (e.g., as shown by reductions in the A-not-B error in infants from 5–6 months to 8–10 months) (Cuevas & Bell, 2010; Diamond, 1990b). The rudiments of cognitive flexibility tend to emerge latest in infancy, at around 9–11 months of age, and involve the ability to seek out alternative methods to retrieve objects that are not directly in view (Diamond, 1991). The emergence and development of these rudiments of EF rely primarily on the circuits and systems of the prefrontal cortex. Activity of pyramidal neurons and increased levels of dopamine in the DL-PFC are thought to be particularly important for supporting these cognitive advances during the latter part of the first year of life (Diamond, 2006).

Toddlerhood

During toddlerhood, the rudimentary aspects of EF continue to develop and become more complex; however, limited research has examined EF development in toddlerhood compared to pre-verbal infants and preschool children. There is wide variability in EF abilities among toddlers, which could be due to variable and rapid rates of development in language skills and vocabulary knowledge, which have been associated with a EF (Schonberg et al., 2018). During the second year of life, an important advancement in the development of EF is an improvement in understanding the physical connections between objects and abstract rules (Diamond, 2006). Around 20–21 months of age, toddlers acquire recognition memory and a basic understanding of abstract rules (e.g., success on the Delayed Non-Matching to Sample task requires a toddler to displace a novel stimulus to retrieve a reward) (Diamond, 1990a). Then, beginning as early as 2 years of age, young children may also begin to shift their actions according to changing rules (e.g., put on shoes for dry weather and boots for rain) (Best & Miller, 2010; Diamond, 2006). The third year of life is an important time for the development of symbolic representations, including language and symbolic play, which is paralleled by developments in the social cognition correlates of EF (e.g., rudiments of theory of mind and moral reasoning) (Diamond, 2006; Panesi & Morra, 2021). Although there are a multitude of factors (e.g., genetics, risk factors such as socioeconomic disadvantage, child temperament) that strongly predict EF development in these few first years of life (Leve et al., 2013; Raver & Blair, 2020), positive and warm caregiving characterized by high levels of support and secure caregiver-child attachment are significant drivers of healthy EF development (Blair, 2016). The child-directed and reciprocal nature of early interactions is important for long-term EF development, and factors that diminish the quality of these early interactions, such as the interference caused by the use of technology (e.g., cell phones) by caregivers and increased screen time in toddlers, predict poorer EF development later in childhood (Anderson et al., 2017; McHarg et al., 2020).

The Preschool Years

The preschool years are one of the most well-studied eras of EF development and represent a pivotal period when core components and processes first become evident. However, this is also the time when difficulties with EF may start to appear. Working memory is one of the earliest EF components to emerge. Preschool children's working memory abilities progress from being able to hold in mind two rules and act based on those rules (e.g., correctly sorting a card with a red rabbit based on colour during the Dimensional Change Card Sort (DCCS)) at around 3 years of age (Zelazo, 2006) to being able to hold previously known information in mind and construct new concepts in order to develop their understanding of representational change and false beliefs (e.g., a sponge that is painted to look like a rock is actually a sponge) by between 4 and 5 years of age (Gopnik & Astington, 1988; Tomasello, 2018). Preschool children's planning abilities also become more complex and flexible with age. Children generally progress from having rudimentary planning abilities (e.g., motor sequencing) at around 3–4 years of age (Carlson et al., 2004) to more complex abilities such as thinking ahead about the future consequences of an initial action (e.g., correct responses on Tower tasks and Route-Planning tasks) at around 4–6 years of age (McCormack & Atance, 2011).

Between the ages of 3 and 5 years, there are dramatic improvements in inhibitory control and cognitive flexibility, especially the abilities needed to regulate impulsivity and to flexibly change perspectives (Diamond, 2006). Children's capacity for inhibitory control typically becomes apparent between 3 and 4 years of age; their ability to inhibit their physical impulses is denoted by significant improvements in accuracy (i.e., being able to inhibit imitating an action) on Luria's Tapping Test (Luria, 1966) and the Hand Game (Hughes, 1998), which usually occur between 3½–4 years of age. At 4–5 years, children can demonstrate inhibitory control in verbal contexts (e.g., say "night" for the sun card and "day" for the moon card on the Day/Night Stroop) (Carlson, 2005) and delay gratification in order to resist temptation and obtain a larger reward following a temporal delay (e.g., delay eating one marshmallow in order to get two marshmallows after 5 min) (Mischel et al., 1989). By 5 years, children display fewer perseveration errors (i.e., they do not persist with the same response strategy after the rule has changed) and can follow an arbitrary rule to produce a response that differs from the natural, prepotent response (e.g., sort coloured cards by shape rather than by colour) (Best & Miller, 2010). Also, during the later preschool years, cognitive flexibility develops and children are able to shift their behaviour according to context (e.g., they take off shoes at home but leave them on at school) and switch back and forth between rules (e.g., switch between sorting by colour and sorting by shape on the DCCS) (Diamond, 2006; Zelazo, 2006). Given that cognitive flexibility has been theorized to draw on other EFs such as working memory efficiency and inhibitory control, children's cognitive flexibility performance depends on the task type (i.e., inductive word-learning tasks such as the Flexible Induction of Meaning test versus rule-switching tasks such as the DCCS) and the "task impurity problem" (i.e., many tasks of cognitive flexibility also assess verbal inhibition, response speed, and/or abstract reasoning); thus, cognitive flexibility can demonstrate significant intra individual variability and tends to develop later in the preschool years (Deák & Wiseheart, 2015; Diamond, 2006).

These marked improvements in the core components of EF (i.e., working memory, inhibitory control, cognitive flexibility) during the preschool years are also predictive of social cognition, such as theory of mind (i.e., understanding of one's own and other people's mental representations) and moral development (Diamond, 2006; Perner & Lang, 2000). For example, EF abilities at 3 and 4 years of age are strongly correlated with theory of mind, over and above the influence of language ability and sex, suggesting that the relation between EF and theory of mind increases during the preschool period (Müller et al., 2012). Similarly, preschool children's EF and theory of mind capacities are significantly associated with their moral reasoning abilities, and thus EFs are thought to be foundational for mental representation (Baker et al., 2021).

During the preschool years, environmental factors remain strong predictors of children's skills. Predictors of improved EF development include positive parenting behaviours and styles (e.g., sensitivity, responsiveness, autonomy support) and socioeconomic advantage (e.g., parents attended college/university, middle class or higher); while predictors of EF difficulties include adverse home environments (e.g., maltreatment), caregiver mental health symptoms (e.g., depression, anxiety), and socioeconomic disadvantage (e.g., poverty, housing instability) (Ackerman & Friedman-Krauss, 2017; Raver & Blair, 2020). A variety of prenatal factors, such as preterm birth and extremely low birthweight, and health conditions such as fetal alcohol spectrum disorder (FASD), are also significantly associated with poorer EF in preschool children (Ackerman & Friedman-Krauss, 2017). A current focus of the field of EF is applying this knowledge about risk and protective factors within community contexts, particularly in the early years, and in preschool programs, to create community-embedded solutions to racial and economic inequalities in order to support children's long-term neurocognitive health, emotional well-being, and academic success (Raver & Blair, 2020).

Middle Childhood

There are some notable improvements in EFs during middle childhood. Beginning in middle childhood, there are significant age-related improvements in working memory, inhibitory control, and cognitive flexibility (Diamond, 2006). For example, around 6–7 years of age, children start to perform at adult levels on learning to ignore irrelevant information (i.e., can inhibit their strong tendency to look toward the target during anti-saccade tasks and are able to look in the opposite direction) and this performance continues to improve over the next few years (Best & Miller, 2010; Diamond, 2006). Unlike the preschool period where the components and processes of EF emerged and research has focused on pinpointing developments at particular ages, during middle childhood there are incremental improvements in EF abilities and the specific improvements and associated ages are sensitive to task difficulty and demands (McCormack & Atance, 2011).

While parents and other caregivers are children's primary social partners during the first 5 or 6 years of life, middle childhood marks the period when peers begin to take centre stage and become a significant influence on EF development. Children begin to form larger social groups and face the need to manage their place in peer hierarchies, form stable friendships, and organize their behaviour according to shared rules (e.g., cooperation, competition) (National Research Council (US) Panel to Review the Status of Basic Research on School-Age Children, 1984). Thus, middle childhood is a critical phase for the development of social cognition and the "hot" aspects of EF, including emotional control and regulation. Specifically, children's improvements in EFs during middle childhood are associated with increases in understanding complex mental states and higher-order theory of mind abilities, such as second-order false beliefs (e.g., the ability to understand another person's thinking about a third person's perspective) (Bock et al., 2015). These improvements in social cognition are also paralleled by advancements in emotional control (i.e., a child's ability to modulate their emotional responses), and children acquire a greater variety of self-initiated strategies to manage their emotions. They rely less on caregivers for external support; are able to accomplish increasingly complex social and personal goals; and can start to adapt their emotional responses to be contextually and culturally appropriate (Thompson et al., 2008).

Late Childhood and Adolescence

There continue to be age-related improvements in EF processes across late childhood and into adolescence, many of which do not reach peak performance until late adolescence or early adulthood (Diamond, 2006). Children's inhibitory control capacity develops to enable them to flexibly switch between a central focus and peripheral stimuli (e.g., focus on riding a bike or driving and attending as needed to road signs and pedestrians) later in childhood and during adolescence; it reaches its pinnacle in adulthood, which enables individuals to consistently respond in a situationally appropriate manner (Best & Miller, 2010; Diamond, 2002). Adolescents continue to improve on assessments of cognitive flexibility and demonstrate increases in accuracy in switching between different foci and adapting to changing rules (e.g., decreased errors on the WCST), until these abilities reach maturity in adulthood, resulting in individuals being able to revise their actions and plans in response to quickly changing demands and circumstances (Best & Miller, 2010; Diamond, 2006). During adolescence, there are also marked improvements in higher-order EFs, such as problem-solving. These improvements are linked to the maturation of the prefrontal cortex and changes in the reward circuitry of the brain, such as the limbic system (Blair, 2017). Adolescence is also characterized by other cognitive and behavioural changes, such as increases in autonomy and risk-taking behaviours (Nelson et al., 1999), and pubertal maturation which contributes to sex differences in the organization and function of the brain and EFs (Nguyen et al., 2017). Both male and female adolescents also demonstrate significant improvements in the motivational and affective aspects of EF (i.e., "hot" EFs). Specifically, adolescence is characterized by improvements in affective decision-making (i.e., the ability to make informed choices under conditions of uncertainty) and abstract reasoning (i.e., the ability to think about and understand complex concepts that are not tied to concrete experiences) (Best & Miller, 2010; van Duijvenvoorde et al., 2010). Longitudinal analyses using a prototypical "hot" EF task, the Iowa Gambling Task, show that affective decision-making abilities aren't strengthened until later in the teenage years (i.e., 16–18) (Almy et al., 2018; Smithers et al., 2012). During late childhood and adolescence, all the previously mentioned factors (e.g., genetics, parenting, preterm birth) continue to predict pathways of EF development, with the child and family risk factors (e.g., socioeconomic disadvantage, caregiver mental health) that were present in early childhood also playing a significant role in determining EF performance at this time (Berthelsen et al., 2017).

Neural Basis of Executive Function

Executive function development has been closely linked to brain development. The frontal lobes and prefrontal cortex have typically been associated with EF; however, recent imaging studies suggest that posterior brain regions, including the temporal, parietal, and cerebellar regions, are also involved. The emerging view is that EFs demand large-scale brain networks and that the different components of EF – working memory, inhibitory control, and cognitive flexibility – are associated with partially separable and partially overlapping processes at the neural level. This is consistent with the integrative model proposed by Miyake and collaborators (Miyake et al., 2000).

Much of the neuroimaging research has focused on the prefrontal cortex (PFC), which consists of approximately two-thirds of the frontal cortex and is divided into three principal frontal-subcortical circuits: (i) the dorsolateral PFC (DL-PFC), (ii) ventromedial PFC (VM-PFC), and (iii) orbitofrontal PFC (OF-PFC). Functional and structural neuroimaging research implicates these three circuits with EF processes (Alvarez & Emory, 2006). The DL-PFC projects primarily to the dorsolateral head of the caudate nucleus and has been associated with a variety of EFs, including working memory, inhibitory control, cognitive flexibility, planning/organizational skills, and problem-solving (Alvarez & Emory, 2006; Moriguchi & Hiraki, 2013). Functional connectivity of the DL-PFC has also been examined and implicated in these EFs (Panikratova et al., 2020). However, the roles of the other two frontal-subcortical circuits, the VM-PFC and OF-PFC, in EF have received less attention, perhaps due to their overlapping contributions to lesser examined social-emotional components of EF, such as emotional control. The VM-PFC begins in the anterior cingulate and projects to the nucleus accumbens and has been associated with social-emotional aspects of EF, such as motivation and empathy (Nejati et al., 2021; Robinson et al., 2014). The OF-PFC projects to the ventromedial caudate nucleus and has been linked to inhibitory control, attentional control, and emotional processing (Bryden & Roesch, 2015; Kuusinen et al., 2018). Although these three circuits may be associated with specific EFs, they are interconnected, and together they support the various components of EF.

With respect to the tri-component view of EF (Diamond, 2006; Miyake et al., 2000), evidence from lesion studies, neurochemical research, and functional neuroimaging provides support for both the "unity" and "diversity" of the three core EF components in adults (Friedman & Robbins, 2021). Emerging evidence also supports the unity and diversity of the neural substrates of these components in children and adolescents (Fiske & Holmboe, 2019; McKenna et al., 2017). Functional neuroimaging studies have reported that laboratory tasks that assess working memory activate areas in the DL-PFC, ACC, and the superior and posterior parietal cortex (Collette et al., 2005; Marklund et al., 2007). Tasks that assess cognitive flexibility have been shown to activate the right interparietal sulcus, right supramarginal gyrus, left precuneus, left superior parietal cortex, and left middle and inferior frontal gyri (Collette et al., 2005). Finally, tasks that assess inhibitory control have been shown to activate areas such as the right inferior frontal gyrus, right orbitofrontal gyrus, and the right middle and superior frontal gyri (Banich & Depue, 2015; Collette et al., 2005). The common networks implicated in all three core components of EF are the right intraparietal sulcus, the left superior parietal gyrus, and the lateral PFC.

Attention is an important component of EF and the brain networks involved in alerting, orienting, and executive attention overlap those associated with EF. The alerting network deals with the aspect of attention related to how an individual achieves and maintains an alert state and involves input from the norepinephrine system, primarily the locus coeruleus, which modulates frontal and parietal structures (Rosario Rueda et al., 2015). The orienting network deals with selective mechanisms operating on sensory input and has been shown to involve the frontal eye fields, the inferior frontal cortex, and areas of the superior and inferior parietal lobe (Rosario Rueda et al., 2015; Vossel et al., 2016). It has been associated with two separate brain networks, one involved in focusing attention voluntarily using top-down mechanisms (i.e., the dorsal attention system) and a second that reorients attention to task demands (i.e., the ventral attention system) (Corbetta et al., 2008; Corbetta & Shulman, 2002). Finally, the executive network, which is involved in the regulation of thoughts, feelings, and behaviour, has been shown to involve the anterior cingulate and anterior insula (operculum) (Posner et al., 2014; Rosario Rueda et al., 2015). These networks are present from infancy and develop through childhood, and although their anatomies are distinct, they interact to influence attention performance and potentially EF (Mullane et al., 2016; Xuan et al., 2016).

Some researchers have suggested that sex and/or gender differences do not play an important role in determining developmental trajectories of EF (Grissom & Reyes, 2019a, b). However, evidence from a recent systematic review showed that there are significant sex differences in the neural networks underlying performance on laboratory tasks associated with working memory, inhibitory control, and cognitive flexibility (Gaillard et al., 2021). It is important to note that there may be more within-sex variability than between-sex variability in EF, which may speak to the importance of experience and contextual factors in shaping EF development (Grissom & Reyes, 2019a, b). Research that considers how sex and/or gender differences contribute to structure and function in brain regions associated with EF, as well as the influence of hormones at different ages (e.g., pre-puberty, puberty, menstrual cycle phase) on the neural correlates of EF during childhood and adolescence is needed. Overall, gaining a better understanding of the neural underpinnings of EF, as well as between and within-sex differences, may suggest potential avenues for intervention that could result in improved cognitive, social, and psychological development, and physical and mental health outcomes in children and adolescents.

Genetic and Environmental Factors Associated with the Development of Executive Function

Genetics

In addition to neural mechanisms, genetic and environmental factors have also been associated with the development of EF. Twin studies have been used to estimate the extent to which interindividual variation in EF is influenced by genetic (i.e., heritability), shared environmental (e.g., family environment, maternal nutrition during pregnancy), and nonshared environmental influences (e.g., different educational experiences). Behavioural genetic studies that investigated EF in monozygotic twins (MZ), who share all their genes, compared to dizygotic twins (DZ), who share on average half their genes, who have shared familial environments suggest a strong genetic component. The findings of a twin study conducted with a sample of young adults revealed that individual differences in EFs were almost entirely genetic (99%) and were due to a general genetic EF factor that operated across all three components (i.e., updating (working memory), inhibiting (inhibitory control), shifting (cognitive flexibility)), although some genetic influences were specific to individual components (i.e., updating, shifting) (Friedman et al., 2008). Similar findings were reported by Engelhardt et al. (2015) in a sample of twins aged 7.89 to 15.25 years. These studies support the existence of a general EF factor that is highly heritable.

To date, genome-wide association studies have had little success in identifying the genetic correlates of EF. Very little variance in EF task performance has been accounted for with measured genotypes that reach genome-wide significance. In fact, the largest genome-wide association study of EF tasks (data were available for between 5,429 and 13,454 participants based on the task) yielded no genome-wide significant hits for any EF measure (Ibrahim-Verbaas et al., 2016). As genetic variation in behavioural traits such as EF likely reflects highly polygenic effects, with each effect accounting for only a small fraction of the overall variance (Davies et al., 2011), very large genome-wide association studies will be required to identify genetic variants associated with performance on EF tasks.

It has been suggested that childhood EF could be considered a developmental endophenotype (i.e., neurobiological phenotype that is conceptualized as an expression of genetic liability for a clinical disorder) for various outcomes that have a genetic basis, including cognitive, behavioural, and mental and physical health outcomes (Engelhardt et al., 2015). The consideration of EF as a developmental endophenotype may be particularly informative for children with certain clinical disorders, such as Attention-Deficit/Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD), as this may present new opportunities to better understand heterogeneity in EF deficits (e.g., profile ASD subtypes) and for targeted assessments and interventions (Demetriou et al., 2019; Doyle et al., 2005). In a broader sense, it is also possible that performance on measures of EF could be used to identify children who are at risk for poorer psychological, social, and health outcomes. These "at-risk" children could be targeted to receive early intervention.

Environment

Although behavioural genetic studies support a strong link between a general EF factor and genetic variation, environmental factors (i.e., nonshared environment) could also play an important role in influencing EF development (Friedman et al., 2016). A significant body of work has examined associations between environmental factors and EF development, including socioeconomic status (SES), maternal mental health, maternal–child interactions, maternal and child nutrition, and exposure to environmental chemicals, to name just a few.

Socioeconomic Status

Socioeconomic status (SES) is one of the primary determinants of health (https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1) and lower SES (e.g., lower maternal education, lower household income) has been associated with worse EF, even in the early preschool years (Hackman et al., 2015; Last et al., 2018; St. John et al., 2019; Ursache et al., 2012; Wiebe et al., 2011). Further, the effects of early SES on EF development have been found to remain consistent through middle childhood and into early adulthood (Friedman et al., 2016; Last et al., 2018; St. John et al., 2019), suggesting that the relationships between early indicators of SES and EF remain stable over time and display limited variability with age. These findings suggest that associated SES disparities in early childhood are not likely to resolve as the individual matures. However, later changes in family SES have been associated with changes in children's EFs. For example, Hackman et al. (2015) reported that later decreases in family income-to-needs, relative to early childhood, were associated with significant decreases in planning ability and trend-level effects for working memory. Such findings suggest that despite the high level of heritability and stability of EFs, they are not immutable to environmental factors such as SES.

Maternal Depression and Anxiety

Maternal depression and anxiety during the perinatal period and childhood have been associated with poorer EF outcomes in children; however, finding have been mixed (Buss et al., 2011; Gueron-Sela et al., 2018; Jensen et al., 2014; Park et al., 2018; Power et al., 2021; Ross et al., 2020). A recent menta-analysis reported a small, but significant, association between maternal depression during the perinatal period and child EF (effect size $r = 0.07$; 95% CI 0.03–0.10); equivalent to Cohen's $d = 0.14$. (Power et al., 2021). It is notable that no differences in EF outcomes in children were found between prenatal and postnatal exposure to maternal depression. The authors suggest that this absence of an effect could indicate either a "pervasive effect of maternal depression on offspring EF development or the importance of an unmeasured third factor (such as genetic substrates) that underlie pre- and postnatal depression" (Power et al., 2021, p. 231). It is important to note that women who experience perinatal depression are at higher risk of developing recurrent long-term mood disorders such as unipolar and bipolar depression (Dipietro et al., 2008; McMahon et al., 2005; Meltzer-Brody & Stuebe, 2014), so the effects of perinatal depression on children's EF development may be compounded by long-term maternal mood disruption.

Research that examined the influence of maternal anxiety on children's EF reported that maternal pregnancy-specific anxiety was associated with poorer EF in children 6–9 years of age, specifically lower inhibitory control in girls only, and lower visuospatial working memory performance in boys and girls (Buss et al., 2011). Further, maternal pregnancy-specific anxiety was a stronger predictor of EF in children than trait anxiety or depression. In contrast, Ross et al. (2020) did not find an association between prenatal or postnatal anxiety and children's EF at 2 years of age; however, this study measured general anxiety symptoms in mothers, not pregnancy-specific anxiety. Further, it is possible that an association between maternal anxiety and children's EF may not be evident by 2 years of age, and that this association may only become apparent later in childhood as EF processes emerge and develop.

It is also possible that the chronicity of exposure to maternal anxiety and/or depression both prenatally and postnatally may be a factor in EF development, with children who are exposed more frequently and to longer bouts displaying poorer EF. Finally, severe maternal anxiety and/or depression experienced proximal to the time a child assessed could affect EF performance and is something that needs to be considered in future research (Power et al., 2021).

Parent–Child Interactions

Parent–child interactions can be influenced by many factors, including maternal depression and anxiety, and the quality of these interactions could affect the development of EFs in children. Carlson (2003) proposed that three dimensions of parenting are involved in the development of EFs in children: maternal sensitivity, autonomy support or scaffolding, and mind-mindedness. Sensitivity refers to appropriate and consistent responses to infants' signals, whereas autonomy support/scaffolding involves actively supporting children's volition and offering them age-appropriate problem-solving strategies. Mind-mindedness refers to the parent's tendency to use mental terms while talking to the child. Bernier et al. (2010) investigated the associations between quality of parent-infant interactions, as assessed by these three dimensions of parenting, at 12–15 months of age and subsequent child working memory, impulse control, and cognitive flexibility at 18–26 months. All parenting dimensions were associated with EF outcomes, and parental autonomy support/scaffolding was the strongest predictor of children's EFs. These positive parenting behaviours were also associated with better EF performance at 3 years of age, with effects remaining even after controlling for 2-year EF (Bernier et al., 2012). Likewise, Kraybill and Bell (2013) found that maternal positive affect at 10 months of age was related to child EF at 4 and 6 years of age. Cuevas et al. (2014) reported that negative caregiving behaviours were associated with worse child EF as well as poorer maternal EF. Together, these studies provide strong support for the beneficial effects of positive caregiving behaviours on children's EF development.

Nutrition

Maternal nutrition during pregnancy and child nutrition in the early years are important contributors to children's EF development. The fetal brain is highly vulnerable to nutritional alterations in pregnancy, as specific nutrients (i.e., folate, choline, iron, vitamin D, and long chain fatty acids) and other food components (e.g., fibre, fat, and proteins) play a critical role in programming its development and in turn consequent cognitive processes (Kominiarek & Rajan, 2016). Numerous studies have reported a positive association between cognitive functions in children and maternal intake of micro- and macro-nutrients (e.g., vitamin A, vitamin B, folate, choline, iron, iodine, omega-3 fatty acids, protein) and associated foods (e.g., fish) (Arija & Canals, 2021; Bath et al., 2013; Campoy et al., 2020; Chen et al., 2021; Cusick & Georgieff, 2016; Derbyshire & Obeid, 2020; McCann et al., 2020; Nyaradi et al., 2013; Voltas et al., 2020; Wozniak et al., 2020). To date, no studies have specifically examined the association between combinations of maternal nutrients and child EF, and only two studies have investigated the associations between dietary patterns and EF (Mahmassani et al., 2022; Mortaji et al., 2021). Mahmassani et al. (2022) reported that a higher Mediterranean diet score, indicative of a healthier dietary pattern, during pregnancy, was associated with fewer metacognitive problems in middle childhood (i.e., 6.6–9.7 years), and a higher score on the Alternative Healthy Eating Index during pregnancy was associated with better overall EF in children. Mortaji et al. (2021) reported that maternal pregnancy diet quality moderated the association between the postnatal caregiving environment and children's EF at 3–4 years. To advance our understanding of the relationships between maternal nutrition and diet and children's EF development, research that investigates the combined effects of vitamins (e.g., B6, D), essential nutrients (e.g., folate, choline, DHA), minerals (e.g., iron, zinc), specific diets (e.g., Mediterranean diet), and other lifestyle factors (e.g., exercise, obesity) during pregnancy on children's health and neurodevelopment is needed (England-Mason & Dewey, 2021).

The effects of *child nutrition* on cognitive development are well established. Numerous studies have reported positive associations between intake or status of various nutrients, children's diet quality, and cognitive outcomes (Dror & Allen, 2008; Gordon et al., 2009; Grantham-McGregor & Ani, 2001; Haapala et al., 2015; Kvestad et al., 2017; Leventakou et al., 2016; Louwman et al., 2000;

Smithers et al., 2012). A recent systematic review highlighted the role of specific nutrients, including iron, polyunsaturated fatty acids, zinc, iodine, vitamin B12, and folate, in brain development and the development of EFs in children (Costello et al., 2021). It is notable that the majority of cross-sectional studies report positive associations between the status of various nutrients measured in blood and children's performance on EF tasks in both high- and low- and middle-income countries (Adjepong et al., 2018; Algarín et al., 2013; Jumbe et al., 2016; Louwman et al., 2000; Sheppard & Cheatham, 2017). Randomized controlled trails that have investigated the effects of multiple micronutrient supplementation/fortification interventions on EFs have demonstrated an overall positive effect on working memory (Petrova et al., 2019), attention and concentration (Vazir et al., 2006), and cognitive learning strategies (Wang et al., 2017). In contrast, other randomized controlled supplementation trials have not found significant effects (Aboud et al., 2017; Kennedy et al., 2009; Montgomery et al., 2018; Ryan & Nelson, 2008). Further, the evidence from single nutrient randomized controlled trials is mixed, with some reporting that improvements in EFs are associated with supplementation for iron (Scott et al., 2018), omega-3 fatty acids (Portillo-Reyes et al., 2014), iodine (Gordon et al., 2009; van den Briel et al., 2000; Zimmermann et al., 2006), and zinc (Sandstead et al., 1998; Tupe & Chiplonkar, 2009). These inconsistencies could be due to the populations investigated (e.g., deficient versus not deficient), the levels of supplementation provided, the complex interaction among nutrients, and the measures used to assess children's EF; therefore, future research is warranted.

Neurotoxicant

Neurotoxicant exposures *in utero* and in early childhood have been associated with poorer cognitive outcomes in children, including poorer EFs (Grandjean & Landrigan, 2014; Lanphear et al., 2005). Lead, mercury, and arsenic are neurotoxic metallic or metalloid elements that are ubiquitous in the environment (Agency for Toxic Substances and Disease Registry (ATSDR), 2022); and for lead, there is no known safe level of exposure (Centers for Disease Control (CDC), 2022). Studies that have investigated associations between childhood lead exposure and children's performance on EF tasks of working memory, inhibitory control, cognitive flexibility, and planning have reported adverse association at levels as low as 3 μg/dL (Chiodo, 2004; Froehlich et al., 2007; Kordas et al., 2006; Lanphear et al., 2005; Stewart et al., 2006; Surkan et al., 2007). Limited research has examined the associations between prenatal lead exposure and EF; however, a recent study reported that in a cohort with lead levels commonly experienced by U.S. women, there were few statistically significant associations with parent reports of child EF; trends were noted between higher prenatal exposure, and poorer planning/organization and shifting based on parent's responses on the Behaviour Rating Inventory of Executive Function (BRIEF) (Fruh et al., 2019).

Mercury can be found in the air, soil, and water and exists in three forms that have different properties, usage, and toxicity: elemental, inorganic, and organic (i.e., methylmercury, MeHg). The neurotoxic effects of acute and chronic exposure to high concentrations of mercury are well documented by Harada (1995). Little is known about the neurodevelopmental effects of prenatal exposure to inorganic and elemental mercury from workplace and environmental activities such as mining or smelting; however, a recent study suggests that they may be negative (Nyanza et al., 2021). The findings of studies that have investigated the neurodevelopmental effects of *prenatal* exposure to MeHg via maternal diet have been mixed (Barbone et al., 2019; Boucher et al., 2014; van Wijngaarden et al., 2017). Some have reported that prenatal MeHg exposure from fish consumption during pregnancy was not associated with EF outcomes (van Wijngaarden et al., 2017), whereas others conducted in the Faroe Islands, New Zealand, and the USA reported adverse associations between MeHg exposure levels and EF outcomes (Crump et al., 1998; Debes et al., 2016; Oken et al., 2005). Boucher et al. (2014) in a study of an Inuit population in Canada found that prenatal MeHg exposure was associated with poorer performance at 6.5–11 months of age on the A-not-B task, which is believed to be a precursor of EFs (e.g., working memory, inhibitory control) in infants. Research that has examined the effect of *child* exposure to MeHg has also reported inconsistent findings. In a recent study conducted in Brazil, higher childhood exposure levels, measured in hair, were associated with lower performance on measures of visual and verbal working memory and verbal fluency (Santos-Lima et al., 2020). In contrast, Cao et al. (2010) examined the associations between postnatal MeHg exposure, after adjusting for lead levels in toddlers enrolled in the Treatment of Lead (Pb)-exposed Children clinical trial (TLC) and found very few and largely inconsistent associations between blood MeHg concentrations and children's performance on tests of EF. The inconsistencies in the research literature could be due to variability in the measures used to assess EF and the ages at which EFs were assessed. In addition, exposure to mixtures of neurotoxicants and nutrients, and differences in the distributions of genes in different study populations that influence the metabolism of MeHg and nutrients could influence the associations between mercury exposure and EF outcomes (Julvez et al., 2013; Nyanza et al., 2021; Strain et al., 2015; Yeates et al., 2015).

Arsenic, a metalloid that can be found in rocks, air, water, and soil, can have adverse effects on physical and cognitive health. Prenatal and childhood exposure to arsenic from drinking water, even at low concentrations, has been associated with deficits in intelligence in children (Tolins et al., 2014); however, research examining the association between arsenic exposure and EF is limited. In a population birth cohort study from Catalonia, Spain, no association was noted between prenatal exposure to arsenic and child EF at 4 years of age (Forns et al., 2014). However, a study that examined childhood exposure reported negative associations. Specifically, childhood exposure to arsenic >5 μg/L compared to <5 μg/L from well water was associated with reductions of 6.09 points in Full Scale IQ and 4.88 point in working memory (Wasserman et al., 2014). Further, a recent study by Desai et al. (2020) found that in 7-year-old children from Montevideo, Uruguay, exposed to low levels of arsenic, higher exposure was associated with worse performance on measures of rule learning and reversal, visual attention, and working memory, but the effect sizes were small. Future longitudinal studies are needed to clarify the differential effects of prenatal and childhood exposure to arsenic on children's EF outcomes.

The influence of prenatal and childhood exposure to other chemicals including bisphenols, phthalates, perfluorinated compounds, polychlorinated biphenyls, and organophosphates on children's EF is an expanding area of research (Braun et al., 2011; Choi et al., 2021; England-Mason et al., 2021; Jacobson & Jacobson, 2003; Sagiv et al., 2021; Stein et al., 2014; Vuong et al., 2016). Although findings are mixed, studies to date suggest that prenatal and childhood exposure to these chemicals could be associated with poorer EF in children and that some of these associations are sex-specific (England-Mason et al., 2021). These adverse effects on EF could also contribute to additional neurodevelopmental, behaviour, and mental dysfunctions in children and adolescents.

Executive Function and Neurodevelopmental, Behavioural, and Mental Health Disorders in Children

Executive function is often impaired in children with neurodevelopmental, behavioural, and mental health disorders, including Autism Spectrum Disorder (ASD), Intellectual Disability, Attention-Deficit/Hyperactivity Disorder (ADHD), Specific Learning Disabilities (SLD) including reading and math disorder, Developmental Coordination Disorder (DCD), and Fetal Alcohol Spectrum Disorder (FASD), as well as pediatric depression and anxiety (Demetriou et al., 2018; Kingdon et al., 2016; Lifshitz et al., 2016; Lonergan et al., 2019; Murphy et al., 2018; van den Berg et al., 2021; Weber et al., 2018; Wilson et al., 2013; Yaniv et al., 2018). These complex conditions have been linked to disruptions in brain maturation and share an early onset (before puberty) of deficits in personal, social, and academic functioning (American Psychiatric Association, 2013) and have been associated with future mental health (Eyre et al., 2019).

Although children with these various disorders and mental health conditions display impairments in EF, the patterns of difficulties appear to vary by disorder. Among individuals with ASD, specific difficulties in working memory, cognitive flexibility, and planning have been reported (Margari et al., 2016; Otterman et al., 2019), although broader EF deficits across all domains have also been observed (Corbett et al., 2009; Demetriou et al., 2018; Hyseni et al., 2019). In contrast, in children with ADHD, EF difficulties have been noted in the areas of working memory, inhibitory control, vigilance, and planning (Corbett et al., 2009; Willcutt et al., 2005). A meta-analysis by Booth (2010) concluded that children with reading disability have difficulties in maintaining relevant information in working memory, inhibiting irrelevant information, and accessing material in long-term memory. More recent studies have reported that children with reading problems (i.e., developmental dyslexia) show deficits in several EF domains, including, verbal categorical and phonological fluency, visual-spatial and auditory attention, verbal and visual short-term memory, and verbal working memory (Barbosa et al., 2019; Varvara et al., 2014), suggesting that the EFs affected may be primarily in verbal domains. A large body of research has linked low mathematics performance (i.e., math disability, developmental dyscalculia) with impairments in inhibitory control (Szucs et al., 2013), verbal and visuospatial working memory (Bull & Lee, 2014; Szucs et al., 2013), set shifting (Willcutt et al., 2013), sustained visual attention (Anobile et al., 2013), and inattentive behaviours (Fias et al., 2013). There is also some evidence that the relationship between math disability and EF may be specific to measures of EF that demand numerically relevant information.(Ashkenazi et al., 2009; Siegel & Ryan, 1989; Wilkey et al., 2020). Developmental coordination disorder (DCD) has also been linked to EF deficits (Leonard & Hill, 2015). In a recent study, children with DCD were found to display persistent EF difficulties (i.e., working memory, inhibitory control, fluency) over a 2-year period mainly in nonverbal domains and in verbal fluency (Bernardi et al., 2018). In children with FASD, EF deficits have been documented in the areas of cognitive flexibility, planning, strategy use, verbal reasoning, some aspects of inhibitory control, set shifting, fluency, and working memory (Green et al., 2009; Jacobson et al., 2021; Rasmussen, 2005).

Difficulties in EFs are not only seem among individuals with a clinical diagnosis but also among children and adults with subclinical traits (Brocki et al., 2010; Christ et al., 2010; Otterman et al., 2019). This is important, as children with subclinical traits of disorders often remain undetected (Angold et al., 1999), and these sub-clinical symptoms may be associated with EF problems, which may result in impairments and could have a substantial impact on short-term and long-term life outcomes such as educational attainment (Blair & Razza, 2007; Corbett et al., 2009; Diamond, 2013).

Pediatric mental health disorders such as depression and anxiety have also been associated with deficits in EF (Wagner et al., 2015), although the findings of studies are not consistent. Wagner et al. (2015) reported that compared to healthy controls, the most pronounced EF deficits in children with major depressive disorder were in inhibitory control, sustained attention, verbal fluency, verbal memory, and planning. However, a recent meta-analysis concluded that there is little support for EF deficits in pediatric depression (Weber et al., 2018). Research that has investigated the association between pediatric anxiety disorders and EF is limited; however, a recent study reported that children and adolescents with anxiety disorder have poorer planning ability compared to a control group and that difficulties in planning were associated with problems in attention, working memory, and cognitive flexibility (Rodrigues et al., 2019).

Comorbidity among developmental disorders such as ASD, ADHD, DCD, and specific learning disorders such as reading disorder and math disorder, and mental health disorders such as depression and anxiety is common (Czamara et al., 2013; Dewey, 2018; Dewey et al., 2002; Kaplan et al., 2001; Ter-Stepanian et al., 2017). Children and adolescents with comorbid disorders tend to display poorer performance on measure of EF compared to children with a single disorder, and different comorbidities have been associated with different executive dysfunctions (Crisci et al., 2021; Ter-Stepanian et al., 2017). Further, a study by Dajani et al. (2016) found significant heterogeneity in EF performance within diagnostic groups (i.e., ADHD, ASD), with some children with ADHD (34%) and ASD (20%) displaying "average" performance on EF tasks and others displaying "impaired" EF skills (ADHD, 63%; ASD, 78%). Further, in children with comorbid ADHD and ASD, 92% were classified as displaying impaired EFs. These findings suggest that comorbidity should be carefully examined as it may play a significant role in EF performance and in the day-to-day functioning of children and adolescents with developmental, behavioural, and mental health disorders.

Assessments of Executive Function

Ratings of EF

The Behaviour Rating Inventory of Executive Function (BRIEF) (Gioia et al., 2000) is the most widely used rating scale for assessing EF and is considered the gold-standard. The BRIEF is a standardized 86-item inventory for parents and teachers of children aged 5–18, and it has recently been updated to a 63-item version, called the BRIEF-2 (Gioia et al., 2015). There is also a self-report version, the BRIEF-SR (Guy et al., 2000), for children aged 11–18, and a 63-item Preschool Version (BRIEF-P) (Gioia et al., 2003) for parents of children aged 2.0–5.11. The BRIEF inventories are valid and reliable tools for assessing real-world EF problems in children and adolescents (Gioia et al., 2000, 2003, 2015). The BRIEF inventories include individual subscales, which assess a wide variety of EFs (i.e., inhibit, shift, emotional control, working memory, plan/organize, initiate, monitor) and combine into broader indexes (i.e., inhibitory control, flexibility, metacognition, behavioural regulation, emotion regulation, cognitive regulation) and a Global Executive Composite (GEC). Notably, the BRIEF inventories demonstrate convergent and discriminant validity with other measures of common clinical difficulties, such as inattention, hyperactivity, impulsivity, depression, anxiety, and atypicality (Gioia et al., 2000, 2003, 2015). There are a few other rating scales of EF for children and adolescents (e.g., Ratings of Every Day Executive Functioning (REEF) (Nilsen et al., 2017) or related screeners (e.g., Behavioural Screener for the Assessment of EFs, Behaviour Assessment System for Children (BASC-EF)) (Karr & Garcia-Barrera, 2017), but the BRIEF questionnaires are the most frequently used measures.

Performance-Based Tasks of Executive Function

There are a multitude of task-based measures of EF. For young children, these are generally adaptations of neurocognitive tasks, which have been devised into simple games. For example, Hughes (1998) adapted Luria's Tapping Test (Luria, 1966) into a Hand Game, which asks preschool children to imitate or make the opposite gesture of the experimenter. Other notable examples include Zelazo's (2006) adaptation of the traditional inhibitory control task, the WCST (Heaton et al., 1981), into a card sorting game for preschool children, and Kerr and Zelazo's (2004) adaptation of a classical affective-decision making test, the Iowa Gambling Task (Bechara et al., 1994), into the Children's Gambling Game. Many of the performance-based measures of EF developed for young children demonstrate developmental sensitivity, such as tasks of working memory (e.g., Motor Sequencing, Backward Digit Span, Count and Label), inhibitory control (e.g., Shape Stroop, Day/Night, Bear/Dragon, Gift Delay), cognitive flexibility (e.g., Reverse Categorization, Multilocation Search), and emotional control (e.g., Disappointing Gift) (for task details see Carlson, 2005). For older children and adolescents, traditional neurocognitive assessments, sometimes with slight variations, can be administered. This includes tests such as the WCST, Verbal Fluency Test, Design Fluency Test, Digit Span Forward/Backward, Stroop, Tower of London/Tower of Hanoi, Trail Making Test, and N-back (Chan et al., 2008). Many of these tests are individual measures of EF (e.g., WCST); however, some are included in standardized assessment batteries of intellectual or neuropsychological functions such as the Wechsler Scales of Intelligence (e.g., WISC-V) (Wechsler, 2014), NEPSY-II (Korkman et al., 2007), Delis-Kaplan Executive Function System (D-KEFs) (Delis et al., 2001), and National Institutes of Health Tool Box (NIH-TB) (Weintraub et al., 2013). These standardized batteries have strong psychometric properties; however, it is important to note that although many unstandardized performance-based measures of EF can have low test-retest reliability, they often demonstrate convergent validity and clinical utility (Anderson et al., 2008; Chan et al., 2008).

Neuroimaging and Physiological Indicators of Executive Function

Studies of brain structure, function, and connectivity provide information on the underlying neural structures associated with EFs (see section "Neural basis of executive function"). The number of studies investigating the neural basis of EF within healthy and clinical populations has risen dramatically over the past two decades. Functional neuroimaging techniques such as functional magnetic resonance imaging (fMRI), position emission tomography (PET), electroencephalogram (EEG), and near-infrared spectroscopy (NIRS) have illuminated the brain regions that become physiologically and metabolically activated during EF tasks, while structural neuroimaging methods such as magnetic resonance imaging (MRI) and diffusion tensor imaging (DTI) have characterized the volume differences and white matter alterations in individuals with EF deficits. Recently, the insights gained from functional and structural neuroimaging research have been supplemented by additional physical and physiological indicators of EF. This includes monitoring physical movements such as eye tracking, metrics of physiological arousal such as galvanic skin response (GSR) and heart rate, and physiological regulation measures such as respiratory sinus arrhythmia (RSA).

Problems in the Assessment of Executive Function

Executive function is challenging to study and measure from a developmental perspective, largely due to the conceptual inconsistencies previously discussed (see sections "Theoretical considerations" and "Models of executive function") and the issue of task-impurity (i.e., that tasks designed to measure EF typically implicate other cognitive processes) (Hughes & Graham, 2002; Miller et al., 2012). Task impurity is problematic as it introduces systematic variance attributable to non-EF processes associated with a specific task and measurement error. For example, performance on the Stroop (i.e., an inhibitory control task) is also related to colour processing and articulation speed. Another problem in the assessment of EF is that a single task may tap into multiple components or processes of EF. This is often the case for even "simple" tasks, such as the backward Digit Span (i.e., a working memory task), which presumably requires inhibitory control to meet the task demands of inhibiting the natural tendency to repeat items in the same order in which they were heard. Although many experimental psychology tasks have been developed in the hopes of isolating the different components of EF (i.e., fractionation of EF), this is likely at the cost of losing the very "essence" of EF and affects ecological validity (Miller et al., 2012). Latent variable approaches, such as confirmatory factor analysis (CFA), are suggested as a "purer" method of assessing EF as they extract common variance that is shared across observed variables and thereby reduce measurement error (Miyake et al., 2000; Miyake & Friedman, 2012). However, even these statistical approaches demonstrate that EF measures purported to assess the same construct often correlate weakly, calling into question the reliability and validity of assessments of EF using existing tasks (Gärtner & Strobel, 2021). Advancements in technology, such as virtual reality (VR), may enable the real-time evaluation of EF in more “real life” scenarios and offer improved ecological validity (Borgnis et al., 2021).

There are methodological concerns that are specific to the assessment of EF in children. The first is the concordance between the two common methods of measuring EF – parent ratings and performance-based tasks. It is well acknowledged that EFs measured using these different methods are often weakly correlated at best, and that performance-based measures assess a specific aspect of EF (e.g., peeking behaviour on the Gift-Delay) and parent-report instruments assess more global aspects of “everyday” functioning (Bodnar et al., 2007; Ten Eycke & Dewey, 2016; Toplak et al., 2013). It has been proposed that these discrepancies may be due to the engagement of different levels of cognitive processing, as performance-based measures are often concerned with the efficiency of information processing (i.e., algorithmic level), while global rating scales typically assess the goals and beliefs of an individual during decision-making processes (i.e., reflective level) (Toplak et al., 2013). Thus, these different measures likely assess different constructs of EFs, and different neurodevelopmental processes are associated with the algorithmic level (e.g., motor functioning) compared to the reflective level (e.g., attentive ability) (Ten Eycke & Dewey, 2016). A second methodological concern is related to language development in young children. Although EF tasks can be designed to require no or limited verbal ability, the development of EF likely depends on improvements in language abilities; therefore, it is probably misguided to separate them (Hughes & Graham, 2002). Further, as systematic evidence indicates that individual tasks engage different EFs at different ages (i.e., measurement invariance), more research is needed that examines the test-retest reliability and validity of existing and novel measures of EF, particularly as they pertain to everyday contexts (Miller et al., 2012).

Interventions for Executive Function

So why is it important to develop early interventions for EF? First and foremost, EF develops and changes from infancy through childhood and adolescence and into adulthood and old age, and across the lifespan interventions have been associated with improvements in EF (Diamond, 2016; Ferguson et al., 2021; Kinsella et al., 2020). Second, the early gap between those with better and worse EF often does not disappear and can grow larger over time (Fitzpatrick et al., 2014; Hackman et al., 2015; Johnson et al., 2016; Mulder et al., 2017), and problems in inhibitory control and working memory identified in early childhood are associated with later problems in EF and social relationships (Ahmed et al., 2019; Brocki et al., 2010; Jacobson et al., 2011; Moffitt et al., 2011; Rinsky & Hinshaw, 2011; Wåhlstedt et al., 2008). Third, children’s early EF skills predict academic performance from elementary school to college and university (Ahmed et al., 2019; Cortés Pascual et al., 2019; Fitzpatrick et al., 2014; McClelland et al., 2013; Ramos-Galarza et al., 2019). Therefore, interventions that improve EF early in life may significantly affect children’s trajectories of academic achievement and ultimately their social and economic outcomes over their lifespan.

In children aged 2–6, it has been suggested that intervention efforts focus on supporting the three core components of EF (i.e., working memory, inhibitory control, and cognitive flexibility), as these are foundational for all other EF and self-regulatory skills. In middle and late childhood, it has been suggested that interventions target planning/organization and emotion regulation, while interventions for adolescents should focus on the multi-dimensional and context-specific aspects of EF and self-regulation (Bailey & Jones, 2019). Evidence from studies that have included typically developing children, children at risk for EF problems, and children with neurodevelopmental disorders suggest that various interventions are associated with improved EF skills. Diamond et al. (2007) reported that children trained with "Tools of the Mind", a research-based preschool curriculum that focuses on the development of cognitive, social-emotional, self-regulatory, and foundational academic skills, performed better than their untrained peers on measures of EF. Similarly, research with preschool children participating in The Chicago School Readiness Project (CSRP), an intervention designed to support low-income children's self-regulation, found that compared to comparison children, children enrolled in preschool classes where Head Start teachers had been trained in CSRP displayed significantly higher attention skills, greater impulse control, and improved vocabulary, letter-naming, and math skills (Raver et al., 2011). In a recent study that focused on working memory training, Blakey and Carroll (2015) showed that in 4-year-old children, working memory training improved performance on non-trained working memory tasks, but did not affect performance on inhibitory control or cognitive flexibility tasks. In another study that focused on training specific EFs, Thorell et al. (2009) found that preschool children trained for 5 weeks on a visual-spatial working memory task showed improvements in non-trained visual-spatial and verbal working memory and transfer to attention tasks. In contrast, children trained on inhibitory control showed no improvement on non-trained inhibition tasks and no transfer to tasks of working memory or attention. Overall, early intervention efforts focused on the three core components have been shown to improve specific EFs, but there is limited support that these improvements transfer to other EFs or tasks.

Several studies that have examined that the success of play interventions for the development of EFs in preschoolers have also reported promising results. For example, Traverso et al. (2015) conducted an intervention focused on the development of working memory, inhibitory control, and cognitive flexibility with children aged 5. Twelve play sessions lasting 30 min each were conducted over 1 month at the educational centre the children attended. The children who took part in the intervention performed better on tasks that targeted these three areas of EF. A play-based intervention study by Hermida et al. (2015) with kindergarten children found few differences between the intervention group and controls in EF skills; however, the intervention group showed significantly higher language and math grades one year after the intervention. Rosas et al. (2019) reported that a longer play-based intervention (i.e., 60 45-minute sessions held over a 3-month period), similar to Hermida et al. (2015) and Traverso et al. (2015) resulted in improved EFs in preschool children at 8 months post intervention.

Computerized training programs such as CogMed, which progressively increases working-memory demands, have also been associated with improved working memory; however, these improvements did not generalize to other EFs such as cognitive flexibility or inhibitory control (Bergman Nutley et al., 2011; Holmes et al., 2009; Thorell et al., 2009). In a study that investigated the effects of CogMed working memory training compared to math training in adolescents with severe learning disability and comorbid ADHD, those in the working memory training group showed greater improvements in a subset of working memory measures compared with those in the math training group. However, there was no transfer of training to measures of cognitive and behavioural attention and academic achievement (Gray et al., 2012). Finally, in a randomized control trial that used a computer game to train multiple EFs, including visuospatial working memory, inhibitory control, and cognitive-flexibility, in school-aged children with ADHD, improvements in working memory and inhibitory control were specifically related to the type of treatment received; no improvements were noted for cognitive flexibility (Dovis et al., 2015). The results of these studies suggest that computerized training programs may improve the EF that is being trained, but there is little generalization to other EFs.

The EF intervention literature is beginning to investigate whether mindfulness training is associated with improved performance on measures of EF and emotion regulation and could be a promising intervention for improving EF skills in children as young as 4 years of age (Schonert-Reichl et al., 2015; Zelazo et al., 2018). However, the research to date is limited and no specific conclusions can be drawn regarding the efficacy of mindfulness in improving EF in children and adolescents.

A recent review (Diamond & Ling, 2016) and a meta-analysis (Takacs & Kassai, 2019) both support the contention that interventions can improve some EFs in children and adolescents, but there is limited transfer of training from the trained EF (e.g., working memory) to other EFs (e.g., inhibitory control, cognitive flexibility). Further, based on the research to date "we do not know how much they can be improved … or how long benefits last and what determines how much EFs improve or whether benefits last" (Diamond & Ling, 2016, p. 43), which supports the need for prospective longitudinal intervention studies investigating the long-term effects of EF interventions.

Directions for Future Research

Executive function has become an important cross-disciplinary construct that has been the focus of over a half-century of dedicated research. Although the field of EF suffers from terminological inconsistencies, the conception and evaluation of the three core processes (i.e., the tri-component view) – working memory (updating), inhibitory control (inhibition), cognitive flexibility (shifting) – is predominant in the field. However, questions have been raised regarding the suitability of reducing EF to these three core components, and more foundational work is needed to consistently conceptualize this construct.

In addition to clarifying these conceptual issues, research is needed in multiple areas to promote the healthy development of EF from the prenatal period through to early adulthood. First, more studies are needed that investigate if sex and/or gender differences and hormones are associated with the structure and function of the brain regions (e.g., DL-PFC, ACC) that have been linked to the development of EF. Second, although individual differences in EFs are almost entirely genetic, which is an arguably immutable factor, there are multiple protective factors, which support the healthy development of EF, and risk factors that confer risk for difficulties with EF, which pinpoint key targets for intervention. This includes environmental factors such as socioeconomic status, parental depression, parent-child interactions, maternal nutrition during pregnancy and childhood nutrition, and prenatal and early childhood exposure to environmental neurotoxicants. Third, policy changes are necessary to help ameliorate underlying racial and economic inequalities and more targeted intervention research is needed in children at different developmental stages (e.g., targeting the core components of EF in preschool children and planning/organizing skills and emotion regulation in school-age children). Related to these concerns is a final important avenue for future research, the operationalization of EF. Given the acknowledged conceptual inconsistencies in the field of EF, it is not surprising that existing measures of EF demonstrate varied developmental sensitivity, psychometric properties, and limited concordance. This is of the utmost concern, as ecologically valid and reliable measures of EF are needed to consistently identify the genetic basis and neural correlates of EF, the environmental factors that shape the development of EF, and the targets for intervention to support the healthy development of EF in all children and adolescents including those with neurodevelopmental, behavioural, and mental disorders. This issue relates back to the conceptualization of EF and suggests that some of the field's longstanding views warrant reconsideration. The field of EF also should consider the bidirectional influences between EF and self-regulation (Blair & Ursache, 2011). Interventions could target both abilities, which in turn could promote long-term neurocognitive health and positive outcomes (e.g., academic success) (Howard et al., 2021). Further by embracing the etiological complexity associated with the development of executive functions and utilizing advanced statistics, we may better understand both typical and atypical development of EF across multiple levels of analysis spanning genes to behaviour and could foster a transdiagnostic paradigm shift in our conception, assessment, and treatment of impairments in EF in children and adolescents (Beauchaine & Thayer, 2015; Beauchaine & Zisner, 2017).

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Theory of Mind

14

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Introduction

Theory of mind is widely studied in neurotypical and child clinical populations (Cotter et al., 2018; Wellman, 2014). Premack and Woodruff (1978) coined the term "theory of mind" to characterize the prediction and explanation of behavior by attributing unobservable psychological states. The importance of ToM in child development rests upon the assumption that what people say and do is incompletely understood, if not altogether incomprehensible, without some grasp of how thoughts and feelings frame and give meaning to those behaviors.

Meta-analyses report delays or impairment in ToM development in children diagnosed with autism spectrum disorder (ASD), language disorders, attention deficit hyperactivity disorder (ADHD), and intellectual disabilities (Cotter et al., 2018). However, differences in ToM performance in children with ASD and neurotypical children have narrowed over time which may reflect increasing heterogeneity within the ASD population (Rødgaard et al., 2019).

ToM in ASD[1] is by far the most extensively studied among neurodevelopmental disorders. Consequently, research in that area is a focal point throughout the chapter, although we integrate findings from other populations when doing so illuminates points and themes under discussion. According to the DSM-V (American Psychiatric Association, 2013), one of the two core diagnostic criteria of ASD is social communication and social interaction differences which may manifest themselves in

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[1] In this chapter, we use person-first language (e.g., children with ASD). However, we recognize that the use of identity first language is preferred (e.g., autistic children) by some members of the autistic community.

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difficulties with initiating and maintaining bouts of social engagement, conversation, and establishing and navigating personal relationships with others (e.g., peers). These deficits are accompanied by behavior patterns characterized as restricted and repetitive that may present as strong interests or participation in a limited range of activities.

Though impaired ToM is one possible explanation for the observable behavioral challenges those with autism experience in the realm of social engagement, it does not fully account for variations in social competence (Roselló et al., 2020). However, as discussed throughout the chapter, there is considerable debate and continued need for research on the nature and extent of its impact.

Cognitive accounts of children's ToM are dominant in the literature and they are our focus in this chapter. The chapter begins by characterizing the nature of the construct and examining how it is measured in childhood. Our focus is on explicit ToM reasoning measured by behavioral studies rather than on tacit, nonverbal forms of ToM that are perhaps better characterized as "submentalizing" (see Heyes, 2014). The third section addresses how ToM relates to executive function, language, and social behavior. The fourth section of the chapter examines ToM-based behavioral interventions for children with autism. The chapter concludes with a discussion of future directions, with focus on the measurement, assessment, and treatment of ToM. In essence, readers of this chapter will learn about the developmental landscape of ToM in neurotypical and neurodiverse populations, why it matters, how other skills relate to it, and what to do when working with children who require support to advance their ToM skills.

Theory of Mind: Construct and Assessment

Cognitive processes, such as reasoning and drawing inferences about thoughts and feelings, distinguish ToM from constructs like empathy that involve predominantly affective processes (Happé et al., 2017; Schurz et al., 2021). Beyond that distinction, precise definitions of ToM remain elusive (Warnell & Redcay, 2019). One challenge is the multiplicity of mental state concepts (e.g., belief, knowledge, pretense, intention, and desire) and the wide ranging ways in which they relate to behavior and inform social interactions. Reflecting the breadth of its scope, ToM is, arguably, a multidimensional construct (Warnell & Redcay, 2019). For instance, evidence from social cognitive neuroscience suggests that reasoning about cognitive states is separable from reasoning about affective states (e.g., Shamay-Tsoory & Aharon-Peretz, 2007).

Heterogeneity in measurement follows from the breadth of the theory of mind construct. A recent survey identified more than 200 different early childhood "theory of mind" measurements in the research literature (Beaudoin et al., 2020). The variability, as we discuss below, complicates attempts to identify a single instrument as a definitive measure of ToM. Instead, it may be that "theory of mind" is an umbrella term under which separable processes are tied to different behavioral measurements (e.g., Schurz et al., 2021). As Table 14.1 illustrates, there is a wide variety of most ToM behavioral measures. Research on the psychometric properties of ToM measurements is relatively limited (Beaudoin et al., 2020; Brewer et al., 2017). Despite this caveat, ToM behavioral measurements may serve a useful role in clinical settings as informal criterion-referenced measurements (Westby & Robinson, 2014). This section concludes by highlighting considerations for their use in applied settings.

Theory of Mind: The False Belief Task

Research on theory of mind in childhood began with a focus on false belief understanding (Wimmer & Perner, 1983). In a typical false belief task, a scenario plays out in which (a) a protagonist witnesses

Table 14.1 Representative ToM measures for children

Early Childhood: 5-step ToM Scale	Advanced Theory of Mind
1. **Diverse Desires** – The child and someone else have different desires about different snack options; the child must infer the other person's snack preference based upon that person's different desire 2. **Diverse Beliefs** – The child and someone else express different beliefs about an object's location. The child does not know the actual location. The child predicts where the person with the different belief will look for the object 3. **Knowledge Access** – The child knows the contents of a container and judges whether someone without informational access would also know the identity of the hidden contents 4. **Contents False Belief** – A distinctive container (e.g., band-aids) holds unexpected contents (e.g., pencils). The child must infer what a naive observer will think is inside the container 5. **Hidden Emotion** – The child must distinguish between a character's actual feelings (sad) and emotional display (happy)	**False Belief: Second-order False Belief task** – One of the characters in a vignette, A, forms a false belief about what B believes. Children must judge that A will draw an incorrect inference about B because of the false belief about B's belief. (e.g., Perner & Wimmer, 1985) **Inferences from Perceptual Stimuli: Reading-the-mind-in-the-eyes test (RMET)** – Thirty-six photographs of the eye region depict various expressions of emotion and thought. Participants choose from among four options the mental state descriptor (e.g., "serious" "reflective") that best describes what the person is thinking or feeling (Baron-Cohen et al., 2001) **Story-based Inferences: Strange Stories** – Brief vignettes of social interactions that feature a non-literal verbal utterance (e.g., a joke or an ironic statement). Participants infer the speaker's intended meaning when asked to interpret the utterance (Happe, 1994; White et al., 2009)
Informant-Reported Theory of Mind in Childhood	**Assessment Battery of Theory of Mind in Childhood**
Theory of Mind Behavior Checklist – Parents respond to questions assessing the frequency over the last week of eight ToM- related behaviors (e.g., understood a joke, comforted somebody, asked about someone's feelings) observed in their children. Ratings are from never to very often (Begeer et al., 2015)	**The ToM Subtest from Developmental Neuropsychological Assessment (NEPSY)** – In the verbal portion, 15 items assess 1st and 2nd order false belief, recognition of mental states, and comprehension of figurative language. The contextual portion includes social perspective taking tasks in which the child must select the picture that matches the feelings of a character in six different situations (Korkman et al., 2007)

Note. The 5-step ToM Scale descriptions are adapted from Wellman and Liu (2004). Tasks are listed in the order they are typically passed, from least to most difficult

an object placed in a location but (b) does not witness its transfer to a new location (Wimmer & Perner, 1983). Children are asked to predict where the protagonist, upon returning, will look for the object. They must reason from the actor's subjective perspective rather than from an objective perspective. In neurotypical development, children's explicit understanding of false beliefs generally emerges between ages 4 and 5 (Wellman et al., 2001).

False belief tasks are by far the most widely administered ToM measurement (Beaudoin et al., 2020). They offer a variety of practical advantages in basic and applied settings. They can be administered quickly and are relatively easy for children to follow, especially when vignettes are accompanied with pictures and comprehension prompts. The test-retest reliability for false belief measures is generally acceptable, especially when scores are aggregated, for children with varying intellectual abilities (Hughes et al., 2000). Also, there is a degree of clarity on what false belief tasks are measuring. They are relatively circumscribed in their focus on children's capacity to infer and reason about a belief in conflict with their own. Task variations load onto a single latent factor (Hughes et al., 2018). Finally, false belief tasks are generally good at differentiating between neurotypical and neurodiverse populations. For instance, a meta-analysis conducted on the first wave of ToM research in the 1980s and 1990s found that (a) children with intellectual disabilities outperformed children with ASD, but (b) both groups were significantly outperformed by neurotypical controls (Yirmiya et al., 1998). By far, the most common task in those studies was the false belief task.

Despite the advantages, reliance on false belief tasks alone is limiting and assessment efforts have benefited from two advances in the field. First, new tasks allow for measuring precursors to false belief understanding. Second, findings that false belief mastery in childhood *is* attainable for individuals with autism mean that further more nuanced understanding might also be possible (Happé, 1994). Many Advanced ToM tasks were initially developed to investigate reasoning after false belief understanding for children and adolescents with ASD (Miller, 2012). We discuss each of these developments in turn.

Theory of Mind: The 5-Step Scale

A 5-step ToM Scale (see Table 14.1) tests the assumption that false belief understanding is built upon conceptual precursors that develop in early childhood (Wellman & Liu, 2004). For instance, a basic conceptual awareness that people can have different mental experiences (Diverse Desires, see Table 14.1) would seem to be a prerequisite for understanding that those different perspectives include true and false beliefs. Each task in the 5-step scale is verbally administered and requires children to identify and reason about a perspective different from their own. The scale exhibits internal consistency and convergent validity (Hiller et al., 2014). Both cross-sectional and longitudinal studies find that neurotypical children (roughly ages 2–6) usually progress through the scale in a stepwise manner (Wellman, 2014; see Table 14.1 for the sequence). Occasional cultural variations in which two tasks are passed in reverse order implicate a role for socio-cultural processes in ToM development (Slaughter & Perez-Zapata, 2014).

Children with ASD and children diagnosed with mild intellectual disability are delayed in passing each step in the scale but, for the most part, the sequence for both groups resembles the sequence for neurotypical children (Peterson et al., 2012; Smogorzewska et al., 2018). An exception is that false belief understanding is particularly difficult for children with ASD and often comes after mastery of the Hidden Emotions task (Peterson et al., 2012). Over a 1½ year period, the majority of children with ASD (ages 3–11 at initial testing) who were not at ceiling made gains on the ToM scale (Peterson & Wellman, 2019). However, there was no evidence of children with ASD "catching up" with TD controls.

One clue for the particular difficulty of false belief understanding for children with autism comes from findings that passing the task appears to substantially rely on verbal abilities. Fisher et al. (2005) found that grammatical knowledge and receptive vocabulary, combined, predicted false belief understanding in almost 90% of the ASD sample (middle childhood) in their study. The magnitude of the predictive relation was much less pronounced for a comparison group of children with moderate learning difficulties. We discuss more fully why language and false belief understanding are related later in this chapter (Section "Language and theory of mind development").

Advanced Theory of Mind

The Advanced tasks in Table 14.1 represent common approaches to measuring ToM in children who have mastered false belief understanding. They are generally administered in middle childhood (ages 7–12) and adolescence (ages 12–18). Advanced ToM measurements tend to have multiple items that allow for a greater range of performances than the pass-fail tasks used in early childhood. Another common task feature involves asking children to infer what characters think and feel in the context of narrative structures (e.g., sequence, goal, and interaction) that are verbally conveyed or inferred from the patterned movements of geometric figures. For instance, in the Strange Stories task, an item asks children to explain why someone would say a ‘white lie’ to spare someone’s feelings (Happé, 1994). Children must coordinate the perspective of two characters to infer why someone would say something that is not true.

The variety of task features and content among the Advanced ToM tasks naturally raises concerns over whether the instruments are all measuring the same construct. Some have found that various Advanced ToM tasks form distinct factors in neurotypical children (Osterhaus et al., 2016) and in children with ASD (Altschuler et al., 2018). However, others have not found relations among various Advanced tasks (e.g., Warnell & Redcay, 2019). Evidence from neurotypical children finds improvement on Advanced ToM measurements through adolescence (Meinhardt-Injac et al., 2020). However, the rate of development and the impact of covariates such as language on development may vary across different tasks which further supports the notion that ToM is not a unitary construct (Meinhardt-Injac et al., 2020).

Clinical Implications

If different ToM measurements are capturing different dimensions of ToM, then developing a profile from a battery of measurements would be more informative than simply distilling performance into a single score (Westby & Robinson, 2014, see Table 14.1 for a representative example of ToM batteries). A battery of measurements could prove useful in providing an objective assessment with sufficient breadth to cover a range of ToM outcomes in intervention studies (see Section “Intervention”). A profile could, in addition, specify a targeted intervention approach (Westby & Robinson, 2014). A profile could also distinguish between children’s understanding of cognitive and affective states. Although more research is needed, the distinction may carry clinical relevance as only ToM tasks about affective states predicted social symptoms in children with ASD ages 7–11 years (Altschuler et al., 2018) and social adjustment in similarly aged children with intellectual disabilities (Nader-Grosbois et al., 2013).

A battery of tasks that vary in difficulty can also provide information about the developmental level of children’s ToM understanding. In a study of 62 children with ASD (8- to 16-years-old), a cluster analysis resulted in three groups: (a) Children who passed tasks like those found in Table 14.1 that measure precursors to false belief understanding, (b) children who exhibited false belief understanding, and (c) those who performed well on Advanced ToM tasks (Hoogenhout & Malcolm-Smith, 2017). The groups were comparable in age but differed in severity level. All of the children in the first cluster needed additional support and were placed in autism-specific schools, whereas only one child in the highest cluster was placed in an autism-specific school.

Because ToM assessments differ in the demands they impose on verbal skills and the executive functions, the assessment of those skills can inform task choices in clinical settings (see Hamilton et al., 2016). For instance, the use of multiple-choice options to replace open-ended questions is an option for children with severe language impairments (e.g., Burger-Caplan et al., 2016). Caregiver reports (see Table 14.1) are another alternative for children whose verbal skills limit their ability to complete behavioral tasks. Caregiver reports also complement behavioral measurements by providing information about ToM skills as they are applied in everyday settings. Those observations could be helpful in identifying instances when ToM performance is discrepant from social skills (Livingston et al., 2019). Direct observations of children’s social interactive behaviors are possible with assessments that utilize emerging methodologies such as virtual reality or dynamic, interactive procedures (Beaudoin et al., 2020).

Theory of Mind: Individual Differences and Social Behavior

Children vary in the rate at which they succeed on ToM tasks. A meta-analysis of 58 longitudinal studies of over 7000 children ranging from early childhood to adolescence found that rank-order differences in ToM were moderately stable over time (Devine, 2021). The degree of stability was comparable in both early and middle childhood. The correlates and antecedents of individual differences are heavily researched. The next section looks at three constructs with particular prominence in the literature: the executive functions, language, and social behavior.

Executive Function in Theory of Mind Development

The components of the executive functions are the interrelated but distinct processes that include planning, inhibition, working memory, and cognitive flexibility. They develop throughout childhood and adolescence and promote the deliberate, conscious control of goal-directed behavior (Zelazo & Carlson, 2012). ToM task performance is correlated with executive functioning for neurotypical children (e.g., Devine & Hughes, 2014). ToM tasks impose executive demands because they involve suppressing one's own perspective and taking another, less salient, perspective. Many tasks also feature vignettes that require cognitive switching between perspectives and keeping track of narrative details.

A meta-analysis found that differences in executive functioning predicted false belief understanding rather than the other way around in early childhood (Devine & Hughes, 2014). The relation was evident across different executive function tasks. More than playing a role in overcoming various task demands, early executive capacities may also support the development of ToM (see Devine & Hughes, 2014, for a discussion). However, the research literature for children after age 5 is inconclusive, with evidence suggesting that executive functioning predicts ToM development and also that the relation is bidirectional (see Weimer et al., 2021). Given the wide range of Advanced ToM task demands, further research is needed to clarify how different components of executive functioning might impact ToM performance (Weimer et al., 2021).

The executive function-ToM relation is also evident in neurodivergent populations such as ADHD (Pineda-Alhucema et al., 2018) and autism (e.g., Pellicano, 2007). Interpretations of group differences in ToM should take into account how the executive functions impact performance on behavioral ToM tasks. For instance, in a study of children with ADHD (ages 8–12), attentional and inhibitory processes mediated ToM deficits (Mary et al., 2016). Studies on children with ASD during early childhood (e.g., Pellicano, 2007) and those including participants into adolescence (e.g., Joseph & Tager-Flusberg, 2004) confirm the relation between executive function skills such as planning and ToM. Similar to studies on neurotypical populations, more research is needed to clarify the changing nature of the connections between executive function and ToM across development beyond the preschool years in children with ASD.

Language and Theory of Mind Development

Similar to the executive functions, the connections between language and ToM have been widely investigated and clear links have been established between language and ToM in the preschool years and beyond (see Tompkins et al., 2019). Milligan et al. (2007) found that all measures of language including both specific linguistic structures (i.e., understanding of sentential complements) and general language skills (e.g., syntax and semantics) accounted for performance on measures of ToM. de Villiers and de Villiers (2014) posit that mastery of sentential complements with embedded communicative or mental state verbs (e.g., Noelle *said* that Kaylee was dancing; Noelle *thought* that Kaylee was dancing) is prerequisite to children's false belief understanding. Recognizing that such sentences are true even if the complement clause is false reflects false belief understanding. The relation between false belief understanding and complementation structures involving communication verbs is particularly robust for children with ASD (Tager-Flusberg, 2000). In contrast, others (e.g., Slade & Ruffman, 2005) assert that general language skills, such as vocabulary and syntax, are critical for ToM understanding, whereas understanding of sentential complements is not required.

Farrar et al. (2017) conducted a meta-analysis accompanied by qualitative analysis to explore these two competing views. Based on the data sourced, Farrar et al. explored the possibility of different "linguistic pathways" to ToM understanding and how the nature of language-ToM relations might depend on the population(s) under investigation. To this end, they were limited to analyzing studies that included measures of ToM, complementation, and general skills. Though results yielded greater support for the general language hypothesis for TD children, findings suggested that the complementation hypothesis may hold true for children with ASD. Farrar et al. note that these findings should be interpreted with caution given the limited number of studies and heterogeneity of the populations in the studies analyzed. See Farrar et al. (2017) for qualitative analyses of the studies included and possible explanations (both methodological and conceptual) that may account for variations in the ToM performance across populations of children with and without language impairments.

Theoretical debates aside, it is evident that language (general language skills or specific syntactic structures) is an influential factor in all children's ToM development. Thus, the role of language in ToM should be considered when working with children with ASD (Whyte et al., 2014) and language impairments (Miller, 2004; Westby & Robinson, 2014). Earlier work on the ToM-language connection in children with Developmental Language Disorder (DLD; formerly known as Specific Language Impairment) suggested that reducing the language demands associated with the ToM tasks yields similar ToM performance for children with DLD and their same age peers (Miller, 2004). According to the Nilsson and López (2016) meta-analysis, greater clarity is needed to discern if language is the primary factor responsible for ToM challenges in children with DLD or if variations in skills (e.g., executive functions) or environmental or genetic differences underlie ToM outcomes.

Theory of Mind and Social Behavior

ToM reasoning also involves social cognitive processes like perspective-taking that, in theory, should impact children's social behavior and relationships. This prediction has received extensive attention in neurotypical children and many studies offer some support for it. A meta-analysis conducted on studies of children between ages 2 and 12 found a modest but statistically significant relationship between ToM and prosocial behavior (Imuta et al., 2016). A relationship of similar magnitude between ToM and popularity with peers was found in a meta-analysis of studies with children ages 2–10 (Slaughter et al., 2015).

There is less research on possible ToM-social behavior links in child clinical populations. Nevertheless, there is some evidence that ToM and peer relations are associated in children with language impairments (Andrés-Roqueta et al., 2016) and intellectual disabilities (Nader-Grosbois et al., 2013). There is considerably more research examining children with ASD. Studies report a relation between ToM and social behaviors, although null findings in some studies indicate that further research is needed in this area (Brunsdon & Happé, 2014). One methodological area that warrants further attention is researchers' choice of social behavior measurement. For instance, general social skill instruments may be overly broad and include items more closely associated with conformity to social conventions (e.g., following instructions) than with specific interpersonal perspective-taking skills like joining into a peer group that are theoretically aligned with the ToM construct (Peterson et al., 2016).

The heterogeneity of verbal skills in children with ASD poses a challenge for conceptualizing possible ToM-social behavior links. Because verbal ability is so strongly predictive of false belief performance in children with autism, it is possible that the tasks are solved in a linguistically mediated fashion. Perhaps children verbally work out the solution through step-by-step reasoning that is mostly devoid of direct inferences about beliefs (Happé, 1995). If so, success on ToM tasks does not clearly reflect the factors like perspective-taking and social reasoning that purportedly impact social skills. Evidence in support of this possibility comes from a study in which language mediated the relation between ToM and peer competence for ASD children ages 5- to 13-years (Peterson et al., 2016).

Another challenge for the ToM-social behavior link is that some individuals with ASD exhibit good social skills despite difficulty in ToM understanding. In a study of adolescents (ages 10- to 15-years) with ASD, scores on an Advanced ToM task were used to classify participants as having relatively good or impaired theory of mind based on whether they were above or below the median of TD peers (Livingston et al., 2019). Those who exhibited fewer social symptoms despite low ToM scores were classified as high compensators. High compensators had significantly better executive functioning skills and verbal IQ scores than those with comparable ToM but more severe social symptoms. General cognitive features could be used to work around ToM impairments. For instance, top-down executive processes may be recruited by high compensators for socially adaptive purposes like planning for social interactions or inhibiting behaviors that might be unwelcome in some contexts (Livingston & Happé, 2017).

Intervention

The majority of ToM interventions targeting children with developmental disabilities focus on children with ASD (Southall & Campbell, 2015), though a few have focused on children with language impairment or intellectual disability (e.g., Durrleman & Delage, 2020; Hutchins & Prelock, 2014). Because the social-communicative impairments that are core symptoms of ASD are so closely associated in theory to the ToM construct, our primary focus is on children and adolescents with ASD. Interventions aimed at improving ToM skills in children and adolescents with ASD either target mentalizing skills directly (e.g., Wellman et al., 2002) or the developmental processes underlying ToM skills, such as joint attention, emotion identification, or executive function skills (e.g., Rice et al., 2015; Solomon et al., 2004). Interventions also aim to improve ToM skills as a mechanism to improve social behavior and to generalize those skills to everyday social contexts (e.g., Szumski et al., 2019).

This section focuses on interventions in which ToM is either the skill targeted for improvement or the outcome of interventions. It is beyond the scope of this chapter to provide an exhaustive review of these interventions (but see meta-analytic work; Fletcher-Watson et al., 2014; Hofmann et al., 2016). Rather, our aim is to provide representative examples of the interventions with the most rigorous methodology (e.g., group comparisons) and replicability as these provide the strongest evidence for the efficacy of particular approaches; see Southall and Campbell (2015) for a review of other types of ToM intervention (e.g., small N, multiple baselines). We also review more recent findings and include interventions that examine ToM as an outcome of intervention, not only the target of intervention. These interventions can be generally categorized as those that target ToM skills directly, one-on-one and group interventions focused on social skills more broadly, computerized interventions (Southall & Campbell, 2015), and interventions targeting language. In this section, we review these approaches and conclude with some limitations and practical considerations.

Types of Interventions

Targeted ToM Interventions

In one of the earliest ToM interventions, Hadwin et al. (1996) aimed at improving emotion understanding (situations that elicit particular emotions), false belief (e.g., seeing leads to knowing), or play (e.g., teaching pretend play) over eight 30-min sessions ($N = 30$; Mage = 9 years). Based on pretest to posttest scores, they found that children improved on the specific tasks that were trained for emotion understanding and false belief, but not play. However, performance did not generalize to other highly similar tasks (e.g., different protagonists, scenarios) and there were no crossover effects (e.g., teaching false belief understanding did not lead to better emotion understanding). Performance also did not generalize to children's spontaneous use of mental state terms while narrating a story (Hadwin et al., 1997).

Other interventions target ToM skills by teaching children to visualize beliefs. *Photos in the Head* uses mannequin or doll heads (Fisher & Happé, 2005; McGregor et al., 1998; Swettenham, 1996) to teach children concepts about thought (e.g., a thought is like a picture in one's head). Intervention proceeds until concepts are understood, up to ten 20–25 min sessions. Building on the work of Swettenham (1996), who found little generalization to untrained tasks, McGregor et al. (1998) found that children with ASD (8–16 years) performed significantly better on false belief tasks after training relative to ASD control and TD control groups, though their progress was less advanced with less generalization to other false belief tasks than the TD intervention group ($N = 48$). Fisher and Happé (2005) replicated the *Photos in the Head* Intervention in a sample of 27 6- to 15-year-olds with ASD; they found that improvements extended to a 12-week follow-up and generalized to other ToM tasks (e.g., a deception task). Similarly, *Thought-Bubble Training* uses pictures of people with a thought bubble to encourage children with ASD to visualize what someone is thinking (Paynter & Peterson, 2013; Wellman et al., 2002). Training progresses through six stages (Paynter & Peterson, 2013). Paynter and Peterson (2013) found that this approach led to significantly better false belief task performance and generalization to non-trained ToM tasks, including at a delayed posttest 23 days after training relative to a control group ($N = 24$; 4–12 years).

Group Social Skills-Theory of Mind Interventions

Although there is evidence of efficacy of targeted interventions, the benefit of group-based intervention, particularly for ToM and social skills, is that these skills can be practiced in the context of interaction with peers and models. Group interventions focus on social interactions in context and often include a comprehensive set of targeted skills, such as identifying emotions, nonverbal communication, perspective taking, and conversational and problem-solving skills (e.g., Bauminger, 2007; Begeer et al., 2011; Solomon et al., 2004). This more holistic approach is important because for older children and adolescents with ASD, the core symptoms of the disorder (i.e., impairment in communication, social interaction, and reciprocity) translate into difficulties with establishing and maintaining relationships, which in turn can lead to other mental health difficulties, such as rejection, anxiety, loneliness, and depression (Cheung et al., 2021; Waugh & Peskin, 2015).

Many early group interventions with older children with ASD were limited by small sample sizes, a lack of randomized control groups, and lack of generalization to other skills, such as teacher-rated social skills (e.g., Ozonoff & Miller, 1995). More recently, researchers have utilized randomized controlled trial (RCT) designs. Begeer et al. (2011) examined the *Theory of Mind Training*; training occurs in groups of 5–6 children during 16 weekly 1½ h sessions, which include a progression of 53 ToM lessons. In an RCT with children with ASD ($N = 40$; 8–13 years), they found that the intervention group improved on several ToM tasks relative to the control group as well as on their understanding of mixed and complex emotions. However, there was no significant effect of intervention on generalized social skills (empathy or parent-reported social skills). Begeer et al. (2015) also examined a shortened version of this training (the *Mini ToM Intervention*) in an RCT with a waitlist control group ($N = 97$) with children with ASD aged 7–14 years. They also found intervention effects on intermediate false belief tasks and parents' reports of ToM behavior (e.g., child understood a joke), and a reduction in autistic features, but not easier or more complex false beliefs (e.g., second-order), emotion understanding, and parent- or teacher-rated social skills.

Similarly, Waugh and Peskin (2015) developed the *Social Skills and Theory of Mind Training (S.S.ToM)* Intervention to integrate the internal processes of ToM with the external demands of maintaining friendships. In an RCT with 49 children with ASD (aged 6–13 years), children met weekly in small groups of four to seven for 10 weeks. Training sessions concurrently focused on mental state concepts and social skills (with visual scaffolding) and parents received their own training in supporting these concepts in children. They found that the S.S.ToM group showed significant growth in most areas of social responsiveness and ToM (Strange Stories and parent-reported ToM), whereas a Children's Friendship Training group and waitlist control group did not experience the same gains across most measures. These findings were largely replicated in a recent study in Hong Kong schools with children with ASD in the intervention group improving in parent-reported social competence (particularly empathy, such as concern for others), ToM, and qualitative parent-reported functioning at home, school, and in the community (Cheung et al., 2021; $N = 74$; aged 6–14 years).

In the *Social Competence Intervention for Adolescents (SCI-A) program*, core social deficits are targeted (e.g., perspective taking) within the educational setting by trained school personnel (Stichter et al., 2016). The intervention involves five units (e.g., feelings and emotions) with five to seven 45-min lessons each. Stichter et al. (2016) found significantly improved ToM (i.e., understanding of faux pas) from pretest to posttest, but not performance on the Reading the Mind in the Eyes test ($N = 34$). Students' parents and teachers also reported improvements on social awareness in the areas of social cognition, social communication, and social motivation. This intervention is also efficacious in younger children at improving ToM and parent-reported social skills (Stichter et al., 2012).

Peer modeling programs have also been efficacious for increasing ToM and other social skills of children with ASD. For example, in the *SENSE Theater* program, age-matched peers and children with ASD engage in a 10-session summer camp program with 10 objectives focused on social interaction and communication through play and performance (Corbett et al., 2016). In a study of children with ASD ranging in age from 8 to 14 ($N = 33$), Corbett et al. (2016) found a significant increase in communication, play, social skills, and ToM with a particularly large effect on ToM (i.e., social perspective taking) for those in the intervention group relative to a waitlist control group of children with ASD. Interestingly, however, they found that the effect of treatment on autistic features (i.e., Social Responsiveness Scale) depended on children's initial level of social interaction style (e.g., amount of time engaged in group play).

There are also more intensive ToM interventions; for example, in the 50-lesson *Social Skills Training* intervention, children with ASD participate in one-on-one training during the first year and in group training with TD peers during the second year (Bauminger, 2007). Training focuses on several social skills, including group behavior, conversation, emotion understanding, cooperation, and double messages (e.g., irony). Bauminger (2007) found evidence of improvements in some aspects of emotion recognition, emotion understanding, and justification answers in the Strange Stories task, as well as other social skills ($N = 26$; school-aged children with ASD). Although most of these group interventions have been conducted with older school-aged children, there is also some evidence that social skills interventions are efficacious at improving ToM skills in younger children when the intervention is focused on resolving social conflict through conversation ($N = 52$; Szumski et al., 2019).

Though there are far fewer interventions with children with intellectual disability, group ToM intervention also shows promise for improving ToM in this population. In the *ToM Program for*

Children, groups of 3 children with intellectual disability meet twice a week for 45 min aimed at teaching nine mental states through games, pictures, videos, and group activities (Jacobs & Nader-Grosbois, 2020). These researchers found that compared to a control group, children in the intervention group had improved ToM, particularly cognitive rather than affective aspects of ToM performance; intervention effects were stronger for children with initially lower cognitive abilities (*N* = 30; 4–12 years). There was also some evidence for improvement in some aspects of parent-rated ToM skills and teacher-rated social skills for children in the intervention group.

Computer-Based Theory of Mind Interventions

Researchers note several benefits of using computer-assisted interventions for children with ASD (Parsons & Mitchell, 2002; Rice et al., 2015; Silver & Oakes, 2001); computers are repetitive and predictable, present only the necessary information, do not require social interaction, are interactive and multimodal, can be completed at one's own pace, can provide customized feedback and intensive one-on-one training, and are cost-effective. Features such as sound effects, actions, and animations can draw children's attention to relevant stimuli and are intrinsically rewarding.

Silver and Oakes (2001) examined a computer intervention, the *Emotion Trainer,* with children with ASD in an RCT (*N* = 22; 10–18 years). Participants completed 10 computer sessions over 2–3 weeks. Trials started with simple emotion labelling and progressed to more advanced concepts (e.g., emotions triggered by particular situations). Participants responded and were given immediate feedback and reinforcement. Children in the intervention group improved on some, but not all, of the Emotion Trainer tasks from the beginning to ending of the intervention period. Compared to the control group, children receiving the Emotion Trainer program also had greater emotion recognition and Strange Stories scores.

Similarly, the *FaceSay*™ computer program involves games aimed at teaching the facial processing skills needed for social cognition, such as eye gaze and joint attention; the intervention occurs in 25-min sessions each week for 10 weeks (Rice et al., 2015). In an RCT with children with ASD (*N* = 31; 5–11 years), Rice et al. (2015) found that children in the intervention group improved in affect recognition, ToM skills, and teacher-rated social skills.

However, there was no effect of intervention on direct observations of positive and negative play behavior on the playground. These results do suggest generalization as the *FaceSay*™ program focuses on facial processing skills, not ToM skills directly. Bauminger-Zviely et al. (2013) also found that a computerized social skills program led to improved performance on the Strange Stories task from pretest to posttest (*N* = 22; *M*age = 9 years).

Language-Theory of Mind Interventions

The language interventions focus on training complement syntax in children with lower language skills, which puts them at risk for lower performance on ToM tasks (Durrleman & Delage, 2020). In the *Differentiating Ideas from Reality with Exercises* (DIRE) intervention, children are trained to understand complements of communication, e.g., "X said that Y". Children progress through 100 trials in 8 to 12 30-min sessions (Durrleman & Delage, 2020). They found that both children with DLD and TD children significantly improved in comprehension of complements after the training (*N* = 50; 3–9 years). These two groups also improved significantly in the (untrained) verbal and low-verbal ToM tasks. Some effects were maintained at a delayed posttest 6–8 weeks later. Similarly, Durrleman et al. (2019) contrasted DIRE training and a word-learning control condition in a sample of ASD, DLD, and TD children (*N* = 60; 2–11 years). They found significant improvement in the syntax training group (but not the control group) on understanding of false complements, verbal ToM, and nonverbal ToM. Though sample sizes were small, the intervention appeared to affect each of the groups similarly.

Generalizability and Other Difficulties

Numerous researchers have noted the difficulty of generalizing skills trained in ToM intervention with children with ASD to non-trained abilities (Begeer et al., 2015; Fletcher-Watson et al., 2014; Paynter & Peterson, 2013; Silver & Oakes, 2001; Southall & Campbell, 2015; Stichter et al., 2012). Most treatment gains are assessed in the short term and generalization to non-trained tasks is elusive. Whereas numerous studies found gains in ToM understanding, generalization to other domains, real-world behaviors, or skills or tasks not directly taught was often absent (Begeer et al., 2011; Fisher & Happé, 2005; Hadwin et al., 1996; Paynter & Peterson, 2013).

It is also important to note that the interventions reviewed here may not generalize to children with ASD and co-occurring intellectual disability. Nearly all of the ToM interventions have excluded children with below-average verbal IQ or general IQ scores, often because comparison groups include children matched on IQ (e.g., Begeer et al., 2011, 2015; Rice et al., 2015; Szumski et al., 2019; Waugh & Peskin, 2015). Yet, 1/3 of individuals with ASD have intellectual disability (Centers for Disease Control, 2020). Children with below-average verbal intelligence do not appear to benefit from ToM intervention as well as children with ASD, but average language skills (Bowler & Strom, 1998).

A related concern is whether treatment gains diminish over time. Most studies only include an immediate posttest (e.g., Bauminger-Zviely et al., 2013; Corbett et al., 2016; Ozonoff & Miller, 1995; Stichter et al., 2012, 2016; Szumski et al., 2019); however, there is some evidence that treatment effects on ToM outcomes are maintained 3 weeks to 3 months later (Paynter & Peterson, 2013; Waugh & Peskin, 2015). Still, others find no lasting effects at delayed posttests; however, participation rates at delayed posttests tend to be small (e.g., Begeer et al., 2015; 31%; Soorya et al., 2015; 49%).

Many of these interventions are pretest to posttest designs (e.g., Hadwin et al., 1996) or assignment to treatment or control groups is not randomized (e.g., Ozonoff & Miller, 1995; Swettenham, 1996), which is needed to sufficiently judge whether interventions are efficacious. This is problematic as it is possible that children in the experimental group receiving no intervention improve in false belief performance over time (e.g., Fisher & Happé, 2005). It is also possible that children in the experimental group show significant gains from pretest to posttest, whereas Time × Group interactions are not statistically significant (i.e., the experimental group improved over time, but not more so than the control group; e.g., Jacobs & Nader-Grosbois, 2020). Small samples have also limited the conclusions that can be drawn from many of the ToM intervention studies with many studies finding no effect of intervention on ToM skills (e.g., Solomon et al., 2004). However, RCTs with larger samples are becoming more common in ToM intervention work, improving our ability to draw cause and effect conclusions from these studies (e.g., Begeer et al., 2015).

Other difficulties are that well-designed interventions involve verification of diagnosis and recruitment of targeted samples, matching children on cognitive ability (e.g., IQ test scores), training staff to implement intensive interventions, and maintaining relationships with families over this duration, including those in the control group (Solomon et al., 2004). Additionally, few studies report on procedural fidelity to the intervention (Southall & Campbell, 2015).

Future Directions

Interventions aimed at improving ToM have yielded varying outcomes. Moving forward, there are important considerations for researchers to keep in mind pertaining to methodology and assessment as well as designing interventions for children with ASD. Progress is tied to refinement of the ToM construct and its measurement. The goal of this section is to provide an overview of these considerations; recommendations for future research are threaded throughout.

Measurement and Construct

ToM behavioral measurements are often brief vignettes presented verbally or pictorially. The development of dynamic, interactive assessments might offer improved ecological validity and provide a picture of ToM strengths and difficulties that are simply missed by more passive assessments. For instance, videotaped adaptations of the Strange Stories vignettes are a step closer to actual social interactions because they provide multiple social cues such as intonation and facial expression that convey what others think or feel (Murray et al., 2017). Interactive tasks that require reciprocity and collaboration with the tester can provide direct evidence of children's capacity to perspective-take (e.g., Backer van Ommeren et al., 2017).

Research is also needed for identifying the underlying component processes of theory of mind (e.g., gaze following or perspective-switching) and validating behavioral measurements of those respective processes (Schurz et al., 2021; Warnell & Redcay, 2019). Agreed-upon terminology about theory of mind and its taxonomic organization could, in turn, lead to an assessment protocol. An established protocol would allow for consistency across studies and would allow for refinement in assessment and interventions (Happé et al., 2017). Related, a developmental perspective might track the impact of component processes such as gaze following that, when impaired, have downstream effects on language acquisition and then ToM (Brooks & Meltzoff, 2015). Longitudinal research that establishes developmental precursors would, of course, have implications for training and intervention.

Increased empirical attention on the social and cultural context for ToM development in child clinical populations would inform the refinement and utility of caregiver reports. Research and assessment on the family environment often focus on the impact of the child with ASD on the parent rather than on possible bidirectional relations (see Hickey et al., 2020). This stands in contrast to the wealth of research addressing the impact of parenting on theory of mind development in neurotypical children (Miller, 2016). To illustrate, parental talk about the mind is a well-documented correlate of ToM development in neurotypical young children (e.g., Tompkins et al., 2018). Much of that research takes place in the context of shared reading. Increased empirical attention on linguistic input during shared practices like storytelling could inform the types of parent-child information clinicians gather and resultant intervention strategies (Channell & Bosley, 2021).

Interventions and Methods

Given the inherent limitations of improving a skill that is a core difficulty of the ASD diagnosis, researchers have summarized suggestions for the design of intervention in this population, including repetition of tasks and multiple examples, highly structured intervention, breaking the intervention into small steps sequenced from easier to more difficult concepts, practicing skills in real settings and in different contexts, role play, and others (Parsons & Mitchell, 2002; Silver & Oakes, 2001).

Many interventions are conducted by researchers and trained clinicians (e.g., Waugh & Peskin, 2015). For these interventions to be effective in the real world, another consideration is how easy they are to implement by parents or teachers. Thus, researchers argue that it is important to utilize manualized programs (i.e., manual and formal curriculum) to increase confidence in implementation and the ability to address the needs of clinical populations (Szumski et al., 2019). Some of the manualized ToM interventions discussed here include the *Mini ToM intervention* (Begeer et al., 2015), the *Social Competence Intervention for Adolescents (SCI-A)* curriculum (Stichter et al., 2016), the *S.S.ToM* (Waugh & Peskin, 2015), and the *SENSE Theater Intervention* (Corbett et al., 2016). Interventions also need to be accessible and affordable for use in home and at school (Parsons & Mitchell, 2002).

Golan et al. (2010) also note that individuals with ASD may not be intrinsically motivated to learn from others' eyes or faces as TD children; thus, interventions designed for children with ASD need to involve stimuli that are engaging. Similarly, researchers argue that interventions should capitalize on the strengths of children with ASD, particularly their proclivity to visualize information (*S.S.ToM.*; Waugh & Peskin, 2015), understand pictures (*Thought Bubble Training*; Wellman et al., 2002), and systematize their environment (e.g., *The Transporters Intervention*, Golan et al., 2010). According to the double empathy problem (Mitchell et al., 2021), individuals with ASD are better able to understand and empathize with the minds of others with ASD than neurotypical minds. Thus, it is possible that group interventions for children with ASD may be less challenging and more effective when other children with ASD are the social communication partners rather than neurotypical peers.

Another consideration and area of growing interest concerns moderators of intervention. Regarding participant characteristics, interventions may be more or less efficacious depending on the severity of diagnosis, interaction style, or level of co-occurring maladaptive behavior (Begeer et al., 2015). For example, group interventions are often used with individuals who are higher functioning (Begeer et al., 2011; Solomon et al., 2004) and children with less severe diagnoses tend to respond better to ToM intervention (Begeer et al., 2011). For children with ASD, the impact of co-occurring diagnoses such as intellectual disability (Roselló et al., 2020) or ADHD (Berenguer et al., 2018) also need to be taken into account when determining inclusionary and exclusionary criteria for participants. Additionally, social difficulties are heterogeneous. Some children with ASD may be uninterested in initiating social contact, whereas others may be overbearing in their engagement with others (Begeer et al., 2015; Waugh & Peskin, 2015). Thus, the impact of intervention may interact with baseline individual differences or even family characteristics. For example, de Veld et al. (2021) found greater treatment effects on some ToM skills when children with autism had either more or older siblings.

Intervention studies do not typically systematically compare dosage—either of session length or total duration of the program. Though most sessions are kept brief (10–20 min; Szumski et al., 2019), the total length of intervention varies from 1 to 2 weeks (e.g., Hadwin et al., 1996; Swettenham, 1996) to several months or even 2 years (e.g., Bauminger, 2007; Szumski et al., 2019). It is not clear if longer interventions would result in better gains in ToM performance though Silver and Oakes (2001) found that the number of times children used the *Emotion Trainer* program correlated with their improvement in emotion recognition and Strange Stories performance. Dosage effects may explain why some ToM interventions with children with ASD have not improved ToM performance, perhaps because only a few sessions were focused on ToM within a broader social skills training (Soorya et al., 2015).

More work is also needed on the efficacy of these intervention approaches in culturally and linguistically diverse populations as most work has focused on Western cultures (Cheung et al., 2021). However, there may be cultural differences in language, resources, family support, or expectations around service (Cheung et al., 2021) that should be considered when implementing these interventions in non-Western cultural settings. For example, Cheung et al. (2021) noted that the high volume of homework for Hong Kong children made it impractical to complete the *S.S.ToM* intervention homework.

Finally, there remains theoretical debate about the nature of improvement in ToM skills in children with ASD. Some researchers view training not as teaching conceptual understanding to children with ASD, but with providing them with a compensatory mechanism to mentally represent others' beliefs (Wellman et al., 2002) or "hacking" strategies (Happé, 1995). However, given their success at training ToM performance that generalized beyond the tasks trained, others have concluded that ToM intervention has the potential to improve children's fundamental understanding of their social world (Paynter & Peterson, 2013).

Conclusions

In this chapter, we have provided an overview of the key developments and common tasks used to assess ToM from early childhood through adolescence. There is a wide range of possibilities to further develop, refine, and implement ToM interventions for children with ASD and other neurodiverse populations. Partnerships with other healthcare professionals including speech-language pathologists are important given the relation between individual differences in language and ToM. Interventions tailored to the individual child's goals will not only support advances in ToM understanding, but also how they use those skills to support their social interactions with others. From an empirical and clinical standpoint, there is more work to be done to better understand how ToM translates to social communication and social interactions in real-world contexts.

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15

Theories of Intelligence

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Introduction

The goal of this chapter is to provide an overview of theories of intelligence, spanning from historical to contemporary models, with an eye toward highlighting the ways in which theoretical developments have shaped practical aspects of clinical assessment. A common working definition of intelligence, initially provided by Gottfredson, and since widely adopted in the field (e.g., Nisbett et al., 2012; Protzko, 2017; Warne, 2020), describes the construct as:

> [A] very general mental capacity that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings—"catching on," "making sense" of things, or "figuring out" what to do. (Gottfredson, 1997a, p. 13)

Unpacking this definition some, at least three things, stand out. First, intelligence is fundamentally held to be a cognitive construct, defined primarily in terms of thinking skills or capabilities, with no immediate emphasis on motivational, personality, or other constructs. Second, intelligence is somehow both a unitary construct (i.e., described in the singular) and a process that manifests in numerous different ways. Third, intelligence is held to be a highly *general* capacity that is expressed in varied contexts, outside of academic settings alone, and which does not merely reflect school-based learning.

While all three features of the definition above align with the current scientific consensus on intelligence, a number of important issues remain obscured. The most prominent of these is the tension between the notion of intelligence as a unitary capacity versus some sort of composite made up of many lower-order abilities. As will be seen, this has been the central point of dispute in debates about the nature of intelligence for over 100 years and continues to be so today. Related to this is the fact that intelligence is notoriously difficult to define precisely. Scholars have taken a number of approaches in attempting to define it, with each balancing the tensions inherent to the construct with varying degrees of success. At one end of the continuum, Gottfredson's (1997a) definition above provides a partial list of some of the things that intelligent individuals *do* and excludes some common objections.

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As such, it is really more of a description of how to recognize intelligent behavior than a definition per se. At the other end of the continuum, Arthur Jensen, another prominent author in the field, avoided the term entirely in his seminal book on the closely related topic of psychometric *g* (described below). Indeed, Jensen described the results of two scientific symposia on the topic of defining intelligence—respectively held in 1921 and 1986, both without success—and concluded that the term "should be discarded altogether in scientific psychology" (Jensen, 1998, Chapter 3). Between these two extremes, numerous authors have offered their own definitions of intelligence, variously ranging from concise yet vague, elaborate and list-like, or (like Jensen) simply admitting futility (see: Wasserman, 2012, pp. 39–40).

This difficulty in defining intelligence reflects what appears to be a fundamental tension in the concept itself. On the one hand, *tests* of intelligence must be capturing some meaningful property of individuals, in the sense that differences in performance between people are highly stable across the lifespan (Deary et al., 2004) and strongly relate to real world outcomes measured later in life. Those include not only occupational and educational status (Ceci & Williams, 1997; Gottfredson, 1997b; O'Connell & Marks, 2021; Strenze, 2007), and creative and scientific accomplishments (Park et al., 2007), but surprisingly, even health and longevity (and even when controlling for childhood SES: Calvin et al., 2011). Likewise, the core phenomenon in the field of intelligence research—the finding that performances on diverse types of tasks essentially always positively correlate (see below)—has been consistently replicated for over 100 years (Spearman, 1904), across hundreds of datasets (Carroll, 1993), and recently, across much of the globe (Warne & Burningham, 2019). Taken together, these facts indicate that whatever is being measured by intelligence tests clearly manifests at the level of individuals, differentiates people in important respects, and is highly replicable across time, cohorts, and even cultures. As such, theories of intelligence and the tests on which they are based are not only measuring something "real," but they arguably capture some of the most robust phenomena in all of behavioral science (and compare to the replication crisis facing some areas of psychology; Aarts et al., 2015; Stanley et al., 2018).

Conceptual and Practical Issues Yet, on the other hand, many issues remain. For example, how is it that intelligence is somehow a single, general process that nevertheless manifests in numerous and highly diverse situations? To wit, tasks of spatial reasoning, general cultural knowledge, verbal rehearsal of number or letter sequences, and speeded visuomotor tasks are all considered to be important indicators of intelligence (Wechsler, 2008a). Yet each involves manifestly different content and likely recruits fairly diverse neural networks. In turn, is intelligence truly a unitary entity, or is it composed of subprocesses, and if so, in what fashion? This generality also complicates the search for neural correlates of intelligence, which might otherwise help ground and refine the construct. This is because of the fact that, as behavior becomes more complex, the neural networks involved are likely to become more variable from one person to the next (Euler, 2018).[1]

These persistent questions about the nature of intelligence also complicate the resolution of related debates, including questions about how intelligence develops (Demetriou et al., 2018; Savi et al., 2019), the extent to which genetic and environmental factors interact during development (Dickens & Flynn, 2001; Tucker-Drob et al., 2011), the degree to which intelligence overlaps with or depends on

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[1] It is worth noting that these challenges are not necessarily true of psychological constructs in general. Research on memory provides a clear counterexample where, like intelligence, formal scientific investigations also began near the end of the nineteenth century (Ebbinghaus, 2013), but has since succeeded in moving from a broad and vaguely defined construct to a situation where numerous sub-types of memory have been distinguished and linked to specific neural processes (Squire & Schacter, 2003). The difference likely reflects the fact that memory can be studied experimentally via within-subject procedures that ignore individual differences, whereas intelligence has been studied almost entirely as a between-subjects phenomenon.

other processes like motivation or certain personality constructs (Colom et al., 2019; DeYoung et al., 2005; Duckworth et al., 2011), and how the processes that make an individual person intelligent relate to the between-subject effects that form the bulk of the literature (Kovacs & Conway, 2016; Weinberger, 2015).

It is perhaps because of these tensions that the much derided definition offered by E.G. Boring (1923) actually turns out to be fairly apt. Famously, Boring asserted that "…intelligence as a measurable capacity must at the start be defined as the capacity to do well in an intelligence test. Intelligence is what the tests test." However, in the subsequent (and typically omitted) portion of the quote, he went on to write:

> This is a narrow definition, but it is only the point of departure for a rigorous discussion of the tests… An observational method for extending knowledge of intelligence as the tests test it is the method of statistical correlation. The relation to intelligence of any measurable capacity at all can be determined by comparing the relative performances of a large number of persons in an intelligence test with their achievement in the measure of capacity in question. (p. 35)

Thus, while Boring's initial definition is clearly circular and seemingly arbitrary, it is only "the point of departure" for a more serious discussion that acknowledges that construct validation is *always* an iterative process (Cronbach & Meehl, 1955). That is, research on psychological traits necessarily begins from a colloquial understanding of a term, from which scientists rationally develop measures designed to assess the trait in question. From there, they assess the ability of the measures to *predict real world outcomes* thought to relate to the construct and proceed to further refine their theories and instruments. In the case of intelligence, Boring's definition not only foreshadows the nearly unmatched predictive validity of intelligence testing, but also the ongoing difficulty in refining the construct.

For clinicians, it is of course the accuracy of those real-world predictions that determine whether intelligence testing is useful, and it is our aim in this chapter to show how theoretical debates about intelligence are relevant to practitioners. In our view, these debates matter because the most successful theories get translated into tests directly. From there, they go on to influence the ways that psychologists interpret and present test data to clients and their families, which in turn shape the perceptions that clients and those around them go on to form about their needs and capabilities. As such, seemingly esoteric debates about whether intelligence is wholly unitary or at least multifaceted, and whether it is a static and "intrinsic" property of people or something that develops over time ultimately bear on people's lives in important ways.

In this respect, we want to close this section by noting a final tension surrounding intelligence, intelligence research, and its assessment in individual people. On the one hand, well-validated intelligence tests, like those discussed later in this chapter, clearly do measure something important about individuals, in a reliable fashion, and in a way that provides information about their possible or probable (but not foreordained) outcomes. As such, it is clearly a mistake to interpret the ongoing theoretical controversies about intelligence as cause to entirely dismiss the construct or the enterprise of intelligence testing. Moreover, all areas of science face ongoing debates, and the debates we highlight below, should also not be taken as justification for dismissing the considerable amount that is known about human intelligence, or for adopting alternative theories that persist in the popular media (and even some textbooks) but have failed to withstand serious scrutiny (see: Warne et al., 2018).

Yet, the fact that the theoretical consensus does develop and change should give both theorists and clinicians appropriate humility in their statements about what test scores mean for individual people. Yes, the empirical record of intelligence testing is strong, but conceptions about its nature, malleability, and its influence via social and cultural factors continue to mature. This casts the assertions of some figures in this area that intelligence is an immutable characteristic of people or even specific groups in an especially poor light, particularly given the impossibility of ever isolating and quantifying the many factors that influence intellectual development (Turkheimer, 2000). Indeed, it is regrettable that many figures in the history of intelligence research held views that are now (rightly) considered highly objectionable for the ways in which they disparaged various groups on the basis of race, sex, and disability and for advocating eugenics as a means to "improve" future generations (e.g., see: Allen, 2001; Schumacher, 2019; Wasserman, 2012). Although such views were unfortunately common at the time, and have been long rejected (Warne, 2019), they cast a shadow that intelligence research is still working to overcome (Wai, 2020). As such, two of our aims in this chapter are to demonstrate how continued study has helped to distinguish the empirical facts of intelligence from unjustified assumptions that were sometimes inferred on their basis and to highlight the importance of conceptualizing intelligence in a way that recognizes the dignity and supports the success of all individuals.

The rest of the chapter is structured as follows: section "Early theories of human intelligence" reviews the historical development of theories of intelligence, beginning from the earliest scientific research at the end of the nineteenth century. The section "Twentieth-century perspectives" covers contemporary models that are instantiated in some of the assessment batteries in current wide use. In section "Recent developments in theories of intelligence", we review the newest group of theories, which are noteworthy in that each is either explicitly developmentally or process-focused in its orientation. Thus, readers will note the general arc of theoretical development from a relatively static (and at times essentialist) view of human intelligence, toward an increasing emphasis on the different facets of intelligence and how they interact over the course of cognitive development. The section "Practical applications and implications" concludes the chapter by reviewing the connections between specific theories of intelligence and some of the intellectual assessment batteries in common use clinically and presents a brief (hypothetical) case example to illustrate how theoretical debates influence battery structure, and ultimately clinical interpretations. Finally, we note that because we have aimed to provide an accessible overview of theories of intelligence for practicing clinicians, we have necessarily emphasized the critical features of various theories, at the expense of a more nuanced presentation of some views. Thus, we point interested readers to the source material cited below, as well as more detailed reviews available elsewhere (Deary, 2000; Jensen, 1998; McFarland, 2019).

Early Theories of Human Intelligence

Francis Galton and Reductionism in Intelligence Research The earliest writings on individual differences in intelligence date back to ancient times. However, it is generally agreed that, like much of the rest of psychology, the formal study of cognitive ability did not begin until the late nineteenth and early twentieth centuries with the work of Francis Galton, Alfred Binet, and Charles Spearman (Jensen, 1998). Galton provides a useful starting point, as the figure generally associated with the first attempt to measure individual differences in mental abilities.

Discussions of Galton appropriately situate him within the intellectual milieu of the late nineteenth century and especially in relation to Darwin's account of natural selection which was gaining acceptance at the time. The preface of the second edition of his book *Hereditary Genius* (1891) gives an indication of his basic views and scientific goals, where he wrote:

> At the time when the book was written, the human mind was popularly thought to act independently of natural laws, and to be capable of almost any achievement, if compelled to exert itself by a will that had a power of initiation. Even those who had more philosophical habits of thought were far from looking upon the mental faculties of each individual as being limited with as much strictness as those of his body, still less was the idea of the hereditary transmission of ability clearly apprehended. (vii)

From this, we can immediately see the connection between Darwin's theory of natural selection and Galton's project. Explicitly, natural selection provided a scientific explanation for how different species came to possess their traits, and in particular, it emphasized that it was the degree to which a trait proves adaptive for a given environment that determines whether it would ultimately be passed on to an organism's offspring. Galton's aim was to apply this same logic to human beings. Specifically, he aimed to show that, like other species, (1) the characteristics of human beings had also been selected for on the basis of their adaptive benefits, (2) they are subject to physical and biological constraints, and (3) they could be passed down by heredity (Galton, 1883, 1891).[2] In the quote above, we can also see that Galton was in part reacting to what he perceived as a tendency to view human beings as falling outside the reach of physical laws. Thus, a main goal of his work, and one of his primary intellectual contributions, was to *naturalize* the study of human traits, by showing that they could be measured in the first place and by trying to understand them through the lens of natural selection.

The remainder of Galton's research efforts can be seen in this light, which informs his scientific contributions as well as his failures. In terms of the former, Galton's interest in understanding even basic aspects of variation among people led him to make foundational contributions to the fields of biometrics (the measurement of human bodily characteristics, such as fingerprinting) as well as statistics. Most notably, these interests led him to establish what he termed the "Anthropometric Laboratory," where, with the help of several assistants, he was able to record information on the basic demographics and physical features (height, weight, eye color) of nearly ten thousand individuals, as well as their performances on a battery of simple perceptual and motor tasks (e.g., pitch discrimination, reaction time; Galton, 1882; Sattler, 2002). From his studies there and elsewhere he established that many human characteristics vary along distributions and demonstrate reliable statistical associations (e.g., the association between height and limb length, or between the heights of parents and their children). From this work, he developed the precursor to the correlation coefficient, regression analysis, and the concept of regression to the mean (Fancher, 2009).

Galton's emphasis on natural selection and heredity also provides the through-line that connects his work in the Anthropometric lab to his views on intelligence. Namely, although he did not think that simple tasks measured intelligence directly, he did view them as indicators of basic physical efficiency, which in turn would influence intellectual ability by way of sensory constraints (Wasserman, 2012). In particular, he held that since we gain our knowledge of the world solely through the senses, a greater ability to discriminate basic stimulus features should result in a "larger…field upon which our judgment and intelligence can act" (Galton, 1891, p. 19). From this, one can see how Galton became the namesake for reductive approaches in intelligence research. That is, approaches that emphasize the role of what are ostensibly "lower-order," more basic physiological processes in supporting or constraining intelligence, and the related idea that it should be possible to understand intelligence by "decomposing" it into simpler constituent parts. Likewise, although Galton never provided his own positive definition of intelligence (Jensen, 1998), his hereditary view of the construct is evident in his assumption that it was an inborn aspect of individuals, which was subject to relatively little influence by training or education (Galton, 1883, 1891).

Despite the positive aspects of Galton's program to naturalize the study of individual differences, his emphasis on natural selection, and specifically the reductive way with which he applied it to intelligence, also provides a guide to understanding his failures. Most prominently, subsequent attempts at

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[2] The controversy surrounding the heritability of intelligence—the degree to which variability in intelligence is "due to" genetic versus environmental factors—is not our focus here and requires a much longer treatment. Suffice it to say that the topic is exceedingly complex, and insofar as "*all* human behavioral traits are heritable" (Turkheimer, 2000; emphasis added), any fruitful discussion starts from the premise that genetic and environmental factors inevitably interact in producing complex traits, rather than trying to resolve the question in favor of one explanation or the other (Turkheimer, 2019).

measuring intelligence via anthropometric procedures near the turn of the twentieth century quickly confirmed the limitations of the approach (Wasserman, 2012). Likewise, while there is now clear support for Galton's contention that seemingly simple tasks of reaction time or sensory discrimination should relate to intelligence (Deary et al., 2001; Sheppard & Vernon, 2008), in practice, the effect sizes are modest. A fair interpretation of these results might be that, while Galton was vindicated in principle, the fact that these processes are only moderately related to actual intelligence makes their theoretical significance somewhat unclear. Finally, Galton can also be critiqued for the way in which he continually conflated the notion of "natural" processes with those that are hereditary per se, which fails to recognize that even environmental influences on traits can of course be entirely natural (e.g., the effortless way in which most children learn their native language). This conflation also fails to recognize that all behavioral traits are ultimately physiologically mediated. In summary then, whereas Galton played an important role in setting the study of individual differences on a scientific footing, in the end, his work also illustrates the limitations of an overly reductive approach to understanding intelligence.

Alfred Binet and the First Practical Test of Intelligence In historical reviews, it is sometimes common to contrast Galton and Binet as exemplifying opposite extremes in their approach to studying intelligence. Galton is generally presented at one end of the continuum, as a figure who worked in many fields, but was primarily concerned with theoretical issues in intellectual assessment, whereas Binet is typically portrayed as solely concerned with the applied goal of developing a working test of intelligence. In actuality, Binet was a prolific author whose interests also ranged fairly widely and was concerned with theoretical issues (Siegler, 1992), while Galton's work on the basic measurement of individual differences, and especially in statistics, should be equally recognized for its impact on applied aspects of assessment. Nevertheless, it remains useful to contrast the two figures, at least heuristically, due to the much more direct impact of Binet's work on conceptions of intelligence as it is actually measured. Indeed, it is not an overstatement to say that most of the crucial features of contemporary intelligence test batteries, and many of the insights underlying them, were developed in Binet's work.

As detailed by Wasserman (2012), Binet's research to develop a working test of intelligence spanned a period of 21 years, beginning with the 1890 publication of a series of studies he had conducted with his then school-age daughters and culminating in the publication of the third revision of the Binet-Simon Intelligence scale in 1911. Throughout the intervening period, Binet worked with several colleagues to develop a working scale of intelligence, which included testing and revising items, planning scale development, and publishing their ideas. In an 1895 paper with Victor Henri, Binet explicitly contrasted their approach with that of Galton, critiquing the latter's overemphasis on "sensations and simple processes" and presciently arguing that "we must not deduce…that it is sufficient to study elementary processes to know the nature of complex processes" (Nicolas et al., 2014).

The most immediate impetus to develop a working scale came in 1904, when the French government commissioned a study of how to extend public education to children with auditory or visual impairments or developmental disabilities (Wasserman, 2012). Together with Theodore Simon, Binet then developed and normed 30 tasks on a group of 50 children ages 3–11, publishing the test in 1905 as the Binet-Simon scale (Sattler, 2016; Wasserman, 2012). Although the scale was unfortunately ignored in its time by the French establishment (Siegler, 1992), its publication was a singular event in the history of intelligence assessment.

There are a number of features that made the Binet-Simon scale so innovative. First, he gave considerable thought to how the scale would actually function in practice. As a result, it featured standardized instructions for administration and scoring (thereby helping to maximize the reliability of the scale) and involved no specialized equipment for its administration. Second, it was the first norm-referenced scale, meaning that rather than taking absolute measures of performance (as one could do for sensorimotor variables such as visual acuity or grip strength), performance was rated relative to the average performance of children at the same age. This innovation reflected his insight to incorporate developmental considerations into the test, recognizing that what is an appropriate level of difficulty at a given age would not be appropriate for another, and which also justified the decision to order the tasks by increasing difficulty and complexity. This age-normed approach was further codified in the 1908 revision via the mental age score, which formed the basis for what became the IQ score (Wasserman, 2012).

Most crucially, because Binet was focused on the issue of differentiating individuals, this led him to recognize that complex rather than simple tasks were much better suited to this purpose. He recognized that it was not necessary to completely characterize mental functioning, or to determine all the mental variables on which individuals differ, but merely to identify the "strongest and most important" (Binet & Henri, 1895; translated by Nicolas et al., 2014). In contrasting his approach with that of Galton's, he wrote:

> The objection will be made that the elementary processes can be determined with much more precision than the superior processes. This is certain, but people differ in these elementary processes much more feebly than in the complex ones; there is no need, therefore, for as precise a method for determining the latter as for the former. (Binet & Henri, 1895; translated by Siegler, 1992, p. 181)

This quote concisely communicates a fundamental principle that distinguishes the "general" (i.e., experimental) approach to psychology with the effort to measure individual differences (Cronbach, 1957). On the one hand, simple processes are, by their very nature, much more amenable to precise measurement. And, because they are simple, it is much easier to discern their connection to particular nervous system functions (consider visual acuity or pitch discrimination), which also makes them compelling for researchers who are interested in physiological or genetic correlates of traits. Yet on the other hand, because simple tasks do reflect the action of comparatively discrete neural processes, the processes they tap are likely to be highly *conserved* across individuals. Thus, the very quality that makes simple tasks appealing for reductionist research also undermines their usefulness as measures of individual differences (Euler, 2018). Binet's key insight, which is still evident in contemporary intelligence measures, is that even though complex mental processes cannot be measured as precisely, because they admit of greater variation across people, that alone makes them sufficient as indicators of individual differences.

The last important innovation of the Binet-Simon scale was the fact that it sampled a diverse range of abilities. This reflected both Binet's skepticism about the value of single tasks used in isolation as measures of intelligence (Boake, 2002) and his substantive view that "intelligence is not a single function, indivisible and of a particular essence" (Binet, 1909/1984; cited in Siegler, 1992). Binet was clearly correct about one of these and less so about the other. Although history has clearly vindicated his choice to use to diverse tasks to derive a composite measure of intellectual ability, the question of whether intelligence reflects a single essence is not at all settled and remains a defining issue in the field.

Spearman, Psychometric** g**, and the First Factor Models of Intelligence In 1904, Charles Spearman made what is probably the definitive contribution in the history of intelligence research, with his discovery of psychometric g. In his article, Spearman identified and set out to correct what he saw as the major problems with prior efforts to scientifically characterize human intelligence. These included failures to control for confounds (e.g., age differences between subjects, practice effects), failures to minimize and statistically account for measurement error, and most crucially, failures to describe the results in a precise, quantitative fashion (Spearman, 1904).

Spearman attempted to address these issues in a series of studies conducted with children and adolescents, whom he assessed on measures of basic sensory discrimination (following Galton and the thinking of the time) and then related to estimates of intelligence, in the form of grades in various academic subjects, and instructors' and others' rankings of the students' intellectual ability. Although Spearman's samples were very small by contemporary standards (only 33 boys participated in the most important study), he nevertheless observed positive correlations among the perceptual measures and the intelligence estimates, as well as between the two. Most importantly, however, because of his goal to produce more rigorous estimates of the true relationships, he took two additional steps that proved decisive.

First, he devised a method to statistically control for measurement error in the correlation between two variables, which allowed him to estimate the *true* correlation between them (and thereby laying the groundwork for classical test theory; Jensen, 1998). He then devised a way to extend this procedure, such that it could be used to indicate the amount of shared variance between two *series* of measurements. For example, if one calculates the average correlation among the sensory measures, the average correlation among the ability estimates, and the average correlation between the two, one can then apply the formula to these three variables and identify the amount of true score variance (the variability that is free from measurement error) that the two series share in common. Note that this also applies to the correlations between variables within a single domain, such that tests of auditory and visual discrimination and judgments of weights can all be subjected to this procedure to determine how much variance they share in common. Spearman found, for the first time, that performances in seemingly very different subjects (e.g., English, Classics, French, Mathematics, Music, and Pitch discrimination) were all positively related.

Second, Spearman identified that by arranging the resulting correlation table hierarchically, he could use an additional procedure to examine the patterns of shared variance among the different variables (Jensen, 1998). Specifically, he showed that, as a matter of mathematical necessity, when the relative sizes of the correlations are consistent throughout the entire table, it is then possible to separate the variance contributing to them into only two parts: a first part, that is common to all the variables in the table, and a second part, that is unique to each individual task (Spearman, 1927). That is, he showed that, for any set of variables showing this pattern, *a single statistical factor* accounts for a large portion of their shared variance. In the time since, it is been shown that this single factor emerges from cognitive batteries in a highly reliable way and accounts for a much greater share of variance than any additional factors (Deary, 2012). The practical importance of this is that, although one might intuitively expect that a host of highly different cognitive processes would account for differences between people in Mathematics versus English, in actuality, just a single process (or a set of integrated processes) may be most relevant. Based on these findings, Spearman developed his "two-factor" theory, where he argued that individual differences in any tests of cognitive ability draw upon differences in just one general factor and a test-specific factor, where the former reflects just a single, universal intellectual ability. He provisionally termed this factor "general intelligence" and later revised this to the more theoretically neutral, lowercase letter *g* (see additional details in Beaujean, 2019).

A few additional points should be made about psychometric *g* and the statistical method of factor analysis that Spearman pioneered with his discovery of it. First, it is important to note that although *g* is almost inevitably found in factor analyses of cognitive test batteries, this fact is an empirical regularity rather than a logical necessity. For instance, in personality research, the most well-established model involves not one, but five separate dimensions (Costa & McCrae, 1992), with its major competitor being a six-factor model (Ashton & Lee, 2007). This indicates that there is nothing inherent to exploratory factor analysis that dictates the number of factors that will be obtained. In the case of personality, where several different dimensions are needed to represent individual differences, the practical result is that there is no fixed relationship between the way a person scores on one dimension and another (e.g., someone can be high on Agreeableness and high, low, or average on Neuroticism or any other dimension). Critically, this is not the case for cognitive ability, where individuals who score highly on one task tend to score highly on another. This latter pattern is termed the *positive manifold phenomenon* (simply meaning that the correlations among the tests are all positive) and is the underlying reason why *g* emerges from cognitive test batteries.

Second, an important corollary to Spearman's finding that *g* is a universal feature of any sufficiently broad sampling of cognitive tasks is his observation that any two tasks that relate to *g* equally well (i.e., that have the same "*g*-loadings") should be equivalent as measures of overall intellectual ability. Spearman termed this principle the "indifference of the indicator" and offered it as the reason why Binet's method of aggregating performance across many types of tasks was successful for measuring intelligence (Spearman, 1927). That is, insofar as the variance in any cognitive test largely reflects *g,* in any broad sampling of tasks, *g* will dominate over their more idiosyncratic variance, making the aggregate across them little more than a measure of *g* itself (Spearman, 1927). Importantly, this phenomenon can be readily observed in actual test data where, for example, tasks of vocabulary knowledge and visual-analogical reasoning have been shown to have nearly identical *g*-loadings despite their highly dissimilar content (Wechsler, 2008b).

Finally, while the empirical record of *g* is undeniably strong, it is important to clarify some additional issues pertaining to what does and does not follow from the basic empirical facts about it. For example, while the existence of *g* does *seem* to indicate that just a single process "explains" individual differences in cognitive task performance, the validity of this interpretation hinges entirely on what one means by an explanation. To be explicit, *g* is, at its core, a *statistical* entity that reflects patterns of variation in performance on cognitive tasks. As such, it does seem valid to say that it "explains" variation among individuals, in the sense of the amount of variance it might account for in a social science context (e.g., correlating with occupational outcomes in population-based studies), or in terms of its predictive validity for informing clinical or educational decisions about an individual based on their obtained IQ score (e.g., about the appropriateness of a particular placement or intervention). However, this does not mean that *g* reflects a unitary *physical* entity in the nervous system or anywhere else, in the sense of resulting from just a single cognitive or physiological process. This last issue—the degree to which *g* as a statistical phenomenon corresponds to real phenomena in the brain—is of course an empirical question and has been the starting point for debates in the field ever since.

Initial Alternatives to Two-Factor Theory Following the publication of Spearman's (1904) paper, and throughout the rest of the twentieth century, psychologists put considerable effort into trying to develop the most accurate theory of human intelligence. Like Spearman, many of these authors used factor analytic techniques to test structural models. In these models, each factor reflects a statistical grouping of tests that form a set by virtue of correlating relatively highly with one another and being relatively uncorrelated with the others in a given battery. In turn, the "structure" of the model refers to the number of statistical factors that are needed to represent the variance among the test scores and the patterns of interrelations between the different factors that make up the model. Recalling the examples above, response patterns on personality questionnaires can often be represented well with structural models containing five or six factors, while Spearman of course argued that just a single factor, *g*, was common to all cognitive tasks. The psychological meaning or interpretation of a given factor depends on the degree to which the underlying items contributing to it clearly involve the same type of content (e.g., verbal or visual material) or processes (mental speed, long-term memory, etc.). Finally, competing models can be compared to one another in terms of how well they "fit" the data in terms of the amount of variance each explains and other statistics. Thus, many debates in intelligence research in the twentieth century (and still today) concern competing models that aim to describe the structure of human intelligence in terms of how various cognitive processes might interrelate to ultimately explain the variance among test scores.

The clearest challenge to Spearman's two-factor theory, or any theory that posits a *g* factor, initially came from what have been termed "multifactor" theories, which were promoted by authors like Thorndike, Thurstone, and Guilford (Sattler, 2016). The critical feature of these theories is that they all argued that intelligence was made up of multiple, *uncorrelated* psychological factors, represented by distinct, narrower abilities, such as memory and speed of processing. Because these abilities were held to be uncorrelated, multifactor theories directly opposed the idea that variation in intelligence could be subsumed by a single general factor as in two-factor theory. A major appeal of these models is the fact that, unlike *g*, which seems to resist a clear psychological interpretation, it is fairly intuitive to imagine that individual differences might be split up among many different faculties and that these might roughly correspond to different aspects of brain functioning, educational experience, or practice. A number of these models were proposed, including Thorndike's multifactor theory, which was conceptual rather than quantitative, and Guilford's Structure of the Intellect model which contained over 100 factors that intersected across three dimensions (Sattler, 2016). For present purposes, it is most useful to focus on the canonical multifactor theory, Thurstone's "Primary Mental Abilities" model.

Like other multifactor theorists, Thurstone held that cognitive ability was comprised of multiple, uncorrelated abilities. To support this view, he developed tests that were designed to function as pure measures of the primary abilities and employed a method of factor analysis which allowed one to identify multiple, maximally independent factors (Jensen, 1998). Through a series of studies, Thurstone was able to identify what he argued were eight primary mental abilities (e.g., verbal comprehension, perceptual speed, and memory; Wasserman, 2012). Over time, however, it became clear that rather than enabling one to identify factors that are truly uncorrelated, Thurstone's method essentially forces this result and precludes the identification of a single general factor which could otherwise emerge. In fact, it was eventually established that although Thurstone's measures were somewhat successful in measuring only a single primary mental ability, they all also measured *g*, with the latter sometimes accounting for more variance in the score than the primary ability of interest (Jensen, 1998). Ultimately, Thurstone was forced to acknowledge that what he hoped were independent mental factors were actually intercorrelated and could themselves be accounted for by a second-order *g* factor. Figure 15.1 depicts schematic versions of Spearman's two-factor theory and Thurstone's Primary Mental Abilities model.

This same result has proved true of other theories that have aimed to identify sets of uncorrelated processes that might account for individual differences in cognitive performance. In short, although it is the case that individuals do vary along different cognitive dimensions (e.g., one person might have strong verbal skills and weak spatial skills, and vice versa for someone else), and that these do somewhat correspond to different aspects of brain functioning, it is simultaneously true that most of the variance in cognitive ability is shared across cognitive domains, as reflected by the positive manifold.[3] Thus, the debate as to whether human cognitive abilities might actually be uncorrelated has now been decisively settled. Human cognitive abilities are positively intercorrelated, full stop.

Notwithstanding their empirical defeat, the early multifactor models nevertheless left two important legacies. First, Thurstone's work on primary mental abilities eventually culminated in a consensus around what are now called "broad" ability factors. These are abilities that are common to tests involving similar cognitive processes (much like Thurstone's primary abilities), but which are identified at an intermediate level of abstraction, between narrow abilities that are measured by individual tests and a higher-order *g* that accounts for the variance among the broad factors themselves (e.g.,

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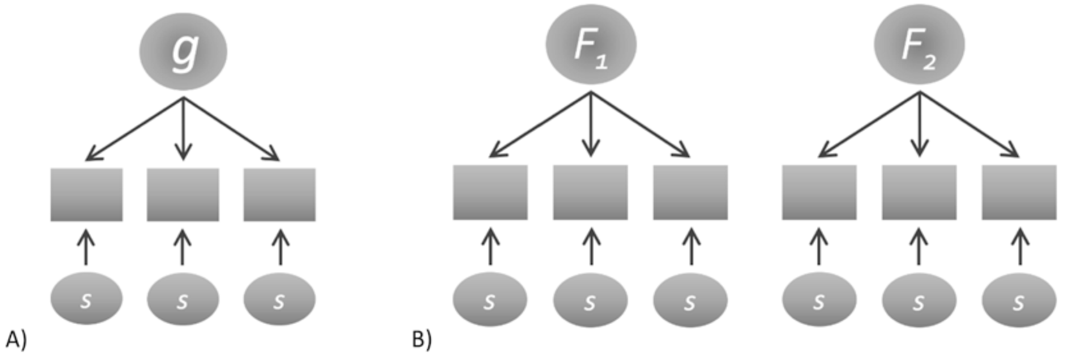
[3] This is a subtle point. The reason why these can be simultaneously true has to do with the fact that the processes that cause variation within individuals are not necessarily the same as those that cause variation between them. Psychometric *g* reflects that fact that an individual's strengths or weaknesses in various sub-domains are independent of their overall intellectual level.



Note. Two schematic factor models. Manifest variables are depicted as rectangles and latent variables are depicted as ovals. A) Example version of two-factor theory involving the three tests, whose common variance loads onto a single *g* factor and plus a unique test-specific factor. B) Example Primary Abilities model involving six tests, two abilities, and no general factor.

Fig. 15.1 Example factor models of intelligence
Note. Two schematic factor models. Manifest variables are depicted as rectangles and latent variables are depicted as ovals. (**a**) Example version of two-factor theory involving three tests, whose common variance loads onto a single *g* factor plus a unique test-specific factor. (**b**) Example Primary Abilities model involving six tests, two abilities, and no general factor

verbal comprehension would be considered a subdomain of the broad factor of verbal skills, both below *g*). Thus, the ultimate outcome of the debate between Spearman and Thurstone was essentially an integration of their two views, such that Spearman came to acknowledge the existence of broad factors in batteries that sufficiently sample from similar types of tests, and Thurstone accepted the emergence of a general factor from the intercorrelations among the broad abilities. These so-called hierarchical models are endorsed by many researchers in the field today (see Fig. 15.2, and section "Twentieth-century perspectives"). Second, although the statistical case for *g* has been long settled, its physiological basis remains very much under debate. In fact, a model first developed in Spearman's own time—the "bonds" model (also called sampling theory), advanced by Godfrey Thomson—has reemerged as an important alternative for conceptually explaining *g*. In brief, Thomson argued that while *g* was an adequate quantitative description of the positive manifold, it did not follow that its emergence from a battery of tests indicates the presence of just a single underlying process (Bartholomew et al., 2009). Instead, Thomson argued that *g* could also emerge for the reason that tests require overlapping sets of mental processes to complete them. The more processes that are shared by a set of tests, the higher the correlation between them (Bartholomew, 2004). Because Thomson's model was somewhat overlooked in the scholarly literature until recently, the next Section addresses other important developments in conventional factor modeling that occupied the second half of the twentieth century, before returning sampling theory and other more innovative models in section "Recent developments in theories of intelligence".

Twentieth-Century Perspectives

Cattell's Theory of Fluid and Crystallized Intelligence In 1943, in the context of mass testing for military conscription during World War II, Raymond B. Cattell reviewed the state of adult intelligence testing in the United States and described his surprise at the many problems he saw in the field.

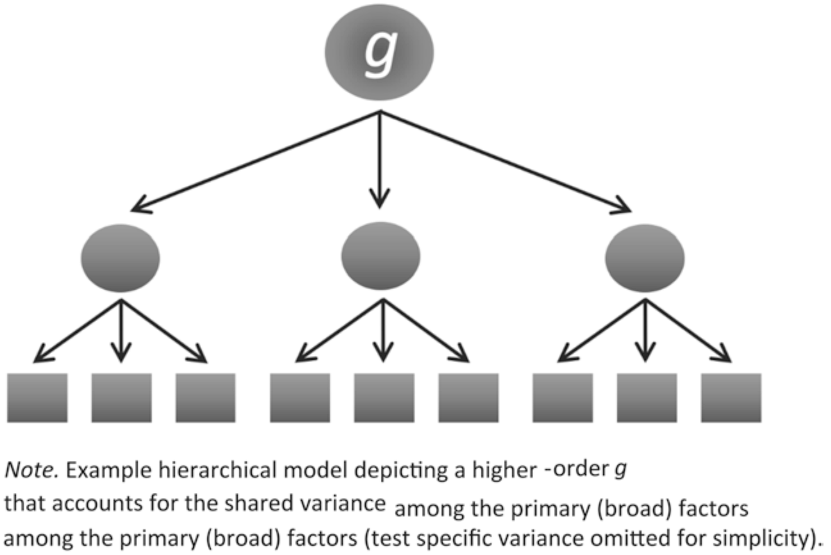


Fig. 15.2 Example hierarchical model
Note. Example hierarchical model depicting a higher-order *g* that accounts for the shared variance among the primary (broad) factors (test-specific variance omitted for simplicity)

Overall, he noted a disconnect between the large number of tests available and their general inadequacy for use in the population at large. This was typically due to the tests having been normed for college students, and thus being insufficient for assessing intelligence in individuals with more limited educational experience, people who lacked English fluency, or older individuals who performed more slowly on timed tests but nevertheless demonstrated high intelligence when assessed by other means (Cattell, 1943). Cattell saw all of these weaknesses as ultimately resulting from the lack of adequate theory as to the nature of intelligence, which in turn had provided insufficient guidance for test development. He then offered his own view—based on both factor analytic results and a synthesis of broader findings in psychology—that adult intelligence primarily consists of not one, but two, broad cognitive abilities. These abilities, now termed fluid (Gf) and crystallized intelligence (Gc), still represent two of the most important concepts in theoretical and applied work on intelligence.

Fluid intelligence reflects the ability to solve novel problems, and especially emphasizes efficiently responding to unfamiliar stimuli under momentary conditions, whereas crystallized intelligence reflects learned skills and knowledge. Critically, Cattell held that the two abilities are developmentally connected, such that someone's crystallized intelligence explicitly reflects the solidification, through learning, of what was once fluid ability. Thus, it is through the application of one's momentary cognitive resources (perception, attention, reasoning) that an individual comes to develop various skills and habits that they can then call upon to solve knowledge-based problems. In turn, any cognitive test can be grouped according to whether it involves more fluid versus crystallized abilities, or some combination of the two. The most famous measure of fluid intelligence is likely the Ravens Progressive Matrices, in which the examinee is presented with an array of figures that vary in their visual characteristics (image color, shape, texture, and combinations therein) and must identify the item that correctly completes the array from a set of figures that vary on the same features. The items become progressively more difficult as the test progresses, moving from essentially simple visual matching problems to those that require multipart logical operations, with typical administrations requiring examinees to complete approximately 40 items in 30 min (Raven & Court, 1998). Thus, the Ravens matrices test exemplifies many characteristics of typical fluid intelligence tasks, and most notably, the use of visual and especially figural content, and the need for attention and "on-the-spot" reasoning under timed conditions. In contrast, canonical measures of crystallized intelligence include vocabulary tasks or tests of general knowledge, which depend heavily on prior learning.

In developing the theory of fluid and crystallized intelligence, Cattell sought to address a number of issues in the broader field. These included (1) changes in the *g*-loadings of various tasks from child to adult samples, (2) the dissociation of mental speed from overall ability in adults as they age, and (3) the tendency for brain injury to most adversely affect tasks requiring mental speed and novel or abstract problem solving, while generally sparing language measures like vocabulary and verbal comprehension (Cattell, 1943). The persistence of Gf-Gc theory reflects how well it accommodates the phenomena responsible for these effects. For example, because Gf and Gc differ in the degree to which they depend on momentary cognitive processes, they exhibit distinct developmental trajectories over the lifespan. Gf, through its reliance on mental speed in particular, increases through childhood into early adulthood, after which it begins to decline, likely reflecting patterns of white matter maturation and change in the brain (Bendlin et al., 2010; Penke et al., 2010; Ferrer et al., 2013). Conversely, because the acquired skills and semantic knowledge that support crystallized intelligence are more related to cortical networks (particularly in the left hemisphere; Palmer et al., 2021), its developmental trajectory shows a similar increase through childhood into early adulthood, but remains stable or actually increases through the sixth decade of life and is relatively preserved even into old age (Salthouse & Davis, 2006; Spreng & Turner, 2019). These associations are also consistent with decades of neuropsychological research, which has demonstrated impairments in tasks that require fluid abilities in conditions affecting white matter connectivity and diffuse neural networks, such as in severe traumatic brain injury or subcortical dementias, with relative preservation of language functions and other crystallized skills (Lezak et al., 2012). Finally, because Gf seems to be best tapped by tasks involving abstract, figural content, rather than verbal and factual information that is more explicitly emphasized in formal education, it was also argued that Gf-Gc theory provided a basis for developing "culture-fair" intelligence tests (Cattell, 1963).

In the following years, Cattell worked with his student, John Horn, to expand the theory of fluid and crystallized intelligence to include other broad abilities. Like the original theory, the authors were motivated by evidence that the original Gf-Gc model could not account for developmental and neurological processes that seemed to affect domains beyond just fluid and crystallized skills. Ultimately, their follow-up studies culminated in the extended Gf-Gc theory, which includes the following eight domains: Acculturation Knowledge (Gc), Fluid Reasoning (Gf), Short-Term Memory (Gsm), Long-Term Memory (Glm), Processing Speed (Gs), Visual Processing (Gv), Auditory Processing (Ga), and Quantitative Knowledge (Gq) (Sattler, 2016). As detailed by Horn and Blankson (2012), in the extended model, Gf and Gc reflect their original interpretations—the capacity for focusing attention, understanding the elements of problems, and reasoning about them efficiently (Gf), and the "acquisition of knowledge about the language, concepts, and information of the dominant culture" (Gc). Gsm reflects the ability to maintain and manipulate information held in mind over brief intervals (often called working memory), while Glm reflects the capacity to maintain and retrieve information over spans ranging from minutes to longer. Gv and Ga reflect abilities mediated in their respective sensory domains, such as spatial orientation, visualization, and length estimation (Gv), and auditory comprehension and judgments of rhythm (Ga). Gq entails mathematical abilities like number facility and algebraic manipulation, while Gs is tapped by tasks like perceptual and decision speed. Last, it is also worthwhile to note that the factors that make up extended Gf-Gc theory can be conceptually grouped according to their broad developmental and neurological correlates—those that are vulnerable to diffuse neurological injury or age-related decline (Gf, Gs, Gsm), those that relate to the development of expertise (Gc, Gq, Glm), and those that reflect particular sensory functions (Gv, Ga) (Horn & Blankson, 2012).

There are a few other things to note about the extended Gf-Gc theory before moving on. First, as is true of the factors in any structural model, in actual practice, performance on tasks designed to tap any of the domains will rely on Gf, Gc, and other domains to varying degrees. Second, both the original and the extended Gf-Gc theories explicitly do not include a *g* factor (Jensen, 1998). This actually relates to an important criticism of the theory, which is that, in models with broad factors that do allow for a higher-order general factor, it is frequently not possible to statistically distinguish Gf from *g* itself (e.g., see Kvist & Gustafsson, 2008). This undermines the claim the Gf is a meaningful statistical entity apart from *g,* and particularly in light of the common finding that tasks designed to measure Gf are often the most highly *g*-loaded in any battery (e.g., Wechsler, 2008a). The final point, although somewhat complex, is important and relates to more recent developments regarding the cultural dependence of tasks of Gf and Gc.

In particular, although it is certainly the case that tests of Gc are heavily dependent on cultural knowledge, it has now become clear that measures of Gf are also not (and probably can never be) "culture fair" or "culture-free." Compelling evidence for this comes from studies on the Flynn effect, which is the finding that scores on intelligence tests tend to increase in populations over time (i.e., later generations score higher on the same version of a test than their parents or grandparents did; Williams, 2013). Interestingly, it has been repeatedly shown that the Flynn effect is actually *largest* for tasks of Gf and systematically decreases as tests rely more on Gc (Pietschnig & Voracek, 2015). Though initially counterintuitive, the best explanation for these findings appears to be that the effect results from increasing capacity for abstract reasoning in individuals across generations, perhaps due to increasing societal demands on information processing (Armstrong et al., 2016; Fox & Mitchum, 2012). That is, it is considered relatively unlikely that factors like genetics or nutrition would have changed dramatically and fast enough in populations where the Flynn effect has been studied to account for these differences in test performance between children and their parents or grandparents. Conversely, the average person's familiarity with certain forms of technology and more abstract concepts has clearly increased over successive generations (Flynn, 2007). Thus, insofar as the observed increases in abstract reasoning are much more likely to reflect changes in cultural demands rather than other effects, it suggests that tasks of Gf must also be culture-loaded to an important degree. In summary then, although tasks of Gc are very obviously culture-loaded, it does not follow that tasks of Gf are "culture-fair," simply because they do not explicitly involve linguistic stimuli or information gained through formal education. To the contrary, it seems likely that familiarity with figural material and certain types of cognitive operations can be culturally transmitted as well, such that tasks of Gf are probably best understood as merely "culture-reduced," relative to typical tasks of Gc. In the end, such developments highlight the need to consider how these factors could be at play in any test, and especially for examinees with unique or more limited cultural and educational experience.

Vernon, Carroll, and Hierarchical Models of Intelligence The final set of twentieth-century models to consider are the hierarchical models, which consist of three levels or "strata" of cognitive constructs that vary in their generality. An example of hierarchical model depicting a higher order *g* is shown in Fig. 15.2. The general form of any hierarchical model consists of three or four levels, with narrow abilities (those tapped by a single test; e.g., reading speed, numerical fluency) at the lowest level, broad factors at the next level (akin to Gc, Gf, etc.), and a *g* factor at the highest level of the model. One important hierarchical model was developed by Phillip E. Vernon, who argued that the structure of intelligence had *g* at the apex, followed by the two broad abilities of verbal-educational skills versus spatial-mechanical skills at level two, and a set of three narrower abilities below these (these are: verbal fluency, divergent thinking, and scholastic and numerical abilities below verbal-educational; and perceptual speed, psychomotor and physical skills, and spatial and mechanical abilities below spatial-mechanical; Vernon, 1951, 1965). Although Vernon's model seems to resemble the original Gf-Gc model at first glance (with its two broad factors anchored by verbal versus spatial skills), as described by Johnson and Bouchard (2005b), the two models actually differ in important ways.

First, in direct contrast to Gf-Gc theory, Vernon explicitly incorporated *g* in his model of intelligence, for the reason noted above that it is often not possible to truly separate Gf from *g* (Johnson & Bouchard, 2005b). Second, whereas the core of the Gf-Gc model is the conceptual separation of those two capacities based on their relative dependence on prior learning (prominent for Gc, much less so for Gf), Vernon's model instead contrasts the two broad factors in terms of their primary information processing modalities. Thus, although tasks of fluid abilities often emphasize visual stimulus presentation or spatial reasoning, and tasks of crystallized abilities tend to emphasize language, Gf should not be equated with visuospatial skills, and Gc should not be equated with language. Vernon's mode, in contrast, explicitly emphasizes distinct content dimensions and acknowledges the influence of learning to performance on both (Johnson & Bouchard, 2005b). Thus, Vernon's broad factors can be better understood distinguishing between abilities that are emphasized in educational (e.g., mathematics) versus noneducational contexts (e.g., mechanical skills), where both are understood to be influenced by experience.

As a result of these differences, the two theories make different predictions for how particular tasks should relate to their respective broad factors. To take a hypothetical example, in the Arithmetic subtest of the Wechsler scales, the examinee is asked to solve verbal arithmetic problems that are spoken aloud (Wechsler, 2008a). When viewed through the lens of the original Gf-Gc model, this task would likely rely substantially on both factors, via its demands on attention and working memory processes related to Gf as well as mathematical knowledge related to Gc. Conversely, under Vernon's model, the task might be better represented by just the verbal-education factor alone, for the reason that word problems are routinely taught and practiced in school, and less commonly encountered in noneducational contexts. Notably, although Vernon's model is much less familiar to broader psychology than Cattell's ideas about fluid and crystallized intelligence, the former has consistently outperformed Gf-Gc theory in studies that have explicitly compared the two (Johnson & Bouchard, 2005a, b). As such, it represents an important contrasting perspective that users of intelligence tests should also keep in mind.

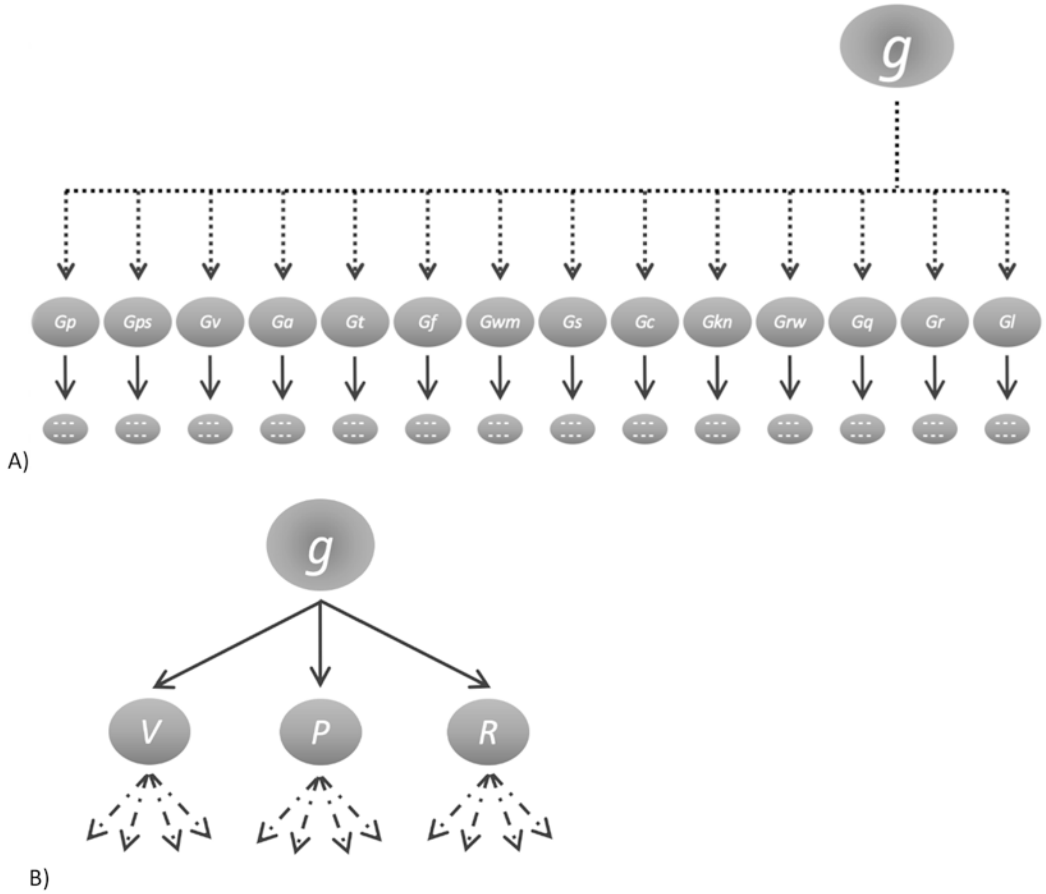
The final twentieth-century model to be familiar with is Carroll's three-stratum theory. Carroll's model is widely regarded as one of the most important achievements in research on cognitive ability (Beaujean, 2015, p. 132; McGrew, 2009; Wasserman, 2012, p. 44), for the way that it comprehensively synthesized and consolidated much of the prior work in the field. In his book *Human Cognitive Abilities* (1993), Carroll presents his reanalysis (via factor analytic methods) of over 460 cognitive ability datasets drawn from 19 countries and over 131,000 individuals. In this process, he derived factors at various hierarchical levels, which he tentatively grouped according to features such as task descriptions, patterns of similar factor loadings, test instructions, and details of items and scoring procedures, which he then progressively refined. In these initial steps, he arrived at 19 groups of factors ranging from general and broad cognitive factors (e.g., *g*, Gc, memory factors) to those reflecting things like academic achievement, sensory acuity, and interpersonal and motivational skills. Below these, he identified numerous narrow ability factors (that varied as a function of the tests in a given battery), and which reflect things like communication ability, length estimation, figural fluency, reading comprehension, tonal memory, and simple and choice reaction time, among many others (Carroll, 1993).

Near the conclusion of this monumental work, Carroll described his view of the structure of human cognitive ability, which is noteworthy in at least three respects. First, as noted above, he argued for a three-level hierarchy, with a general factor (*g*) at the apex, followed by broad and narrow ability factors. Regarding *g,* he stated simply that "[t]here is abundant evidence for a factor of general intelligence…found at the highest order of analysis for a given dataset" (Carroll, 1993, p. 624). Carroll's comprehensive survey was thus essentially the final word among scientists on whether *g* is in fact an inevitable consequence of cognitive ability batteries (insofar as scientific questions are ever definitively closed). He then listed eight broad factors, which, in his words, "differ in the relative emphases they give to process, content, and manner of response" (Carroll, 1993, p. 634). In this respect, the three-stratum model highly resembles the extended Gf-Gc theory. The second important feature of the three-stratum model is that Carroll explicitly ordered the broad factors according to their statistical proximity to *g*, with Gf being closest, followed by Gc, learning and memory, visual and auditory perception factors, broad retrieval ability (e.g., verbal fluency skills), and two speed-based factors at the far end. Third, he also acknowledged several tentative aspects of the model and explicitly cautioned that "it is not intended that the three strata be rigidly defined" (Carroll, 1993, p. 635). Among these, he noted that narrow abilities often load on multiple different factors as opposed to just one, he felt that there could be intermediate levels of generality between the strata he identified, and perhaps most importantly, he did not consider the eight broad factors he listed to have exhausted all possibilities (Carroll, 1993). Thus, although Carroll's work was important for how it consolidated prior insights and set an authoritative standard against which to compare future models, it also left the door open for future developments.

Contemporary Psychometric Models of Intelligence: CHC, VPR, Bifactor, and Formative Models Readers who have followed to this point should have a strong grasp of the ideas needed to understand the most prominent contemporary models of intelligence under discussion in the scholarly literature and applied test development. This is because these final two models are largely extensions of earlier work. They are: the Cattell-Horn-Carroll theory (CHC), which (naturally) integrates the extended Gf-Gc model with the three-stratum model, and the Verbal-Perceptual-Image Rotation model (VPR), which is an outgrowth of Vernon's hierarchical model (see Fig. 15.3). Both models might be considered "conventional" in the sense that they were developed using the factor-analytic techniques that were, until recently, used for all the models discussed in this literature. At the conclusion of this subsection we also introduce readers to two additional considerations about structural models (the bi-factor model and the distinction between reflective and formative models) that are commonly encountered in this literature.

CHC theory is arguably the closest one could come to what might be considered a consensus view about the structure of intelligence. As noted above, it represents a synthesis of the views of Cattell and Horn on the one hand and Carroll on the other. Overall, it acknowledges the considerable overlap between their accounts (and, indeed, Carroll himself saw his findings as confirming aspects of Gf-Gc theory; Carroll, 1993, p. 624) and attempts to reconcile differences between and develop refinements based on subsequent findings. Most of the following information on CHC theory was taken from Schneider and McGrew's (2018) recent chapter reviewing and updating the theory, which provides a detailed exposition of the broad and narrow factors (along with assessment recommendations and other considerations) and to which we refer interested readers.

As Schneider and McGrew outline in their chapter, CHC consists of a hierarchical model that emphasizes broad abilities grouped across several dimensions. Although the model is hierarchical, it focuses primarily on the existence and relations between broad and narrow abilities and offers a fairly nuanced account of the status of *g*. In an important earlier paper on CHC, *g* is depicted as part of the theory, but none of the loadings between *g* and any of the broad abilities are shown, in an effort to reconcile the original authors' disagreement on the status of the general factor (McGrew, 2009). A subsequent chapter aligns somewhat with Carroll's view in including *g*, but encourages users of the theory to reach their own conclusions about applying it or not, depending on their theoretical view and the assessment context in which they are working (Schneider & McGrew, 2012, p. 111). In the most recent account, the authors acknowledge *g* as a statistical factor, as well as its predictive validity as an index of someone's overall cognitive ability, but they express reservations that it reflects any unified



Note. Schematic versions of the CHC and VPR models. A) CHC model with 14 broad factors, with dashed lines for *g* indicating the nuanced account of *g* in CHC.B) VPR model shown with three broad factors. Dashed lines to narrow abilities indicate that these are always contingent on battery content.

Fig. 15.3 CHC and VPR models

Note. Schematic versions of the CHC and VPR models. (**a**) CHC model with 14 broad factors, with dashed lines for *g* indicating the nuanced account of *g* in CHC. (**b**) VPR model shown with three broad factors. Dashed lines to narrow abilities indicate that these are always contingent on battery content

cause that underlies those manifest effects. Later in the same chapter, the authors also point out that, when examined closely, Cattell's version of fluid intelligence functions in much the same way as Spearman's *g*, making the point somewhat moot (Schneider & McGrew, 2018).

The crux of CHC theory is the broad factors, their conceptual groupings, and the narrow factors that comprise them. Each broad factor can be conceptualized along one of two orthogonal dimensions. The first dimension divides the broad abilities into those that are expressed via tasks of speed versus level (i.e., emphasizing speed or accuracy). The second dimension separates the abilities into the following four conceptual groups: *Motor Abilities* (Psychomotor abilities (Gp), and Psychomotor speed (Gps)); *Perceptual Processing* (Visual-Spatial (Gv) Auditory (Ga), and Decision Speed (Gt)); *Controlled Attention* (Fluid Reasoning (Gf), Working Memory (Gwm), and Attentional Fluency/Processing Speed (Gs)); and *Acquired Knowledge* (Comprehension-Knowledge (Gc), Domain-

Specific Knowledge (Gkn), Reading and Writing (Grw), Quantitative Knowledge (Gq), plus the two speed/efficiency-based factors of Retrieval Fluency (Gr) and Learning Efficiency (Gl)). Four other tentative, non-speeded abilities are also suggested to exist under Perceptual Processing (Kinesthetic (Gk), Tactile (Gh), Gustatory (Gg), and Olfactory processing (Go)), though the authors acknowledge that more research would be needed to definitively establish these (Schneider & McGrew, 2018).

Similar to the theories from which CHC was derived, its broad factors can also be grouped under an alternative conceptual framework. Under the latter scheme, the groupings are the Domain-Free Capacities (Gf, Gwm, Gl, Gr, Gs, Gt), which are independent of particular sensory modalities; those that pertain to Acquired Knowledge Systems (Gc, Gkn, Grw, Gq), which are less-readily modeled as distinct factors, and which are also linked to personality dimensions and interests (e.g., one's interests influence the areas in which they develop domain-specific knowledge); and the Sensory- and Motor-Linked Abilities, which though somewhat broad, are not nearly as general as those that operate across modalities (Schneider & McGrew, 2018). Interestingly, in the latest update to CHC theory, Schneider and McGrew also make a case for eventually including emotional intelligence (Gei) as a broad ability within CHC. They cite long-standing scholarly interest in social and interpersonal functioning as a subdomain of intelligence as well as more recent factor-analytic evidence in support of including emotional intelligence, but also note that additional research is needed to confirm its status as a unique ability and clarify the narrow domains that comprise it (Schneider & McGrew, 2018).

The final contemporary structural model is the Verbal-Perceptual-Image Rotation (VPR) model, which has been developed in a series of papers by Wendy Johnson and colleagues (Johnson et al., 2007; Johnson & Bouchard, 2005a, b; Major et al., 2012). As noted above, the VPR model represents a refinement of Vernon's hierarchical model, which involves *g* at the highest level and two broad factors of verbal-educational and spatial-mechanical-practical abilities. In their first article on the topic, Johnson and colleagues compared the statistical adequacy of three models, which were respectively based on the original Gf-Gc theory, Carroll's three-stratum model, and Vernon's model in the same large dataset (Johnson & Bouchard, 2005b). Results indicated that Vernon's model demonstrated better overall model fit than either Gf-Gc or the three-stratum theory, and the narrow stratum factors it contained were more clearly differentiated from the broad factors than in the other models. For example, fluid intelligence was not distinguishable from *g* in the three-stratum model, and neither lower-order fluid nor crystallized factors could be distinguished from their broad factor counterparts in the Gf-Gc model. Nevertheless, although Vernon's model was statistically superior, it still did not meet the authors' a priori criteria for a "well-fitting" model. Thus, in an exploratory fashion, they assessed a refined model which included a memory factor at an intermediate level and added a broad visualization factor to the two other factors representing verbal/academic and perceptual skills. The resulting VPR model demonstrated the best fit of any of the models assessed (Johnson & Bouchard, 2005b). Shortly thereafter, the authors replicated their findings in two additional large datasets (both containing over 500 participants and more than 40 tests), demonstrating that Vernon's model consistently outperformed the original Gf-Gc model, and further, that the VPR model provided an additional improvement (Johnson et al., 2007; Johnson & Bouchard, 2005a).

Finally, in a 2012 article, Johnson and colleagues compared the VPR model against the newer models of extended Gf-Gc theory and CHC theory. The study took advantage of the large project TALENT dataset, which contains test results from over 300,000 high school students tested in the United States in 1960. The authors first ran exploratory models to characterize the dataset and develop representative factor structures, from which they compared the three models using the same set of input variables. This resulted in an extended Gf-Gc model that contained additional broad factors of quantitative and visualization ability, and a six-factor version of CHC was implemented. Importantly, because the VPR model recognizes the fact that model structure and fit are always contingent on the tests from which the model is estimated, this enabled some domains to be modeled under a single factor in VPR (e.g., English and Mathematics, which both plausibly fall under a verbal-educational factor), whereas no such hybrid factor is possible in the other two models (Major et al., 2012). As in the earlier studies, the VPR model consistently outperformed the other models across all fit indices.

In contrasting CHC and VPR, a few points stand-out. Most notably, CHC was developed with the needs of intelligence test users in mind and aims to continue in that vein. Its authors explicitly cite validity considerations in determining which broad and narrow factors should be included in the model, and in their criteria for removing or adding factors (Schneider & McGrew, 2018). Accordingly, CHC has been explicitly integrated into several current intelligence test batteries (most notably, the Woodcock-Johnson), and even if not directly incorporated, its influence is still clear in recent revisions of others (e.g., the factor structure of the WISC-V; Schneider & McGrew, 2018, p. 80). This contrasts with the VPR model, which emphasizes theoretical considerations around parsimony to a greater degree. For example, VPR includes *g*, and thus avoids the difficulty of including both it and Gf in a single model where the two might be statistically and conceptually indistinguishable (Major et al., 2012). Further, following Vernon, VPR includes many fewer broad factors than CHC (3 versus 14+), and the presence and interpretation of any narrow factors is always understood to be contingent on the composition of the underlying battery. This is a critical point that is easy to overlook in psychometric research on intelligence. In practice, factor models (as opposed to conceptual theories) are fundamentally a function of the data from which they were derived. In addition, while CHC has largely embraced the fluid-crystallized distinction, which differentiates between tests based on their dependence on acquired knowledge, VPR instead maps onto what may be a more natural distinction between verbal and spatial processes, as mediated by the left and right hemispheres of the brain (Major et al., 2012). This relates to the final point, that while the fluid-crystallized distinction may align with how intelligence develops within individuals, such processes are unfortunately not captured in traditional factor-analytic studies on individual differences (Johnson et al., 2007). In summary then, while readers can expect further studies aiming to determine which model is superior to the other in various respects, the “correct” answer will likely depend on one’s reason for applying a structural model of intelligence in the first place. The goal of the CHC model is to provide a comprehensive “taxonomy” of human cognitive abilities (McGrew, 2009), which, though deeply informed by theory, has a decidedly applied bent. The VPR model is perhaps better understood as a broader conceptual framework for thinking about the major dimensions of human cognitive variability (and its manifestation in factor models) in a parsimonious way.

Before closing this section and moving on to discuss the “up-and-coming” models of intelligence, we wish to highlight two additional considerations that readers may encounter when approaching this literature on their own. The first of these is the bi-factor model as an alternative to the hierarchical model, where the two differ in how they account for *g* and the broad factors. In brief, in the hierarchical model, *g* forms the top of a conceptual hierarchy and is derived from the correlations among the broad ability factors (Jensen, 1998, p. 98). In essence, this means that the broad factors (also sometimes called “group” factors in this context) are estimated first, and *g* is derived secondarily from the correlations between the broad factors. In contrast, in the bi-factor model, *g* is estimated directly as the shared variance common to the manifest variables (the test themselves), and the broad factors are estimated secondarily from any remaining variance that is shared among tests that assess similar constructs (Beaujean, 2015; Rodriguez et al., 2016). The result of this latter procedure is that variance in the broad factors is truly independent from *g,* unlike the hierarchical model. Although there are technical reasons why psychometricians may prefer one approach over the other, the reason for raising the distinction here has to do with its implications for substantive ideas about the nature of intelligence. Namely, whether one conceives of *g* as reflecting processes that are somehow independent of those captured by the broad factors (in the case of the bi-factor model), versus whether one sees the influence of *g* as mediated through the broad factors alone.

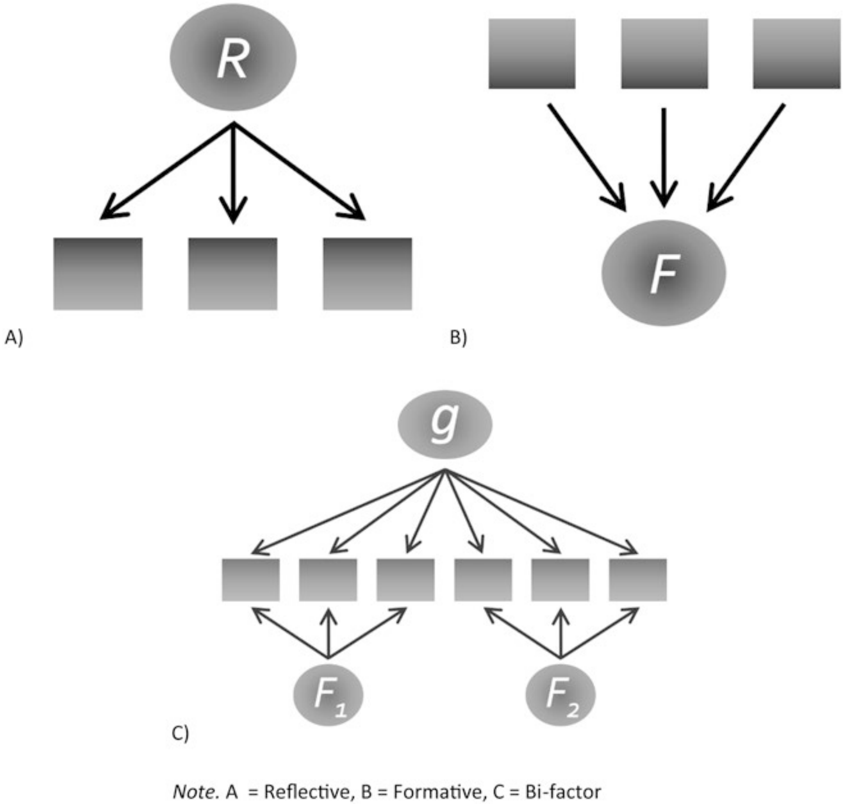


Fig. 15.4 Example reflective, formative, and bi-factor models
Note. (**a**) Reflective, (**b**) Formative, (**c**) Bi-factor

A final point to make in this section concerns the distinction between so-called reflective and formative latent variable models (see Fig. 15.4). All of the models discussed up to this point (with the possible exception of VPR; Major et al., 2012, p. 544) represent reflective models, which are interpreted as expressing the idea that variation in the latent variable is the *cause* of the variation in the variables that load onto it (Borsboom et al., 2003). This is indicated by the direction that the arrows travel (in the case of the three-stratum model, for example) from *g*, to the broad and narrow factors, and ultimately to the tests themselves. Strictly speaking then, such a model would be interpreted as asserting that variability in *g*, whatever its true neurological basis, is somehow the ultimate cause of the variability in the broad factors and the indicators. In contrast, in a formative model, the arrows travel from the manifest variables (the tests or items) to the latent variable, such that the variance in the latter is understood as reflecting variance in the indicators rather than the reverse (Conway & Kovacs, 2015). Common examples of formative variables include concepts like overall health or socioeconomic status (SES). Taking the case of SES, it is intuitive that there is no such thing as a single underlying cause that explains one's level of income or education. Instead, the very notion reflects the combined variance among those and other indicators, which of course can vary independently in any given person (e.g., a highly educated professor with a middle-class salary, and a wealthy celebrity who did not complete high school). As the next section will illustrate, the most recent theoretical models of intelligence have begun to take seriously the idea that, although *g* can be represented *statistically* as a reflective variable, it may be better understood as a formative variable in terms of its relation to brain functioning and development (Deary et al., 2016).

Recent Developments in Theories of Intelligence

In the last two decades, the dominance of traditional factor models of intelligence has given way somewhat to make space for alternative approaches. These alternatives belong to two classes of models, respectively, known as sampling theory (also called the "bonds" model) and network models. Although the two types of models and their variants differ in important ways, they are united by the fact that they all incorporate the advances made during the factor-analytic era, but expand beyond them to offer a more process-oriented view of intelligence. Specifically, although they all acknowledge the positive manifold, and take it as their starting point, each one is also designed to account for it without invoking a unitary, reflective *g*. This means that these models are not only somewhat more plausible from a neurological standpoint, but for some models, it also enables them to address other effects for which traditional factor theories cannot account.

Thomson's Bonds Model and Process Overlap Theory A 2009 paper by Bartholomew et al. (2009) almost single-handedly reignited interest in Godfrey Thomson's bonds model. As outlined by those authors, Thomson was a contemporary of Spearman, who developed the bonds model as an alternative to two-factor theory. Critically, Thomson did not argue that two-factor theory was necessarily incorrect, but only that it is not the *sole* possible explanation for the emergence of the positive manifold (Bartholomew et al., 2009). That is, whereas two-factor theory argues that positive correlations between tests arise from a unitary cognitive or neural source (e.g., "mental energy"; Spearman, 1927), Thomson argued that they could also come about as the result of overlapping cognitive or neural processes that are required by different types of tests. This overlap could be instantiated by the number of "bonds" that the tests share or sample from, and hence the alternative name, sampling theory. From a contemporary perspective, these overlapping bonds might literally be considered synaptic connections, and indeed, Thomson appears to have contemplated ideas along these lines (Thomson, 1951; cited in Bartholomew et al., 2009).

Although Thomson's model was largely forgotten throughout the twentieth century and deemed inadequate as an explanation for the positive manifold by some theorists (Jensen, 1998, pp. 120–121), two papers from the group led by Bartholomew and Deary suggest that scholars were wrong to dismiss it. In brief, by taking advantage of statistical developments that were not available to Thomson (who came to his initial idea by simulating data using dice throws) they were able to show that Thomson's model, which assumes that test scores are a combined function of the specific bonds sampled in the course of the completing the items, gives rise to the identical covariance matrix as Spearman's model that assumes the presence of a latent general factor (i.e., *g*). Further, they show that, like two-factor theory, Thomson's model can also be generalized to datasets containing more than one factor (Bartholomew et al., 2009). Crucially then, because the two models give rise to identical patterns of correlations, it is not possible to statistically distinguish between them. Instead, the choice should be made based on other considerations, like biological plausibility, where sampling theory has a clear advantage. In a second paper, the authors expand the support for the bonds model via simulation studies, show its capability to fit real datasets, and describe how individual differences in the type and number of bonds that people possess could in fact account for differences in patterns of intellectual ability (Bartholomew et al., 2013).

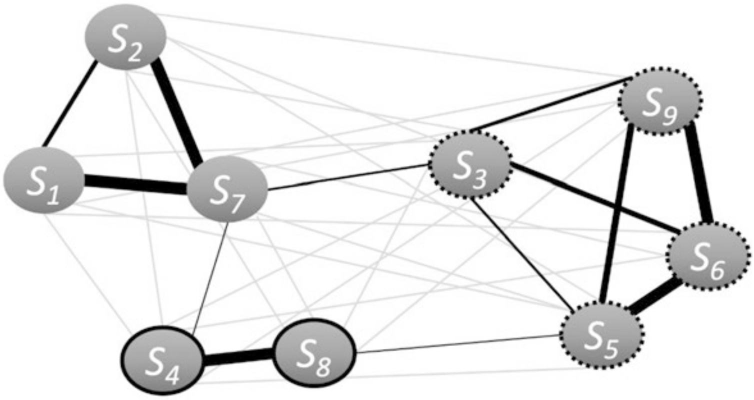
In recent years, a novel model heavily inspired by sampling theory has been proposed in the form of Process Overlap Theory (Kovacs, 2019; Kovacs & Conway, 2016). Like all of the most recent theories, Process Overlap Theory takes the positive manifold phenomenon as its starting point and aims to describe how it could arise without appealing to a latent, unitary *g*. Simultaneously, the theory aims to explain other important phenomena in the intelligence literature, such as the high correlation between *g* and Gf in factor models, and the fact that as tasks become more complex, they also become more *g*-loaded. After reviewing a number of key findings from differential and cognitive psychology, Kovacs and Conway (2016) conclude that the positive manifold arises, not from a unitary cause of mental ability that influences all tasks, but rather because, in practice, all cognitive tasks rely on a subset of independent, domain-general processes that act as limiting factors during cognitive performance. Thus, the positive manifold does not reflect a *single* underlying cause, but the tendency for tasks to draw upon an overlapping set of domain-general processes.

The processes in question are subsumed under the umbrella of executive functions and include things like working memory capacity (itself a multicomponent function), attentional control, goal maintenance, and related abilities (Kovacs, 2019). Drawing on the strong connection between Gf and these executive abilities, and the near unity of *g* and Gf, the authors argue that any cognitive task relies on these domain-general functions as well as domain-specific abilities, with this distinction driving the patterns of relations within and among the broad factors. Hence, tests of verbal reasoning versus mental rotation tasks would be distinguished by their reliance on their respective broad factors, but they might also require working memory and/or attentional control. From here, one can see the similarity to sampling theory, in that both task domains sample from the same set of executive processes, but from a distinct set of domain-specific skills. Importantly, however, unlike two-factor theory, not all tests in a battery need to sample the exact same set of domain-general processes for the positive manifold to arise. It is enough for each test to share one such process with any other (Troche et al., 2021). As a result, a general factor would emerge from a factor analysis of those data, but its underlying cause would be a set of independent (though overlapping) abilities, thereby making it a formative rather than reflective latent variable (Kovacs & Conway, 2016).

Overall, Process Overlap Theory provides a number of innovations over prior models and faces a few limitations. In terms of the former, it has the important virtue of not only providing a new conceptual account of the positive manifold, but it also links this to a formal statistical model of item responding. This means that unlike the prior generation of factor models, Process Overlap Theory explicitly connects patterns of between-subjects variation to the hypothesized cognitive processes that govern responding within individuals. Thus, it takes the important step of trying to ground individual differences research on a foundation of cognitive process models that describe how those differences actually arise. Along these lines, it also stands apart from conventional factor models in connecting relatively well with neuroimaging findings. In particular, it aligns with evidence suggesting that frontoparietal networks in the brain are the most reliable neural correlates of intelligence (Basten et al., 2015; Duncan, 2010; Jung & Haier, 2007; Santarnecchi et al., 2017) and strongly overlap with the networks that govern executive functioning (Barbey et al., 2012). Thus, it is plausible that these networks could operate as a domain-general bottleneck on cognitive ability (Euler, 2018), in the same manner as that predicted by the theory. In terms of limitations, although Process Overlap Theory has elicited considerable interest since its publication, studies evaluating it have thus far provided only mixed support (Frischkorn & von Bastian, 2021; McFarland, 2020; Troche et al., 2021). Some authors have also criticized conceptual aspects of the theory, such as the evidence for attentional control as a viable psychometric construct (Schubert & Rey-Mermet, 2019) and its distinctiveness from two-factor theory and other prior accounts (Deary et al., 2016; Gottfredson, 2016). Notwithstanding these criticisms, Process Overlap Theory still has much to recommend it as an additional formative model of the positive manifold, and as an attempt to link intelligence research to cognitive process models of within-subject effects.

The Mutualism Model and Network Approaches Network models of intelligence represent the biggest departure from traditional factor models and are the focus of most of the innovation currently going on in psychometric work on intelligence. These models are unique in that, instead of positing a hierarchy of latent variables, they represent intelligence as a system of interacting abilities that relate

Fig. 15.5 Network model
Note. Hypothetical network model of intelligence depicting clusters of related tests rather than latent variables



Note. Hypothetical network model of intelligence depicting clusters of related tests rather than latent variables.

directly to one another, where the different tests in a battery are graphically represented as distinct nodes connected by links, which are derived from the partial correlations between them (Kan et al., 2019; Savi et al., 2019; see Fig. 15.5). In a network model, the conceptual role of group factors based on related abilities is replaced by patterns of correlations between the tests, as reflected in the number and strengths of the different links connecting the nodes in the network, such that strongly related nodes can form clusters (Borsboom et al., 2021; Kan et al., 2019). Such models are rapidly gaining interest not only in intelligence research, but throughout differential psychology (e.g., personality and psychopathology research), for the way in which they can reveal the connections between measured variables without reifying specific constructs as the underlying "causes" of the observed correlations.

The first network model of intelligence was the mutualism model developed by van der Maas et al. (2006), which represented the first modern attempt to mathematically account for the positive manifold without invoking a latent *g* factor. Rather than focusing on the correlations between particular types of tests (as in traditional factor models), the authors began by reconceiving cognitive ability as a complex system of interacting parts. Specifically, they invoked the metaphor of an ecosystem where initially independent parts (i.e., distinct, uncorrelated abilities) might come to be related through reciprocal interactions that occur during development (van der Maas et al., 2006). Breaking from the psychometric tradition, the authors employed a modeling framework from ecology that allowed them to represent the growth in cognitive abilities during development, as well as their interactions. They imposed several realistic constraints on their model (e.g., that growth cannot be unrestricted) and used simulations to evaluate the intercorrelations and factor structures that would result under different scenarios in a large population of subjects with a given number of initially uncorrelated abilities (van der Maas et al., 2006, 2019). Critically, they were able to show that when there is no correlation among the limiting factors during development (i.e., in the absence of a *g*-like scenario), the positive manifold will still arise merely from the existence of small, positive correlations between the abilities in the model. Importantly, additional analyses showed that the interactions between abilities need not all be positive for this to unfold (and in fact, under this condition, the model produces a hierarchical factor model) and that the mutualism model could also account for other effects in the intelligence literature, such as the increasing heritability of intelligence over time (van der Maas et al., 2006, 2019). Thus, following sampling theory, the mutualism model represented the second mathematical demonstration that the positive manifold (among other effects) could arise in the absence of an underlying *g* factor.

In the years since the publication of the first mutualism model, the theory has received both positive and negative support from empirical studies. On the one hand, research on predicted developmental effects (Gignac, 2014) and patterns of correlations among group factors (Gignac, 2016) has been taken as evidence against the mutualism model. On the other hand, the original authors have responded to these (and other) claims (van Der Maas et al., 2019; van der Maas & Kan, 2016), and the theory has been supported in other data showing, for example, positive interactions between vocabulary and reasoning skills across periods of development (Kievit et al., 2017, 2019). Most recently, the theory has been updated to incorporate other expected effects from the literature, such as reciprocal positive influences from the environment (e.g., natural talent leads to training opportunities, which further enhance talent), as well as the stronger influence of fluid skills on overall functioning (van der Maas et al., 2017, 2019). In just the last several years, interest in network models of intelligence has gained additional momentum, with several studies showing that network models can statistically compete with and even outperform traditional factor models in published intelligence batteries (van Dijk et al., 2017; Schmank et al., 2019, 2021), and with the publication of an entirely new model that aims to address single-subject learning effects via a network account of intelligence (Savi et al., 2019, 2021).

In summary then, these alternative approaches all show that it is entirely possible to explain the emergence of the positive manifold without appealing to *g* as a real, casual entity. Moreover, they have the advantage over traditional approaches of being more physiologically plausible and demonstrate greater capacity to incorporate cognitive process models of how intelligence develops and manifests within individuals. As such, they hold promise for finally integrating the between-subjects effects that have dominated research on intelligence with experimental and developmental models of cognition as it is actually expressed.

Practical Applications and Implications

In this section, we will provide a brief hypothetical case study to illustrate how theoretical models ultimately influence clinical assessment. Commonly used tests may differ in their theoretical foundations and emphasize certain aspects of information. Therefore, it is important to consider how an individual's performance is dependent upon the structure of the tests used.

Demographic and Referral Information Gabriel, aged 16 years and 6 months, is a left-handed, white male who was adopted at the age of 3 by his current guardians. His adoptive mother completed a Master's degree and works full time for a software engineering company. His adoptive father completed a Bachelor's degree and works full time as a landscape architect. Gabriel's medical history prior to adoption is unknown. Gabriel was referred for assessment due to concerns over academic performance and difficulties completing coursework.

Assessment of Intelligence As part of a larger battery, Gabriel will be given an assessment of intelligence. The Wechsler scales of intelligence are some of the most widely used measures of intelligence (Rabin et al., 2005). Due to his age, selecting the appropriate measure is a vital consideration as he is within the age range for both the Wechsler Intelligence Scale for Children–fifth edition (WISC-V) and Wechsler Adult Intelligence Scale–fourth edition (WAIS-IV). An overarching summary of Gabriel's hypothetical profile for each measure and resulting interpretations based on theoretical considerations are presented below. For more detailed profile analyses of these measures, please reference their respective manuals. While no singular test or test score should ever be interpreted out of context or be the sole basis for a case formulation, the focus of this section is on the implications of results from tests of intelligence rather than across a full battery of tests.

Wechsler Intelligence Scale for Children–Fifth Edition (WISC-V) The Wechsler Intelligence Scale for Children–Fifth Edition (WISC-V; Wechsler, 2014) is designed for children ages 6:0–16:11 and provides a Full-Scale Intelligence Quotient (FSIQ) from 5 primary index scores: Verbal Comprehension Index (VCI), Visual Spatial Index (VSI), Fluid Reasoning Index (FRI), Working Memory Index (WMI), and Processing Speed Index (PSI; Wechsler, 2014). A General Ability Index (GAI) may be computed from the VCI, VSI, and FRI to provide an estimate of intelligence that is independent of working memory and processing speed. This assessment is well-represented, based on confirmatory factor analysis, by a five-factor structure consistent with the Cattell-Horn-Carroll (CHC) model, including a fluid reasoning factor (*Gf*), visual processing factor (*Gv*), crystallized knowledge factor (*Gc*), short-term memory factor (*Gsm*), and processing speed (*Gs*), in which *Gf* is equivalent to *g* (Flanagan & Kaufman, 2009). Thus, the WISC-V is generally interpreted through this theoretical lens (Wechsler, 2014).

A hypothetical WISC-V profile for Gabriel is outlined below (see Table 15.1). All score labels and their respective standard score ranges are based on the American Academy of Clinical Neuropsychology consensus statement on score labels (see Guilmette et al., 2020).

Based on Gabriel's WISC-V profile, neither estimate of intellectual ability (FSIQ, GAI) is interpretable due to the discrepancy between the Visual Spatial domain and the Verbal Comprehension domain (Flanagan & Kaufman, 2009). However, his lower GAI score, in comparison to his FSIQ, can be accounted for by the former's greater reliance on tests of visuospatial abilities, an apparent weakness

Table 15.1 WISC-V profile

WISC-V indexes	Qualitative description
Full Scale IQ (FSIQ)	Low average (80–89)
General Ability (GAI)	Below average (70–79)
Verbal Comprehension (VCI)	Average (90–109)
Vocabulary	Average
Similarities	High average
(Information)	Average
(Comprehension)	High average
Visual Spatial (VSI)	Below average (70–79)
Block design	Below average
Visual puzzles	Below average
Fluid Reasoning (FRI)	Low average (80–89)
Matrix reasoning	Low average
Figure weights	Low average
(Picture concepts)	Low average
(Arithmetic)	Average
Working Memory (WMI)	Average (90–109)
Digit span	Average
Picture span	Low average
(Letter number sequencing)	Average
Processing Speed (PSI)	Low average (80–89)
Coding	Low average
Symbol search	Low average
(Cancellation)	Low average

Note. Hypothetical WISC-V profile for Gabriel. Composite scores are in bold and Primary Index Scales are underlined. The subtests that comprise each Primary Index Scale are listed beneath the Index. The **FSIQ** composite score is generated from scores on the subtests of Vocabulary, Similarities, Block Design, Matrix Reasoning, Figure Weights, Digit Span, and Coding. The **GAI** composite is generated from scores on the subtests of Vocabulary, Similarities, Block Design, Matrix Reasoning, and Figure Weights. The subtests in parentheses () are considered Secondary subtests which are not included in the calculation of Primary Index Scales for Gabriel, as tests of WMI and PSI are not included. A closer examination of his index level scores is required to understand Gabriel's intellectual functioning as these scores are all unitary (i.e., the discrepancy between subtests in a domain is not greater than 1.5 standard deviations; Flanagan & Kaufman, 2009). Notably, his profile suggests a significant weakness in visual spatial functioning. Additionally, his performance on tests of processing speed and fluid reasoning are in the low average range. With regard to pairwise comparisons of the index scores, Gabriel's significantly better performance within the WMI compared to the VSI supports the idea that his ability to mentally manipulate information is not driving the poorer performance seen on tests of VSI (Wechsler, 2014). His greater performance on VCI measures in comparison to both the VSI and FRI suggests a consistent weakness in the ability to use visual information for problem solving or a strength in verbal reasoning (Wechsler, 2014). Finally, at the subtest level, the poorer performance on Picture Span vs. Digit Span and Figure Weights vs. Arithmetic again supports the conceptualization that Gabriel has a more difficult time with visually presented information (Wechsler, 2014).

Using the five-factor model to aid in clinical interpretation, Gabriel appears to have a significant weakness in the visual processing factor (*Gv*). This is an important consideration for interpretation of the entire profile as subtests that either directly or indirectly tap into *Gv* will be associated with poorer performance. Particularly, this conceptualization explains the weaknesses seen for tests of fluid reasoning (*Gf*) and processing speed (*Gs*) as a result of the visual processing demands of these subtests; an idea further supported at the subtest level. Thus, the performances observed for the FRI and PSI are likely underestimations of his true ability for these factors. However, the subtests assessing Short-Term Memory (*Gsm*) and Crystallized Knowledge (*Gc*) factors are significantly less influenced by *Gv* requirements on the WISC-V, besides the Picture Span subtest, and thus his average performance on both may be accurate representations of his abilities. Ultimately, due to significant variability between domains of the WISC-V, a single score is derived from these indices that cannot be meaningfully interpreted as an accurate representation of Gabriel's level of intellectual functioning.

Wechsler Adult Intelligence Scale–Fourth Edition (WAIS-IV) The Wechsler Adult Intelligence Scale–Fourth Edition (WAIS-IV; Wechsler, 2008b) is an instrument for assessing intelligence in older adolescents and adults ages 16:0 through 90:11. The WAIS-IV computes a Full-Scale Intelligence Quotient (FSIQ) from four primary index scores: Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI), Working Memory Index (WMI), and Processing Speed Index (PSI; Wechsler, 2008a). A General Ability Index (GAI) may be computed from the VCI and PRI to provide an estimate of intelligence that is independent from working memory and processing speed. Unlike the WISC-V, the WAIS-IV is based on a four-factor structure, with the four factor indices (i.e., VCI, PRI, WMI, and PSI) represented on the second tier of the three-tier hierarchy. Thus, it somewhat resembles Carroll's three-stratum model, which predated CHC. A hypothetical WAIS-IV profile for Gabriel is outlined below (see Table 15.2).

Again, due to the discrepancies between tests of perceptual reasoning and those of verbal comprehension, neither the FSIQ nor the GAI is meaningful representation of Gabriel's overall intellectual ability (Lichtenberger & Kaufman, 2013). Consistent with the WISC-V profile, the WAIS-IV GAI score is lower than the FSIQ as it does not include tests of working memory or processing speed. Therefore, we must again focus our interpretation of Gabriel's intellectual abilities based on his performance at the index score level. His scores indicate a significant weakness in the perceptual reasoning domain as well as difficulties in the processing speed domain. Conversely, Gabriel's VCI and WMI performances are, like in the WISC-V, within the Average range. Notably, he exhibited a strength in verbal associative and learned knowledge (VCI) compared to tests of nonverbal reasoning and problem solving (PRI), a weakness that cannot be accounted for by difficulties with working memory abilities (WMI). At the subtest level, Gabriel performed better on a test of verbal associative reasoning abilities than on tests of learned knowledge.

Table 15.2 WAIS-IV profile

WAIS-IV indexes	Qualitative description
Full Scale IQ (FSIQ)	Low average (80–89)
General Ability (GAI)	Below average (70–79)
Verbal Comprehension (VCI)	Average (90–109)
Vocabulary	Average
Similarities	High average
Information	Average
(Comprehension)	High average
Perceptual Reasoning (PRI)	Below average (70–79)
Block design	Below average
Matrix Reasoning	Low average
Visual puzzles	Below average
(Figure weights)	Low average
(Picture completion)	Low average
Working Memory (WMI)	Average (90–109)
Digit span	Average
Arithmetic	Average
(Letter-number sequencing)	Average
Processing Speed (PSI)	Low average (80–89)
Coding	Low average
Symbol search	Low average
(Cancellation)	Low average

Note. Hypothetical WAIS-IV profile for Gabriel. Composite scores are in bold and Primary Index Scales are underlined. The subtests that comprise each Primary Index Scale are listed beneath the Index. The **FSIQ** composite score is generated from scores on the subtests of Vocabulary, Similarities, Information, Block Design, Matrix Reasoning, Visual Puzzles, Digit Span, Arithmetic, Coding, and Symbol Search. The **GAI** composite is generated from scores on the subtests of Vocabulary, Similarities, Information, Block Design, Matrix Reasoning, and Visual Puzzles. The subtests in parentheses () are considered Supplemental subtests which are not included in the calculation of Primary Index Scales

Interpreting the observed WAIS-IV profile from a Wechsler Theoretical Model approach (Lichtenberger & Kaufman, 2013), we will compare Gabriel's abilities of Visual-Motor Speed (Block Design, Symbol Search, Coding), Problem Solving without Visual-Motor Speed (Matrix Reasoning, Visual Puzzles, Figure Weights, Picture Completion), and Mental Manipulation (Digit Span, Letter Number Sequencing). While a small difference, Gabriel exhibits greater Problem Solving without Visual-Motor Speed abilities in comparison to those of Visual-Motor Speed, suggesting difficulty quickly encoding and responding to visually presented information by responding motorically and that he may use verbal mediation strategies (Lichtenberger & Kaufman, 2013). His significantly better performance on measures of Mental Manipulation than Visual-Motor Speed, and to a lesser extent Problem Solving without Visual-Motor Speed, indicates a better ability to attend to auditory than visual stimuli (Lichtenberger & Kaufman, 2013).

Network-Based Interpretation of WAIS-IV As discussed in the previous section, a newer approach to WAIS interpretation is based on network structures derived from the correlations between tests representing different abilities (van Dijk et al., 2017). One such model, based on all 15 subtests of the WAIS-IV, found the verbal comprehension and processing speed indices as currently organized in the WAIS-IV to be unique and consistent factors of the overall FSIQ (van Dijk et al., 2017). However, subtests of the PRI appeared to cluster into a visual processing factor, consisting of Block Design, Visual Puzzles, and Picture Completion, and a fluid reasoning factor of Arithmetic and Figure Weights (van Dijk et al., 2017). Notably, the Matrix Reasoning subtest was not correlated with any subtests (van Dijk et al., 2017). Additionally, according to this analysis, there were no correlations between the core WMI subtests (van Dijk et al., 2017). The authors theorize that this is largely driven by Arithmetic tapping into multiple factors, while Digit Span is a consistent test of working memory (van Dijk et al., 2017). These findings mirror the organization of the WISC-V in both factor distinction (Visual Processing, Fluid Reasoning) and subtest reorganization and inclusion of subtests with greater factor relevance (Wechsler, 2014).

An edited version of Gabriel's same WAIS-IV profile, but now incorporating the network structure (with hypothesized network clusters in italics), is outlined below (see Table 15.3). Note that the subtests are grouped by network clusters that do not always align with the WAIS-IV factor structure. Thus, the cluster qualitative descriptions are based on average performance across all subtests included in the cluster and are not a true standardized score.

As can be seen from this network model profile, the interpretation of Gabriel's verbal comprehension and processing speed abilities remain the same: average and low average, respectively, as these clusters are consistent with the current WAIS-IV structure. His performance on measures assessing the working memory domain is still in the average range; however, it must be noted that using this network model, Arithmetic is no longer in this domain. Additionally, his performance on measures comprising the visual processing cluster suggests a significant weakness in this domain compared to the others. His fluid reasoning abilities appear to fall within the low average range. Despite the similarities between this profile interpretation and the first WAIS-IV interpretation, the differences provide

Table 15.3 Network model WAIS-IV profile

WAIS-IV indexes	Qualitative description
Verbal Comprehension	*Average*
Vocabulary	Average
Similarities	High average
Information	Average
(Comprehension)	High average
Visual Processing	*Below verage*
Block design	Below average
Visual puzzles	Below low average
(Picture completion)	Low average
Fluid Reasoning	*Low average*
Arithmetic	Average
(Figure weights)	Low average
Matrix Reasoning	Low average
Working Memory	*Average*
Digit span	Average
(Letter-number sequencing)	Average
Processing Speed	*Low average*
Coding	Low average
Symbol search	Low average
(Cancellation)	Low average

Note. Hypothetical WAIS-IV profile for Gabriel incorporating the structure identified by analysis of the network structure of the WAIS-IV. Composite scores are removed from this profile as the networks are based on cluster abilities and not used for calculations of composite scores. The clusters identified in the network are presented in italics. The subtests that comprise each cluster are listed beneath each. The subtests in parentheses () are considered Supplemental subtests by the WAIS-IV, but are included in estimation of cluster performance for the network model. Because the Matrix Reasoning subtest was not correlated with other subtests, and thus not in a cluster, it stands alone on the table key insights into potential underlying causes of Gabriel's variable performance. Of note, the separation of the PRI into two domains (i.e., visual processing and fluid reasoning) clarifies the nature of Gabriel's weaknesses as being largely restricted to visual-spatial difficulties. Further, the inclusion of Arithmetic into the fluid reasoning cluster, instead of the working memory cluster, provides additional evidence to suggest that visual presentation of information is impacting Gabriel's performance rather than a significant weakness in fluid reasoning abilities. As Matrix Reasoning was not found to correlate with any cluster of tests, it cannot be interpreted within the existing domains. Taken together, based on a network approach to WAIS-IV profiles, Gabriel's intellectual ability is in the average to low average range; although as noted previously, when considering his score discrepancies, a single score is likely not a valid estimation of his true ability.

Conclusion Ultimately, the decision of which intelligence test to use for a client like Gabriel carries significant interpretive implications. In this case, to better illuminate Gabriel's visual spatial (*Gv)* weakness, the inherent structure of the WISC-V was more successful. Likewise, although not validated for clinical use, it appears that similar conclusions about the profile would follow from the network model approach to the WAIS-IV. Although just a hypothetical example, one potential explanation for Gabriel's profile could be the phenomenon of right-hemisphere "crowding." The crowding hypothesis suggests that, due to an early abnormality in the left hemisphere (e.g., tumor, stroke, traumatic brain injury), the right hemisphere takes over language dominance at the expense of visuospatial processes that are typically housed on the right (Danguecan & Smith, 2019; Lidzba et al., 2006). Because Gabriel's parents do not have a comprehensive history of the first 3 years of his life, a brain insult in the left hemisphere resulting in the crowding effect cannot be eliminated. Regardless, based on the two batteries of intellectual functioning, Gabriel has the capacity to perform well in school compared to his peers but may need modifications to reduce visuo-spatial demands. Understanding an individual's strengths and weaknesses for the constructs that comprise intelligence is vital; however, this cannot be done without an understanding of the theoretical underpinnings of the assessment and what that tells you about your client.

Conclusion

An examination of the history and development of intelligence models illustrates its existence as a real, measurable construct. Intelligence has been defined through numerous theoretical and practical approaches. This chapter provided outlines of historical models (Spearman's two-factor theory, multifactor theories, Gf-Gc model, hierarchical models) to contemporary models (CHC, VPR, bi-factor, formative) with a final review of the newest approaches to understanding intelligence (bonds model, Process Overlap Theory, network models). Several principles from intelligence theories relate to practical implications in clinical practice (see Table 15.4 for a guide to the main connections made in this chapter). Intelligence instruments are built upon structural and theoretical findings. As such, it is important to understand how structural models used for interpretation have emerged and how statistical techniques can influence how cognitive abilities are represented. By understanding the development of theories of intelligence, one not only gains knowledge of how theories came to be, but also an awareness of the impacts it has on conceptualization of clinical measurements of the construct.

Table 15.4 Key principles from intelligence theories for practitioners

Principle	Practical implication
In large samples of individuals and cognitive tests, human cognitive abilities are intercorrelated	Individuals who perform well on one type of cognitive test, regardless of content, tend to perform well on others, and vice versa
Cognitive strengths and weaknesses in individuals are statistically independent of their overall intellectual level	It is important to consider overall functioning alongside strengths and weaknesses in interpreting intelligence batteries
Novel reasoning (*Gf*) and application of learned knowledge (*Gc*) represent partially dissociable skills with different trajectories within individuals over the lifespan	Mental speed and novel problem-solving skills typically decline with older age; learned skills and knowledge are largely preserved into later life
Tests of crystallized knowledge (*Gc*) are inherently culture-loaded due to their measurement of learned information. While measures of fluid reasoning are comparatively culture-reduced, performance on these measures is not entirely independent of cultural exposure	It is not possible to devise an entirely culture-free test. Thus, the impact of a client's background must be accounted for in all interpretations of test scores
The most common structural models supported by factor analysis show a hierarchical, three-stratum structure in which *g* is on the highest tier, followed by a variable number of broad and narrow abilities on the second and third tiers, respectively	Individual subtests on a cognitive instrument may represent narrow abilities, while groups of subtests contributing to an index may represent broad abilities. Each individual subtest may load differently on *g*
The factors present in models of intelligence always reflect the battery administered, and different models may provide different frameworks for representing the structure of human cognitive abilities	The "correct" model of intelligence somewhat depends upon one's goal for representing cognitive abilities
Contemporary models explain the positive manifold phenomenon through the lens of interacting cognitive and neural processes	Performance on intelligence tests represents complex cognitive and neural processes. Contemporary models may clarify how these processes differ within individuals
The theoretical foundation of intelligence measures often differs and may lead to differences in interpretation	Appropriate selection of an intelligence measure is an important consideration for accurately representing a client's cognitive abilities. An individual's cognitive abilities, strengths, and weaknesses may be differently represented using different structural or theoretical models

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Part III

Testing Methods in Clinical Child Psychology

16

Intelligence Tests

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Introduction

Assessment plays an essential role in child psychology. Broadly, assessment allows practitioners to better understand the spectrum of individual differences and establishes a common terminology for research, clinical practice, and policy applications. At the individual level, assessment informs clinical decision-making, including diagnosis and intervention planning, and serves to support eligibility criteria for many educational and public services (e.g., special education, Medicaid; Dowdy et al., 2009). Intelligence tests are commonly used to assess individuals with various developmental and neurological disorders, brain injuries, or intellectual gifts in a variety of contexts including schools, clinics, hospitals, military, and personnel selection (Dowdy et al., 2009; Jewsbury et al., 2017). Performance on intelligence tests is linked to important life outcomes such as academic achievement, years of education completed, occupational performance, income, and even health behaviors and mortality (Gottfredson & Deary, 2004; Neisser et al., 1996). Given the strong influence and predictive power of measures of intelligence, intelligence tests (often referred to as IQ tests) continue to play an important role in the field of psychology.

This chapter begins with an overview of popular individually administered IQ tests for children. The common purposes and settings in which IQ tests are used are described, as well as examples of how children's performance on IQ tests informs diagnostic and intervention decisions. Finally, we conclude with a discussion of the similarities and differences between IQ tests and other related tests that practitioners often include in assessments of children.

A discussion of IQ tests must acknowledge their history of biased and oppressive applications (Valencia, 2010). For example, IQ tests are implicated in segregation within schools and the disproportionate identification of children who are racially, ethnically, and linguistically diverse in special education (e.g., Skiba et al., 2016; Sullivan & Bal, 2013). This issue was raised in *Larry P. v. Riles* (1977). This court case influences the use of IQ tests in California schools today. The plaintiffs argued

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that Black students in the San Francisco Unified School District were overrepresented in special education classes for the "educable mentally retarded" (the current preferred term is intellectual disability) based on their performance on intelligence tests. The court ruled the tests were biased as they assumed knowledge linked to White middle-class culture, intrinsically disadvantaging Black students (Wade, 1980). Also the norming sample of the IQ test at that time included only White children, which is described in more detail below. This ruling, which still stands today, prohibits California school districts from using IQ tests to evaluate Black children for special education services. While special education determination serves as just one example, the full extent to which the measurement of intelligence has been applied in oppressive ways is outside the scope of this chapter. Still, it is important to bear in mind the historical context of intelligence tests to avoid the missteps of the past.

Overview of Popular IQ Tests

The focus of this chapter is individually administered IQ tests, in which a qualified practitioner and child meet one-on-one for a testing session. IQ tests often consist of multiple subtests, or tasks, that involve different types of questions, stimuli, and response formats which measure different cognitive abilities. There are dozens of IQ tests available today, a comprehensive review of which is beyond the scope of this chapter. Rather, this section highlights a handful of tests frequently used by practitioners (e.g., Benson et al., 2019; Rabin et al., 2016; Wright et al., 2017). A historical overview of IQ test development is presented to provide the context of frequently used IQ tests, and the most recent editions of each test are described. Additionally, nonverbal and abbreviated/brief IQ tests are briefly described. This section concludes with factors practitioners should consider when selecting the most appropriate tests for the children they test.

First Practical IQ Test and the Stanford-Binet

Alfred Binet is often viewed as the creator of the modern IQ test. Binet was a French psychologist who was tasked with developing a test to distinguish between children who were typically developing and children who were developmentally delayed. In 1905, Binet and psychiatrist Theodore Simon created the Binet-Simon Intelligence Scale for children. Their test was intended to be an objective measure to identify children who needed special school services rather than subjective and potentially biased family and teacher reports (Siegler, 1992). The Binet-Simon Intelligence scale included tasks that measured children's language, memory, judgment, reasoning, and social comprehension. The test was revised in 1908 and performance on all the subtests formed a single composite score, or a combined summary score of multiple data points, of the child's estimated intellectual level or mental age. The *mental age score* created a meaningful metric and indicated the highest age level at which the child answered most subtest items correctly. For example, the mental age score for a 10-year-old who scored equal to the average 13-year-old is 13, which is 3 years higher than the child's chronological age (Boake, 2002).

Henry Herbert Goddard, the research director at the Training School at Vineland for children with cognitive disabilities, was the first to bring the Binet-Simon scale to America. He translated the test into English and in 1908 he published "The Binet and Simon Tests of Intellectual Capacity" (Benjamin, 2009). Goddard encouraged the use of the test by a wide range of practitioners in a variety of settings, including American physicians, professionals within public schools, and professionals at Ellis Island who tested individuals who immigrated to America (Benjamin, 2009). Other versions of the Binet-

Simon Intelligence Scale closely followed. In 1916, Lewis Terman, a psychology professor at Stanford University, translated the French Binet-Simon scale and adapted the test to align with American culture, naming it the Stanford-Binet. The Stanford-Binet included new subtests, extended the age range into adulthood, and Terman replaced the mental age composite score with the *intelligence quotient*, or IQ. Historically, the intelligence quotient was calculated by dividing a person's mental age by their chronological age and multiplying by 100. Notably, the creator of the intelligence quotient William Stern cautioned against equating this single score with a person's worth (Kaufman et al., 2019).

Terman's Stanford-Binet test and subsequent revisions became the dominant IQ tests in America for several decades (Boake, 2002; Kaufman, 2009). The Stanford-Binet was first revised in 1937, and Terman collected *norm or standardized samples* that were described as more representative of the general population. Norms or standardized samples are large samples of individuals who complete a test and serve as the basis of comparison for the test scores of people who take the test. These normative comparisons are the basis of IQ tests and allow practitioners to determine whether the individuals they test perform similarly to their same-aged peers, that is within the average range for their age, or significantly below or above average. Terman used parents' occupations to select children to include in his norm sample. He matched the proportions of various occupations documented in the US census data to his sample, and thus included children from a variety of socioeconomic backgrounds (Boakes, 2002). Yet this focus on representativeness did not extend to race and ethnicity; only White children were included in the norming samples of the Stanford-Binet editions until 1972 (Graves & Aston, 2016). Now the norm samples of IQ tests are designed to match the diversity of the current US population. Modern IQ tests include the child's race, ethnicity, sex, and geographic region and their parents' educational level, often as a proxy of socioeconomic status, to design their norm samples. Proportions of individuals from each demographic category are matched to the percentages documented in the recent US Census data. The representativeness of test norm samples continues to be an important criterion for practitioners when they select tests (AERA, APA, NCME, 2014).

Early on, the Binet-Simon scale and Stanford-Binet were criticized for a heavy reliance on language-based measures which were not appropriate for individuals with limited English proficiency, such as individuals who were immigrants, were deaf or hard of hearing, or had little or no formal schooling. In response, physicians, psychiatrists, and psychologists (many of whom worked at Ellis Island) developed "*performance tests*" intended to remove the language demands and measure visual rather than verbal reasoning with the manipulation of picture boards, puzzles, or blocks (Boake, 2002). The early focus on language-reduced performance tests shaped the development of subsequent IQ tests and continues to be of strong interest today.

The most recent, fifth edition of the Stanford-Binet (SB-5) includes an equal balance of verbal and nonverbal content. The SB-5 measures children's general intelligence, verbal, fluid reasoning, quantitative reasoning, visual-spatial, and working memory abilities (see Table 16.1 for definitions of these cognitive abilities). The SB-5 covers a wide age range from 2 to 85 and above and continues the test's tradition of including toys and manipulatives to engage young children (Becker, 2003). The SB-5 norm samples were collected in 2001–2002 (Roid, 2003). Best practice suggests practitioners should use IQ tests whose norms were collected within the past 10 years (Kranzler & Floyd, 2020) due to a phenomenon known as the *Flynn Effect* (Flynn, 1987). James Flynn documented a tendency for IQ test scores to increase over time when old norms were used, approximately 3 points per decade. This means outdated test norms are problematic as they can result in inflated IQ scores (e.g., Kanaya et al., 2003). For example, if a child earned an IQ score of 70 on a test with norms collected 20 years prior, it is likely the child's adjusted IQ score is six points lower, 64. While the Flynn Effect is a well-documented phenomenon, some evidence suggests the Flynn Effect is declining or may be ending over time (Pietschnig & Voracek, 2015; Dutton et al., 2016).

Table 16.1 Definitions of cognitive abilities in the Cattell-Horn-Carroll (CHC) theory of intelligence and descriptions of typical subtests

Cattell-Horn-Carroll abilities	Description
General intelligence (*g*)	"General mental ability for reasoning, problem solving, learning." (Colom et al., 2010, p. 489) On IQ tests *g* is measured by a total or overall composite score measured by subtests measuring several cognitive abilities
Fluid reasoning (Gf)	The ability to problem-solve with unfamiliar information or novel procedures that cannot be performed automatically. In some studies, Gf and *g* significantly overlap and are statistically indistinguishable (Caemmerer et al., 2020). Quantitative abilities are subsumed within fluid reasoning Gf subtests often involve detecting and completing patterns using visual or numerical information and analyzing such information to complete puzzles
Verbal comprehension-knowledge (Gc)	The breadth and depth of cultural knowledge including language and information learned inside and outside of school. Sometimes referred to as crystallized intelligence Gc subtests often include vocabulary tasks, describing similarities and differences between words, and general information questions
Visual-spatial processing (Gv)	The ability to perceive, transform, discriminate visual information and identify patterns and mentally rotate images Gv subtests often involve mental rotations of visual stimuli, reproducing images using manipulatives or by copying images with pencil and paper, and identifying similar images from distractors
Auditory processing (Ga)	The ability to perceive, discriminate, and manipulate meaningful sounds, which includes phonological coding Ga subtests are not included on most IQ tests, but they typically involve segmenting, blending, and manipulating small units of sound (phonemes)
Working memory (Gwm/Gsm)	The ability to apprehend and maintain awareness of a limited amount of information and manipulate it Gwm subtests often involve retaining and manipulating series of numbers, words, or both, which increase in length and are presented verbally or visually
Long-term storage and retrieval (Glr)	The ability to store and consolidate new information in long-term memory (Gl) and fluently retrieve the information later (Gr) Schneider and McGrew (2018) recently argued Glr may be better represented as two separate abilities (Gl and Gr). Glr subtests often involve teaching the child associations between images and words and requiring them to recall those associations, sometimes after a delay
Processing speed (Gs)	The ability to automatically and fluently perform simple or overlearned cognitive tasks, especially when a high degree of focused attention is required Gs subtests often involve simple scanning, matching, copying, or naming tasks which are timed and require both speed and accuracy

Note. Broad ability definitions are adapted from Schneider and McGrew (2018)

Wechsler Tests

Starting in the 1960s, Stanford-Binet's dominance was replaced by the Wechsler IQ tests, which continue to be the most popular IQ tests today (Rabin et al., 2016; Benson et al., 2019; Wright et al., 2017). David Wechsler's perspective on IQ tests was informed by his experience testing Army recruits during World War I to determine if they were fit for service (Boakes, 2002; Kaufman, 2009). The United States' Army testing program played an important role in the growth of IQ testing; more than 1.7 million recruits completed IQ tests between 1917 and 1919 (Yerkes, 1921). The Army used different tests to assess groups of literate English speakers (Alpha test) and recruits who were illiterate or non-English speakers (Beta test). Wechsler valued both verbal and performance tests, and the two Army tests and the Stanford-Binet inspired many of the subtests on his first test, the Wechsler-Bellevue Intelligence Scale. Wechsler self-published his first test in 1939 while he was the chief psychologist at Bellevue Psychiatric Hospital. He collected the test norms himself and gathered data on White children, adolescents, and adults between the ages of 10 and 59 in Brooklyn, NY (Boakes, 2002; Kaufman, 2009). Norming samples continued to include White children exclusively until the 1970s, when they began to better reflect the racial and ethnic diversity of the United States (Graves & Aston, 2016). In addition to more representative norms, IQ test publishers now routinely statistically test items for bias and publishers and researchers test whether IQ tests measure similar cognitive constructs across various demographic groups.

Wechsler was an innovator in his development of IQ tests. He replaced the intelligence quotient score approach with a *standard score that has a mean of 100 and standard deviation of 15* (Kaufman, 2009). These same standard scores continue to be used in IQ tests today. Another of Wechsler's major contributions to the field of IQ testing was to create a single test which produced separate verbal, performance, and overall composite scores (also known as the full-scale IQ score) derived from an individual's performance on 10–12 subtests. Multiple composite scores were appealing to clinicians who wanted to gather a richer breadth of information from testing when most other prevailing tests, including the Stanford-Binet, continued to only offer one overall IQ score (Kaufman, 2009). Practitioners interpreted the strengths and weaknesses across the individual's multiple composite and subtest scores to inform diagnostic and treatment decisions. This approach, known as profile analysis, continues to be used today, but has its critics, which note reliability concerns (McGill et al., 2018).

The Wechsler-Bellevue was a test designed for assessing children and adults, but in the decade following the test's publication, Wechsler created three separate tests targeted at narrower age ranges. The Wechsler Intelligence Scale for Children (WISC; Wechsler, 1949) was appropriate for 6- to 16-year-olds, the Wechsler Adult Intelligence Scale (WAIS; Wechsler, 1955) was appropriate for 16-year-olds through adulthood, and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI; Wechsler, 1967) introduced some new tasks appropriate for young children aged 2.5–6 years old. Later editions of the Wechsler tests primarily consisted of the original Wechsler-Bellevue subtests, but in the 1990s novel tasks were also added (Kaufman, 2009).

The most recent editions of the child-focused tests are the Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V), and the Wechsler Preschool and Primary Scale of Intelligence, Fourth Edition (WPPSI-IV). The WISC-V is appropriate for children ages 6–16 years old and measures overall intelligence, verbal, fluid reasoning, visual-spatial, working memory, and processing speed abilities (Wechsler, 2014). A Spanish version of the WISC-V is available for Spanish-speaking children and includes a separate norming sample of children whose primary language is Spanish (Wechsler, 2017). The WPPSI-IV measures slightly different abilities depending on the age of the child. Overall intelligence, verbal, working memory, and visual-spatial abilities can be measured for children aged 2.5–3 years old. In addition to these cognitive abilities, processing speed and fluid reasoning can be measured in children from ages 4 to 7 years and 7 months (see Table 16.1; Wechsler, 2012). The most recent fourth edition of the Wechsler Adult Intelligence Scale (WAIS-IV; Wechsler, 2008) is designed for adolescents and adults ages 16–90 and measures similar cognitive abilities. Although Wechsler died in 1981, he continues to be listed as the sole author of the revisions of his widely popular tests (Kaufman, 2009).

Woodcock-Johnson Tests

In 1977, Richard Woodcock published the Woodcock-Johnson Psycho-Educational Battery (WJ). Woodcock's goal was to create a practical test that included many novel subtests which addressed psychologist's, special educator's, and teachers' concerns about students' learning (Shinn et al., 1977). The WJ consisted of 27 subtests which measured cognitive abilities, academic achievement, and students' interests. The WJ was the first IQ test to be co-normed with an achievement test, which included reading, mathematics, writing, and other academic subtests. Part one of the WJ, the Cognitive battery, included 12 subtests which measured verbal knowledge, visual-spatial, fluid reasoning, memory, auditory processing, and quantitative abilities (Shinn et al., 1977). The 1989 Woodcock-Johnson-Revised (WJ-R) test was divided into the Tests of Cognitive Ability (WJ-R Cog) and Tests of Achievement (WJ-R ACH; Woodcock, 1990). Unlike its predecessor, the WJ-R Cog was guided by theory, specifically Cattell and Horn's Gf-Gc theory (fluid and crystallized intelligence, see theories of intelligence chapter). In addition to fluid and crystallized intelligence, the WJ-R also measured short-term/working memory, long-term retrieval, processing speed, auditory processing, and visual processing abilities. The test provided composite scores for seven broad cognitive abilities plus an overall IQ composite score (Woodcock, 1990). The breadth of cognitive abilities measured by the Woodcock-Johnson test distinguishes the test from others (Reynolds & Niileksela, 2015).

The most recent WJ fourth edition, the WJ IV Tests of Cognitive Abilities (WJ IV Cog), is based on the Cattell-Horn-Carroll (CHC) theory, which now guides the development of most popular IQ tests currently in use (Keith & Reynolds, 2010). The WJ IV Cog is appropriate for a broad age range from ages 2 to 90 and older and measures more CHC-based broad cognitive abilities than any other IQ test. The WJ IV Cog measures overall intelligence and the seven broad cognitive abilities listed above. A parallel Spanish form of the test, the Batería IV Woodcock-Muñoz, is also available for a broad age range of Spanish speakers (Woodcock et al., 2019).

Kaufman Assessment Battery for Children

Alan Kaufman's experiences with IQ test development began in the 1970s when he assisted David Wechsler with the revision of the WISC (WISC-R; Kaufman, 2009). Approximately a decade later, Alan and his wife Nadeen Kaufman developed the Kaufman Assessment Battery for Children (K-ABC, 1983). The Kaufmans' goals included the development of a test based on neuropsychological and cognitive psychology theories, the introduction of new IQ tasks/subtests, the reduction of IQ score mean differences between White and Black children, and the introduction of unscored teaching items at the beginning of subtests to ensure children understood the task directions prior to the completion of scored items (Kaufman, 2009). The Kaufman Assessment Battery for Children is now in its second edition, with a recent normative update in 2018 (KABC-II NU). The KABC-II NU measures overall intelligence, verbal, fluid reasoning, visual-spatial, working memory, and long-term retrieval abilities. The KABC-II includes test directions and scoring guidelines in Spanish (Kaufman & Kaufman, 2018). The KABC-II can produce two global or overall IQ scores, one that includes the influence of subtests that measure verbal abilities (Gc) such as vocabulary and verbal reasoning and one that excludes verbal subtests.

Differential Ability Scales

Colin Elliot, a British school psychologist, published the Differential Ability Scales in 1990 with the intention of measuring children's "ability" which the authors deemed to be a "specific and narrower domain of human cognition" than intelligence (Gordon & Elliott, 2001, p. 66). Other distinguishing goals of the Differential Ability Scales were to create a more engaging test for young children and to allow test users to administer subtests that better matched the child's ability level regardless of their age. This flexible subtest administration approach is useful when assessing young children and those with lower abilities (Elliott, 2007). The most recent second edition, DAS-II, was published in 2007 (the norming sample was collected in 2005) and assesses children 2.5–17 years of age. The DAS-II assesses general intelligence, verbal, visual-spatial, fluid reasoning (for 2.5–3.5-year-olds visual-spatial and fluid reasoning are combined), and optional working memory and processing speed composite scores are available. Additionally, there are Spanish and American Sign Language instructions for nonverbal subtests.

Reynolds Intellectual Assessment Scales

Two of Alan Kaufman's former doctoral students, Cecil Reynolds and Randy Kamphaus, developed the Reynolds Intellectual Assessment Scales in 2003 (RIAS). The Reynolds Intellectual Assessment Scales was intended to minimize test administration time by requiring only four subtests to produce three composite scores, the overall general intelligence (*g*), verbal abilities (Gc), and fluid reasoning (Gf) scores subtests (Reynolds & Kamphaus, 2015). The typical administration time is 25 minutes for the four subtests that compose the general intelligence score. The RIAS was intended to reduce dependence on motor coordination, visual motor speed, and reading ability in the measurement of intelligence. The most recent second edition (RIAS-2), published in 2015, is designed for ages 3–94 and includes optional memory and processing speed composite scores. The RIAS-2 allows the child to provide Spanish responses on the verbal subtests (Reynolds & Kamphaus, 2015).

Brief or Abbreviated IQ Tests

IQ tests require substantial time to administer and score and are often time intensive for both the examiner and examinee. The typical administration time for comprehensive IQ tests often exceeds one hour. Brief or abbreviated IQ tests were created to reduce administration time as they consist of fewer subtests and/or items and are thus brief in coverage of skills and in administration time (Homack & Reynolds, 2007). Typical administration time for abbreviated IQ tests ranges from approximately 20 to 30 minutes, which reduces the burden on examiners and examinees.

Two of the most popular abbreviated IQ tests are derived from their well-established full-length counterparts: the Wechsler Abbreviated Scale of Intelligence, Second Edition (WASI-II; ages 6–90; Wechsler, 2011), and the Kaufman Brief Intelligence Test, Second Edition (KBIT-2; ages 4–90; Kaufman & Kaufman, 2004). In addition, the WJ IV Tests of Cognitive Abilities (WJ IV Cog; ages 2 to 90+; Schrank et al., 2014) have an option to compute a total IQ score based on three subtests instead of seven, the Brief Intellectual Ability Composite. The subtests in these abbreviated measures are primarily measures of fluid reasoning (Gf) and crystallized intelligence (or verbal comprehension-knowledge, Gc) and were chosen because the subtests have the strongest relation with general intelligence (*g*). The ultimate goal of an abbreviated or brief IQ test is to offer a similar estimate of general intelligence as a full-length test (Pierson et al., 2012).

Brief or abbreviated tests tend to be less sensitive and specific than longer forms. They are not as accurate at identifying those who do or do not meet specific diagnostic criteria (Homack & Reynolds, 2007). As such, abbreviated or brief tests cannot serve as a substitute for comprehensive tests and should not be used as a diagnostic tool or in high-stakes decision making (McCrimmon & Smith, 2013). Abbreviated IQ tests may be most useful when intelligence is not the primary concern or reason for the evaluation (Bain & Jaspers, 2004), or to screen for, or rule out, intelligence as a contributing factor to a child's presenting concerns. Examples include cases primarily focused on behavioral and emotional concerns or in settings such as hospitals, residential treatment centers, juvenile detention centers, or research labs where the primary focus is not cognitive or education-focused. In such cases, a global or overall estimate of intelligence may suffice to select developmentally and cognitively appropriate interventions and placements.

Nonverbal IQ Tests

Since the development of the first IQ test, test users have been concerned about the high language demands of the tests. Tests which rely heavily on the use of language may underestimate the abilities of individuals who are not proficient in the dominant language, either because they are primarily speakers of another language or their exposure to the language was inadequate due to environmental circumstances. In response, performance tests were created and used in assessments at Ellis Island and in the military during World War I. The first nonverbal IQ test was created by John C. Raven in 1936, the Raven's Progressive Matrices (Mun et al., 2020). Children do not use language to respond to nonverbal IQ tests, instead they point, manipulate objects, or gesture. Most nonverbal IQ tests are considered language-reduced because simplified language is used to provide test directions. Those that are administered completely without language require examiners to use gestures and facial expressions instead. Thus, expressive language is not required for all nonverbal IQ tests, and receptive language demands are diminished for language-reduced nonverbal IQ tests or not required for nonverbal IQ tests without verbal instructions (Drevon et al., 2017). Even when language is completely removed from the directions and responses of the test, the child likely uses internal verbal problem solving to respond to the items. This may mean the child's nonverbal scores are influenced by language, which could influence whether the scores are an accurate representation of their abilities (Braden, 2000).

In addition to minimizing the influence of language, practitioners also use nonverbal IQ tests to reduce the influence of cultural knowledge on individuals' test scores. Thus, nonverbal IQ tests are appropriate for any individuals whose test scores may be influenced by constructs that are irrelevant to the measurement of their intelligence or cognitive ability (this concept is referred to as *construct irrelevant variance*). Practitioners may select nonverbal IQ tests for a child who has not yet developed English proficiency or whose first language is not English, immigrated to the United States from another country, is deaf or hard-of-hearing, has a speech and language disorder, has selective mutism, experienced neurological damage, or is culturally and linguistically diverse (Bracken & McCallum, 2016). Two popular nonverbal IQ tests are the third edition of the Leiter (Leiter-3; ages 3 to 75+; Roid et al., 2013) and the Universal Nonverbal Intelligence Test Second Edition (UNIT-2; ages 3–21; Bracken & McCallum, 2016). Both tests remove language completely from the test administration and are considered multidimensional nonverbal tests because they measure other cognitive abilities in addition to general intelligence such as fluid reasoning, visual spatial, memory, and processing speed (Kranzler & Floyd, 2020).

A popular language-reduced, unidimensional nonverbal intelligence test is the Raven's 2 Progressive Matrices (Raven et al., 2018). The Raven's 2 includes simple oral directions, but the examinee responds nonverbally. The Raven's 2 includes a single subtest of geometric patterns, is primarily considered a measure of fluid reasoning, and produces one general intelligence composite score. The Raven's 2 can be used with a broad age range, ages 4–90 years old, and is used in practice as well as research studies. Practitioners can administer the Raven's 2 one-on-one or with groups, and a digital administration option can be completed via an online platform.

Technological Advances

Practitioners have traditionally administered IQ tests in a paper-and-pencil format, but technological advances are beginning to shift the testing experience for examiners and the children they test. In the traditional assessment formats, practitioners record and score children's responses on a paper record form, and children are required to respond to paper stimuli books or other tangible objects. Technology-based testing options are increasing in popularity, however, and some of the tests described earlier are available in both traditional and computer-assisted formats. Technology-based testing is often facilitated by tablets or computers which display stimuli and record and score responses automatically (e.g., Q-Interactive by Pearson Assessments, https://qiactive.com/; NIH Toolbox, http://www.nihtoolbox.org/). Potential advantages of these computer-assisted tests are efficiency, increased administration and scoring accuracy, and reduced administration times (Young et al., 2021). Researchers are currently exploring equivalency and validity issues related to traditional and computer-assisted assessments. A particularly innovative IQ test, the International Cognitive Ability Resource (iCAR), is publicly available, untimed, and self-proctored, and examinees aged 14 and older can complete the iCAR online in their own homes (Condon & Revelle, 2014; see https://icar-project.com/ for more details). However, in its current form, the ICAR is only suitable as a research tool and is not to be used in clinical settings or decision-making contexts.

Conclusion

Across different IQ tests, similar, but not identical, tasks are used to measure different cognitive abilities (see Table 16.1). Often subtest items are arranged hierarchically with the easiest items presented first and the most difficult items presented last. Some IQ tests incorporate manipulatives into subtests such as blocks, cards, or other familiar objects, which are often believed to be more engaging for young children, whereas other IQ tests do not use such materials (i.e., the Woodcock-Johnson Tests of Cognitive Abilities and the Reynolds Intellectual Assessment Scales). Despite differences in subtest demands, stimuli, and response formats, research studies suggest that the underlying cognitive abilities measured by several different IQ tests are similar (Caemmerer et al., 2020). However, if a child is given two or more IQ tests, the child's scores will not be identical across tests due to measurement error (Floyd et al., 2005).

The IQ test overview section described many of the IQ tests practitioners most frequently used with children (Benson et al., 2019; Rabin et al., 2016; Wright et al., 2017), but this overview is not exhaustive and many other IQ tests are available. When determining which IQ test is appropriate for a child, practitioners must consider multiple factors. Test selection involves psychometric, theoretical, practical, and clinical preference considerations. Test users are responsible for carefully reviewing evidence of reliability and validity of test scores, standardization/norming sample characteristics, and the alignment of each with the characteristics of the populations the practitioner tests (AERA, APA, NCME, 2014). Often test publishers report this detailed psychometric information in technical manuals which test users must carefully review to facilitate test selection. Practitioners may also consider theories of intelligence and how they align with the IQ tests, the typical administration time required for the test, the match between the language of the test and the child, and the cost of test materials. The inventory of tests at the assessment setting may influence test selection as many practitioners are limited to a small number of choices as IQ tests are expensive. Typical assessment settings in which IQ tests are used with children will be discussed further in the next section.

Current Uses of IQ Tests with Children

Qualified Test Users

Most IQ tests are standardized and individually administered, or one-on-one, tests. Standardized tests are administered according to strict instructions such that, to the extent possible, every examinee experiences the test in the same way. "Standardized tests present the same or very similar test materials to all test takers, maintain close adherence to stipulated procedures for test administration, and employ prescribed scoring rules that can be applied with a high degree of consistency" (AERA, APA, NCME, 2014, p. 35). Because IQ tests are norm-referenced, careful adherence to the standardized administration conditions allows a child's performance on the test to be compared to a norm group of same-aged peers. This comparison provides information about the child's relative standing in comparison to peers, whether the child's performance is similar to peers (and considered within the average range) or higher or lower than others their age. Deviations from standardized administration conditions potentially introduce variability into the child's performance and can invalidate test scores.

Given the importance of accurate administration and scoring, IQ tests must be administered, scored, and interpreted by highly trained qualified examiners. Definitions of qualified examiners vary across IQ test publishers, professional associations, and state psychological boards. Some states further differentiate between those eligible to administer a test from those who can interpret the results. Across definitions, qualifications consistently include an examiner whose training included supervised experiential learning and education in psychometric principles, and the examiner must thoroughly review the examiner manual. Three professional organizations—the American Educational Research Association (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME)—jointly released *The Standards for Educational and Psychological Testing* (2014) to promote sound psychological testing standards. The fourth edition describes the ideal examiner as a professional with graduate-level training and supervised experience in measurement and assessment. In addition, the examiner is responsible for selecting the most appropriate test based on test taker characteristics, possessing the knowledge and skills necessary to accurately interpret results, and aligning the intended use of the test with the abilities measured.

Diagnostic Use

Qualified practitioners who serve children frequently administer IQ tests in schools, community clinics, private practices, medical settings, residential treatment centers, juvenile justice settings, and any other child-focused setting. Across settings, IQ test results may be used to inform diagnostic decision making and determine eligibility for services and specific placements. It is important to note that in most cases IQ tests are intended to be used as just one source of information and not the sole criteria for important decision-making processes. Across psychological assessment applications, comprehensive multimethod, multi-setting, multisources evaluations are deemed best practice, and thus IQ tests should be just one tool used to inform clinical decisions (Sattler, 2018; De Los Reyes et al., 2015).

Educational Purposes

Today, intelligence tests are used by practitioners inside and outside schools to determine a child's eligibility for specialized services, accommodations, and placements. Their use is related to decades of federal special education legislation, now known as the Individuals with Disabilities Education Improvement Act (IDEA, 2004). Within special education programming, IQ tests are primarily used to identify children with specific learning disabilities and intellectual disabilities. Beyond special education, IQ test results are often used to identify children who are considered gifted and talented. IQ tests may also be used to provide accommodations and support services in schools through a section 504 plan; such plans improve children's access to the general education environment (Russo et al., 1998). Medical or psychological diagnoses, such as Attention Deficit Hyperactivity Disorder, may warrant a section 504 plan.

Within schools, children with specific learning disabilities constitute the largest group of students receiving special education services, approximately one-third (Hussar et al., 2020). Definitions of learning disabilities or disorders vary but are often described as important in a learning domain such as reading, writing, speaking, and performing mathematical calculations that is due to a neurodevelopmental disorder which persists despite adequate academic instruction (IDEA, 2004; American Psychiatric Association (APA), 2013). Traditionally, IQ tests were an integral component of evaluations for specific learning disabilities. The oldest learning disability identification model required a significant discrepancy between a child's IQ test scores and their standardized academic achievement test scores (known as the ability-achievement discrepancy model). Some contemporary models continue to incorporate IQ test performance and examine students' performance on IQ, academic achievement, and neuropsychological tests for patterns of intraindividual strengths and weaknesses that may explain students' learning difficulties. Another contemporary model, response to intervention model, does not use IQ tests and instead emphasizes progress data based on a child's response to scientific, research-based instruction (Maki et al., 2015). While IQ tests' current role in the identification of learning disabilities remains controversial and there is no single accepted approach to the identification of learning disabilities (Grigorenko et al., 2019), IQ tests are currently a required tool to determine if a child meets criteria for an intellectual disability.

Intellectual disability diagnostic criteria require significantly below average intellectual functioning and adaptive behavior (everyday behaviors expected by society across living settings; Schalock et al., 2010) when compared to age-, gender-, and socioculturally similar peers (American Psychiatric Association (APA), 2013; 34 CFR §300.8(c)(6)). IQ test scores two or more standard deviations below the mean score of 100 are generally considered significantly below average and consistent with intellectual disability criteria (McNicholas et al., 2017). This translates to a standard IQ score of 70 or below, which is located in the left tail of the normal distribution and is lower than more than 97% of the population (see Fig. 16.1 for a visual representation of the IQ test score distribution). Similarly, children who are identified as gifted often have IQ scores in the other tail of the normal distribution. Giftedness describes students who excel in intellectual, creative, artistic, or other specific learning domains (20 U.S.C. Section 7801(22)). IQ tests have consistently informed giftedness definitions and access to advanced educational programming. Most often, the criterion for giftedness involves an IQ score 1.5–2 standard deviations above the mean score (i.e., IQ score ≥120 and above) and higher than nearly 95% of their peers. Although IQ scores in this range are as infrequent as those in the intellectual disability criterion range, gifted educational services are not legally protected (McClain & Pfeiffer, 2012). Some experts recommend practitioners specifically use nonverbal IQ tests to increase the representation of culturally and linguistically diverse students in gifted and talented programs, but current research evidence is mixed (Mun et al., 2020). Children who are gifted are more likely to have areas of weakness overlooked in the school setting such as learning, attention, and social behaviors. These students are often labeled *twice-exceptional* (2E; Foley Nicpon et al., 2011; Reis et al., 2014).

It is important to note that IQ test scores are imperfect measures of a person's true cognitive ability and include measurement error, just as all test scores do (AERA, APA, NCME, 2014). Therefore, some experts encourage practitioners to consider the confidence interval of a test score when making high-stakes decisions that rely on strict cut-off scores, such as those used for giftedness and intellectual disabilities (Kranzler & Floyd, 2020). A confidence interval is a range of scores that contain the individual's hypothetical true score with a specific degree of confidence. For example, let's assume a child's IQ score is 73 and the 95% confidence interval is 68–76. When interpreting the confidence interval, a practitioner would indicate there is a 95% chance that the child's true score is somewhere between 68 and 76. Thus, the child may meet one criterion for an intellectual disability, and their level of adaptive functioning would also be examined.

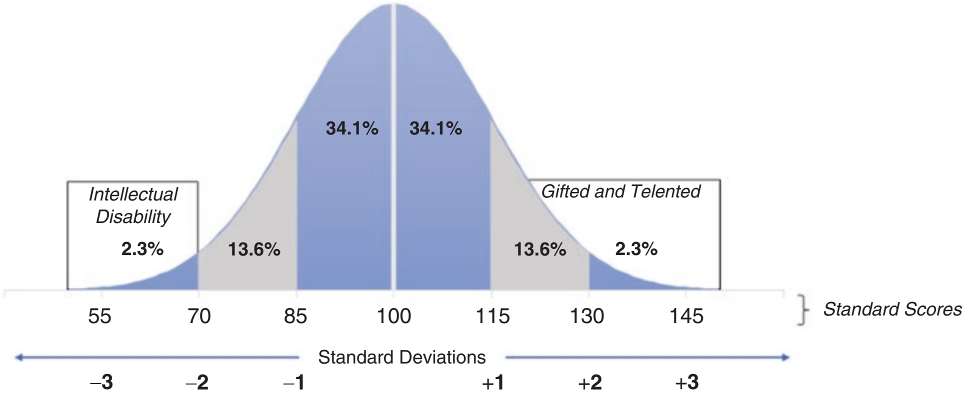

Fig. 16.1 Normal distribution of IQ test standard scores

This figure displays the ranges of IQ test standard scores and the accompanying proportions of people in the population whose scores are within those ranges. Approximately 68% of people will earn scores between 85 and 115 (one standard deviation below (−1) and above (+1) the mean of 100). Approximately 95% of people will earn scores between 70 and 130 (two standard deviations below (−2) and above (+2) the mean score). And approximately 99% of people will earn scores between 55 and 145 (three standard deviations below (−3) and above (+3) the mean score). The further a person's score is from the mean of 100, the less often the score is observed in the population. When practitioners communicate IQ test scores to others, they often use qualitative labels to describe whether a score is considered average, below, or above average, or very high or low. Often scores between 90 and 109 or 85 and 115 are considered within the average range. There is no universal set of qualitative labels, however, and practitioners and test publishers apply these labels inconsistently (Lichtenstein, 2020).

Case Study: Example of IQ Test Results Used for Educational Purposes

Abby is a 9-year-old girl in the fourth grade. Abby's parents described her as precocious, strong-willed, and sometimes difficult when she was young. They remember being surprised at how quickly she acquired language when she first started speaking. She was easily naming colors, numbers, and shapes around 2 years old and started reading when she was four. However, Abby was known to tantrum and pout when she did not get her way. As she got older, she continued to have difficulty moving on when she felt things were unfair. Abby liked school and did well academically, though teachers noted she often raced through her work and began to distract other children when she finished. There were also concerns for "talking back" to teachers. Abby was interested in playing with other children her age, but sometimes had difficulty maintaining friendships, and often seemed more comfortable talking to adults.

Abby's parents were concerned about her socially and behaviorally at school and worried she may have attention or social/emotional problems. They brought her to a psychologist for an assessment who administered a psychoeducational battery of several assessments. Abby's IQ score was two standard deviations above other children her age (i.e., IQ test score was 130), and her scores on other tests were similarly high. The results of this evaluation were used to help place Abby in a gifted and talented program. When Abby was appropriately challenged, her distracting behaviors in the classroom decreased. She also had the opportunity to meet other children with similar interests and was able to make several new friends.

IQ Tests and Intervention Design Children's IQ test results are widely used for educational diagnostic and placement decisions. Critics of the use of IQ tests in education argue, however, that IQ test results are not useful for classroom instructional planning or the design of interventions (Hilliard, 1994). Aptitude-treatment interactions test whether the effectiveness of instruction depends on, or is moderated by, a child's cognitive abilities, which are often measured by IQ tests (Kearns & Fuchs, 2013). For example, if a child has weak working memory abilities (i.e., the ability to hold information in one's mind and manipulate it) implementation of a working memory intervention may be expected to enhance the child's academic performance. Current research findings suggest the effects of working memory training programs do not often generalize to real-world skills and studies do not support consistent aptitude-treatment interactions (Kearns & Fuchs, 2013; Melby-Lervåg & Hulme, 2013). Thus, IQ test results may not be useful for intervention design and current evidence does not support this purpose.

Healthcare Purposes

IQ tests are often used within healthcare settings for individuals with neurodevelopmental disorders as well as acquired neurological deficits. IQ tests are generally used within the context of a larger neuropsychological battery which aims to measure a comprehensive range of aspects of brain functioning, such as cognitive, motor, language, visual-perceptual, memory, attention, and executive functions.

Intelligence tests are often administered as part of a neurodevelopmental battery for children with neuropathology identified prenatally, at birth, or in early development. Neurodevelopmental concerns may result from a range of perinatal complications (e.g., prematurity, low birth weight, hypoxia, perinatal strokes), congenital problems (e.g., spina bifida, cerebral palsy), or genetic conditions (e.g., Down or Fragile X syndromes). For these children, intelligence estimates can provide a useful "snapshot" of their global cognitive functioning that is influenced by multiple genetic, biological, cognitive, and experiential factors (Dennis et al., 2009). Intelligence tests are important in these populations due to the frequency of comorbid intellectual disabilities (Lee et al., 2019). Early neurodevelopmental screening and monitoring is recommended for all children, especially those at an increased risk due to a medical condition (Centers for Disease Control and Prevention [CDC], 2021).

Generally, early childhood screenings consist of developmental tests that evaluate broad foundational abilities such as cognitive, gross and fine motor, social-emotional, adaptive, and emerging receptive and expressive language skills. Experts debate whether fewer cognitive abilities are measured by IQ tests in toddlers and preschoolers, referred to as less differentiation of cognitive abilities (Tideman & Gustafsson, 2004; Potvin et al., 2015). IQ is thought to become more stable at approximately age six (Deary, 2014), but some evidence suggests IQ scores in infants can moderately predict later measures of general intelligence and academic outcomes (Fagan et al., 2007; Yu et al., 2018). In applied practice, early IQ scores can identify children at risk for cognitive weaknesses and facilitate early intervention services for children classified with a developmental delay.

IQ tests are also used to assess and monitor individuals with acquired brain dysfunction, which are injuries and insults to the brain, like traumatic brain injuries (TBI) or toxicities, or neuropathologies like epilepsy or cancer. For example, for children with pediatric brain cancer, tumor growth and the associated treatments can impact cognitive functioning over time. Radiation therapy and chemotherapy have repeatedly been shown to cause declines in IQ scores for years after the completion of treatment (Baade et al., 2010). As such, regular monitoring of neurocognitive functioning of patients over time is recommended to help inform intervention and treatment.

At a broad healthcare level, IQ tests contributed to public health policy changes which have improved health indicators for society (Kaufman 2009). IQ tests helped to expose the harmful effects of environmental toxins, such as lead, on child development. High levels of lead exposure have been linked to low high school academic achievement (Fergusson et al., 1997) and comorbidity with ADHD (Braun et al., 2006). The inverse relationship between lead exposure and IQ has consistently informed the Center for Disease Control's acceptable exposure thresholds (Canfield et al. 2004; Surkan et al. 2007).

Case Study: Example of IQ Test Results Used for Healthcare Purposes

Michael is a 5-year-old boy with a history of epilepsy. He began to have seizures in infancy, which were determined to be arising from his left temporal-parietal networks. Michael trialed several antiepileptic medications before finding one that worked about 2 years ago, and his seizures are now well controlled. Michael was slow to meet his developmental milestones and was not speaking in phrases until he was 3 years old. Michael's teachers noted he was struggling when he started kindergarten. He was not learning his numbers and letters as quickly as the other children and needed to be retaught many times. He also had much more difficulty staying in his seat and following instructions compared to other children. His parents also noticed some of these difficulties at home; Michael was always on the go and constantly moving from one task to another. They expressed concerns to Michael's neurologist who referred him for a comprehensive neuropsychological evaluation.

Michael's neuropsychologists administered a comprehensive battery of tests including IQ, language, visual-spatial, motor, memory, attention, executive functioning, and academic measures. His parents also completed rating scales of his social-emotional and adaptive skills. Michael's overall IQ score was in the low average range. There was a significant weakness in his language skills across multiple tests, which was consistent with his history of left-sided seizure activity and early language delays. He was also noted to have difficulties with attention, processing speed, and executive functioning which are common in children with epilepsy. The results of this evaluation helped Michael get an Individualized Education Program that included speech/language therapy services at school as well as accommodations for difficulties with attention and behavioral regulation in the classroom. Results also helped Michael's teachers and parents better understand Michael's personal strengths in nonverbal and visual-spatial skills, which was helpful in planning learning activities and opportunities for success.

Other Purposes

Individuals with significant disabilities often have needs that require intensive support into and throughout adulthood (Luecking & Wittenburg, 2009; Schalock et al., 2010). IQ tests may be used to determine eligibility for intensive services, such as placement in a residential care facility, employment supports, community-based supports, Medicaid, and social security disability and supplemental security income benefits. IQ tests, along with other assessment data, can document an individual's level of impairment and provide supporting evidence to the government and other agencies about the level of care needed.

In addition, IQ tests are often used in the juvenile justice system to screen youth for intellectual disabilities. Individuals with intellectual disabilities have protections under the law, for example, they cannot be executed in states with the death penalty (Everington & Olley, 2008). Documentation of cognitive impairments during one's early life could mean the difference between life and death for some individuals. In addition, IQ tests are frequently used in the court system for juvenile competency to stand trial evaluations (Ryba et al., 2003).

IQ and Other Related Tests

Spearman's discovery in 1904 that the variation across many different types of IQ subtests can be explained by one overarching factor, general intelligence (*g*), is one of the cornerstones of intelligence testing today (Savi et al., 2019). However, the particular types of tests subsumed under general intelligence are not always clearly delineated. There has been extensive research and debate on which types of tests can be considered measures of "intelligence," and which tests measure something else, such as neuropsychological functioning or academic achievement. Neuropsychological tests are thought to measure specific functions of the brain and tend to be indicators of aspects of brain dysfunction (Boyle et al., 2012), while academic tests measure the amount of knowledge and/or level of academic skills an individual acquired or mastered through planned instruction in educational settings (Chang & Davis, 2011). Given that most scholars agree that intelligence involves both biological and experiential factors (Savi et al., 2019), it is not surprising that both neuropsychological and academic measures are frequently involved in IQ tests to some degree.

Neuropsychological and intelligence tests have been found to assess similar abilities. In fact, within a neuropsychological framework, intelligence has been conceptualized as a composite of neurocognitive abilities measured within a comprehensive neuropsychological evaluation (Larrabee, 2000). Intelligence tests and neuropsychological tests have similar diagnostic accuracy in detecting brain dysfunction (Kane et al., 1985; Sherer et al., 1994); both are frequently used as part of a comprehensive neuropsychological assessment as a measure of "premorbid functioning," a baseline estimate of ability prior to the event causing dysfunction (Gansler et al., 2017). Furthermore, evidence suggests neuropsychological measures may be better conceptualized as measures of intelligence, particularly within a Cattell-Horn-Carroll intelligence theory framework, rather than as unique constructs (Buczyłowska et al., 2020; Jewsbury et al., 2017; Salthouse 2005). Despite the notion that neuropsychological measures may not always be statistically distinguishable from IQ tests, some authors argue against interchanging the two, as neuropsychological tests fundamentally aim to reveal impairments in specific cognitive functions while IQ tests take a broader approach at understanding cognitive abilities overall (Gansler et al., 2017).

Historically, inferences based on children's performance on IQ tests were used to predict their educational performance. Therefore, it is not surprising that IQ test developers often estimate relations between scores on their IQ tests and standardized academic achievement tests as evidence of predictive validity. This source of validity evidence is also referred to as evidence based on relations with other variables, which involves relations between the test and related external variables (AERA, APA, NCME, 2014). Correlations between children's general intelligence (*g*) score, or the overall comprehensive score produced by intelligence tests, and scores on tests of standardized general academic achievement are high, with estimates approximating 0.80. This means that approximately 50–70% of the variation in children's standardized general achievement is explained by general intelligence (Deary et al., 2007; Kaufman et al., 2012). Despite these strong correlations, standardized intelligence and achievement tests appear to measure distinct nonequivalent constructs (Kaufman et al., 2012). Children's overall intelligence (*g*) is the strongest predictor of their academic skills, but other cognitive abilities subsumed under *g* (i.e., fluid reasoning, verbal comprehension, working memory) differentially predict children's reading, writing, and math skills (Caemmerer et al., 2018; McGrew & Wendling, 2010). Researchers do not agree whether the focus of these cognitive-achievement relations should be on overall intelligence only or both overall intelligence and other broad cognitive abilities (Zaboski et al., 2018). Additionally, these predictive relations are not only limited to children's standardized achievement performance. Children's IQ test scores are statistically significant, albeit relatively weaker, predictors of their classroom grades, approximately 40% of the variance in their grades is explained by IQ tests (Gustafsson & Balke, 1993; Rindermann & Neubauer, 2004).

Conclusion

Intelligence tests are widely used with children for a variety of purposes. The first IQ test was created more than a century ago to test children for educational purposes. Since then, the use of IQ tests has spread to many settings and many other IQ tests have been published. Different IQ tests include a variety of tasks and stimuli, but despite these differences, IQ tests appear to measure similar cognitive abilities. Children's performance on IQ tests may inform diagnostic and eligibility decisions for supports and placements in schools, healthcare settings, intensive treatment settings, or courts. The results of IQ tests should not be used as the sole criteria for any clinical decision, instead IQ tests should be just one of many tools in a practitioner's assessment repertoire.

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Measures of Adaptive Behavior

17

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History of Adaptive Behavior

Defining refers to describing the meaning and the exact limits of something. Before the development of the definition of intellectual disability (ID) by the American Association on Intellectual and Developmental Disabilities (AAIDD), the inclusion of adaptive behavior in the diagnosis of ID and the understanding of the limits in one person's functioning have a long history.

Going far back in time, Ancient Greeks left the first documented scripts on adaptive behavior and its relationship with ID. They introduced the word "idiot" to define someone who does not interact with other people and does not participate in community settings.

Both Greek and Roman societies used to think that a person who cares for his or her health and who is able to attend social activities could be defined as "normal." "Idiots" were despised and often killed, because they were considered a burden to the society (Barr, 1905).

During the Middle Ages, the social stereotype did not change; in fact, people with intellectual disorders were often used as jesters with the purpose to entertain aristocrats (History of Intellectual Disability, 2016). The condition was usually attributed to witchcraft.

Only in the Enlightenment period, the first changes of direction were observed. For instance, both Christian humanitarian and scientific studies helped to make the lives of people with ID more worthy to be lived. In the seventeenth century, Thomas Willis provided the first description of ID as a disease. Some European societies started to build up interventions and individualized instructions for people with such disorders.

Another step for the definition of ID was made by Locke (1689), who first distinguished between "idiots" and "madmen."

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In 1838, Itard published the first report of a 10–12 years old child with mental retardation. A hunter and his wife that afterwards decided to adopt him found this child, named the “Wild boy of Aveyron,” in the woods; he was not able to understand and to express language. Every attempt to give him teachings seemed to be unsuccessful. For this reason, the psychiatrist Itard decided to take the wild boy with him in order to study his condition and try to improve his adaptive functioning. At the beginning, the child was unable to meet social norms, to be empathetic, and to learn rules, but thanks to the effort of Itard, the wild boy developed a simplified language and rudimental behaviors that allowed him to interact with other people. Itard taught him to use cutlery, to be politely seated, and to dress himself, demonstrating that adaptive behavior can be modified by environment and rehabilitation (Oakland & Harrison, 2008).

In the same year, Esquirol published a revolutionary book on mental retardation. He noted that different levels of severity can be observed in ID and that language skills may be a key to distinguish between pathological and normal cognitive levels. Furthermore, he pointed out the importance of using objective methods to measure cognitive functioning. In 1838, Seguin, Esquirol’s student, opened a school for children with special needs. This initiated the establishments of more than 80 residential institutions around Europe and America.

In 1859, with the publication of “On the Origin of Species,” Darwin opened the debate about the relative contribution of nature – biological inborn characteristics and nurture – environmental impact on the development of man’s behavior (Darwin, 1859). What is important to remember about this controversy is the idea that species such as ours could change over time. Darwinians believed that ID was inherited.

Influenced by Charles Darwin’s theory, his cousin the psychologist, Francis Galton, proposed selective breeding of humans to reduce ID. He was interested in mental testing and conducted many of the first surveys to measure cognitive functioning. He was also the one who coined the terminology “mental test”.

In 1905, Alfred Binet produced the first standardized test to measure intelligence in children. Binet and his colleagues tried to differentiate between children who could and could not benefit from education (Binet & Simon, 1948). According to Binet, intelligence could be defined as a skill to cope with all the daily life demands. Even though still implicitly, adaptive behavior continued to be considered an important ingredient in intelligence’s definition. During these years, the psychologists Binet and Simon produced the first standardized intelligence scale, known as “Binet-Simon Scale.” In 1916, Lewis Terman revised this test, renaming it “Stanford-Binet Intelligence Scale” and introducing the concept of IQ (intelligence quotient), which was the ratio between mental and chronological age (Cianciolo & Sternberg, 2004). However, his conceptualization of IQ had different limits, such as it didn’t allow clinicians to compare people of different ages.

Only with David Wechsler (1939), who introduced the Deviation Intelligence Quotient, those methodological problems will be solved, as the latter notion allows to evaluate the performance of a subject in comparison to individuals of the same and different chronological ages and to compare the results provided by different tools (Picone et al., 2006).

In parallel with the development of mental testing, the first supported associations began to be founded. In 1879, the United States formed the “Association of Medical Officers of American Institution for the Idiotic and Feebleminded,” renamed “American Association on Mental Deficiency” in 1933 and later “American Association on Mental Retardation” (AAMR). In 2007, as the term “mental retardation” was increasingly been replaced by the less offending definition “intellectual disability,” AAMR changed its name to AAIDD (Schalock et al., 2007). The latest name is used throughout this chapter.

Although adaptive behavior did not play a central role in the diagnosis of ID during the first half of the twentieth century, the importance of social competency, adaptability to environment, and ability to cope with daily life was never completely abandoned. Alternative measures to mental testing began to appear as early as 1916.

Doll (1927), Kuhlman (1920), and Porteus (1921) started to develop psychometric measures of adaptive behavior. Doll, for example, underlined that social inadequacy due to low intelligence was one of the main points of mental retardation. Doll claimed that since IQ tests were normed on the general population, they were unable to really predict how much a person deviated from others. For this reason, he introduced the Vineland Social Maturity Scale (VSMS) (Doll, 1936), a tool of 117 items measuring practical skills and social competence. VSMS was a caregiver-report instrument and was administrable only to children. However, it had different limitations, such as the assumption that a person who has acquired a skill will display that skill.

In 1939, the first edition of the Wechsler Scales (WAIS), named the Wechsler–Bellevue Intelligence Scale, was published by David Wechsler (1939). This test is currently on its fourth edition (WAIS-IV) released in 2008 by Pearson and represents the most used and reliable intelligence test in the world. What is interesting to notice is the definition that D. Wechsler gave to intelligence: *"Intelligence is the aggregate or global capacity of an individual to think rationally, to act purposefully and to deal effectively with his environment"* (1939). Wechsler himself underlined that it would be unreasonable to thinking that intelligence tests may be the only measure of intelligent behavior and other factors should be taken into account. Indeed, dissatisfaction with the IQ scores as the sole index in people with ID raised over the time.

The assessment of adaptive behavior was formally included in the diagnostic nomenclature of ID in 1959, when Heber claimed that performance on mental tests does not always correspond to the real one person's daily life functioning (Heber, 1959). He conceptualized adaptive behavior as a construct consistent of three main factors: practical, social, and conceptual skills.

This new acknowledgment created the need to develop standardized measures of adaptive behavior. In 1969, Nihira and colleagues published the "Adaptive Behavior Checklist," the first psychometric assessment instrument of adaptive functioning to be used together with standard intelligence tests (Nihira et al., 1993). This scale had two forms: one for people older than 12 and one for people younger than 12. Nowadays, its revised nomenclature is the AAMR Adaptive Behavior Scale.

Heber's classification was reaffirmed in 1983 by Grossman, who underlined the importance of adaptive behavior in the diagnosis of ID (for a better definition provided by Grossman, see section "Adaptive Behavior: Assessment"). Both Heber and Grossman recognized the multidimensionality of adaptive behavior and underlined the influence of sociocultural factors on one person's cognitive and adaptive functioning.

Nowadays, it is clear that adaptive skills are essential to survival. Two people can perform at the same level on standardized cognitive tasks, but can exhibit completely different adaptive behaviors to their environments; for this reason, adaptive skills should be always evaluated during ID assessment.

Adaptive behavior deficits have been included in the current official definition of intellectual disability provided by AAIDD (Luckasson et al., 2002, p.1):

Intellectual disability is a disability characterized by significant limitations in both intellectual functioning and in adaptive behavior, which covers many everyday social and practical skills. This disability originates before the age of 18. The following five assumptions are essential to de application of this definition:

1. Limitations in present functioning must be considered within the context of community environments typical of the individual's age peers and culture.
2. Valid assessment considers cultural and linguistic diversity as well as differences in communication, sensory, motor and behavioral factors.

3. Within an individual, limitations often coexist with strengths.
4. An important purpose of describing limitations is to develop a profile of needed supports.
5. With appropriate personalized supports over a sustained period, the life functioning of the person with intellectual disability generally will improve.

In addition to AAIDD, another system for classifying ID is the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (DSM-5), which is published by the American Psychiatric Association (APA, 2013) and which criteria for the diagnosis of ID are as follows:

1. Deficits in intellectual functioning. This includes various mental abilities, such as reasoning; problem solving; planning; abstract thinking; judgment; academic learning; experiential learning. These mental abilities are measured by IQ tests.
2. Deficits or impairments in adaptive functioning. This includes skills needed to live in an independent and responsible manner. Limited abilities in these life skills make it difficult to achieve age appropriate standards of behavior. Without these skills, a person needs additional supports to succeed at school, work, or independent life. Deficits in adaptive functioning are measured using standardized, culturally appropriate tests.
3. These limitations occur during the developmental period. This means problems with intellectual or adaptive functioning were evident during childhood or adolescence. If these problems began after this developmental period, the correct diagnosis would be neurocognitive disorder. For instance, a traumatic brain injury from a car accident could cause similar symptoms.

It is important to underline that, with the publication of DSM-5, IQ scores have been replaced by level of adaptive behavior deficits as the criterion to establish the severity levels of ID. Actually, adaptive behavior is more salient than IQ in predicting the support needs of a person.

Comparing the DSM-5 definition of ID with the ones of the previous editions, it emerges how the last version encourages a more comprehensive view of the individual and emphasizes the importance of adaptive behavior. For instance, in contrast to DSM-IV, which needs impairments in two or more skill areas, the DSM-5 criteria require an impairment in one or more superordinate skill domains (e.g., conceptual, social, practical) (Papazoglou et al., 2014).

Throughout the past 50 years of definitions provided by AAIDD and APA (see APA, 2013; Luckasson et al., 2002; Papazoglou et al., 2014), the relevance of adaptive behavior raised edition after edition. A valid diagnosis of ID requires the clinician to integrate assessment of cognitive functioning and adaptive behavior. In fact, the definition of ID, going back more than 100 years to the present, confirms that both are essential in the classification of ID.

In conclusion, the definition of adaptive behavior has a long history. Today it can be conceptualized as the collection of conceptual, social, and practical skills that have been learned and are performed during daily life. This definition is a continuation of the attention given to adaptive functioning and social adequacy in the diagnosis of ID (Shogren et al., 2017).

At this moment, there are at least 200 adaptive functioning scales that have been used for diagnosis, research, and individualized programming purposes; however, very few have adequate norms and reliability to diagnose ID in people with low IQ. For this reason, in the next paragraph only the principal standardized adaptive behavior instruments will be described.

Adaptive Behavior: Assessment

Assessment of adaptive behavior plays a key role in the diagnosis of ID. Furthermore, it provides important information about planning of treatments not only in individuals with ID, but also in individuals with neurodevelopmental disorders.

Back in the 1970s, investigating adaptive behavior was meant to understand "*the effectiveness and degrees to which the individual meets the standards of personal independence and social responsibilities expected for his age and cultural group*" (Grossman, 1973, p.11). Personal autonomies (moving around, using money) and the ability to take care of themselves (cleaning oneself, getting dressed) and to manage home-life (cooking, cleaning the house, washing clothes) are some features of the dimension of personal independence. The ability to follow the rules, to manage the time, to attend social events, and to respect different social norms represents some features of the dimension of social responsibilities.

Considering all the activities and the skills referable to adaptive behavior, both in the DSM-5 (APA, 2013) and in the last three editions of AAIDD manuals (Luckasson et al., 2002; Schalock et al., 2010; Schalock & Luckasson, 2021), three domains have been identified.

1. *Conceptual domain*: it includes communication and academic skills. Referring to communication, both comprehension and language production should be considered.
2. *Social domain*: it includes relational, social skills, and socio-emotional self-regulation abilities.
3. *Practical domain*: it includes compliance with safety rules and daily life skills. In regard to the latter, personal care, health care, legal decision, and housework tasks should be considered.

Moreover, when we refer to adaptive behavior, we must consider some crucial features (Harrison, 1990; Barclay et al., 1996, Sparrow et al., 1984). The adaptive behavior has the following characteristics:

(a) *Age-specific*: it develops in the first years of life, becomes more complex in adulthood, and then may face a decline in geriatric age. Furthermore, some behaviors can manifest and be adaptive at one age and not be it in other age ranges. For example, for a child, asking the mother to be accompanied to the bathroom is an adaptive behavior in the first years of life while it is no longer so when he/she is older.

(b) *Context-specific*: it is closely dependent on the demands of the environment in which the individual lives. Expectations about adaptive behavior are influenced by:
  - The different cultural/geographical group to which one person belongs.
  - The different contexts: conceptual, social, and practical abilities are not only expressed at home with caregivers but also with teachers, friends, and unknown people to relate to for various reasons (e.g., call a doctor's office to make an appointment). An evaluation of adaptive behavior in different contexts like home and school is recommended.

(c) *Concrete manifestation*: adaptive behavior must reflect the typical performance of the individual, not its best performance nor the performance he could hypothetically put in place if there was the opportunity.

(d) *Modifiability:* adaptive behavior can worsen or improve based on several factors including environmental changes or habilitation/rehabilitation programs.

Only through an accurate evaluation, that considers the different domains (conceptual, social, and practical) and different features of adaptive behavior, the clinician understands the exact functioning of the individual.

How is it possible to accurately assess adaptive behavior? Over the years, the scientific scene has tried to answer some questions concerning the methodological aspects of the evaluation of adaptive functioning:

1. *How should the evaluation be carried out? Directly or through third parties?*

Currently, the scales for measuring adaptive functioning involve interviewing the caregiver. Some exceptions provide a self-assessment by the individual (see ABAS-2 16–89 years "self-rating," Harrison & Oakland, 2003), but especially in cases of ID, it cannot be considered for diagnosis purposes. For the same reasons, the advantage of an indirect assessment also consists in measuring adaptive behavior even in cases of severe or profound ID, in which direct assessment is very difficult.

2. *Is it preferable to use one or more sources of information?*

As seen above, one feature of adaptive behavior is that it is context-specific. For this reason, having multiple sources of information (home, school, work) allows you to delve deeper into the functioning of the individual (Tassè et al., 2012, 2016).

3. *Is it necessary to have a global adaptive functioning score or different domains' scores?*

A profile that considers the different domains allows you to have a more specific picture of the functioning of the individual, of his strengths and weaknesses. This is important both for an accurate diagnosis of ID (criterion B of Diagnostic and Statistical Manual fifth edition, DSM-5 Manual; APA, 2013) and for planning targeted interventions.

These characteristics discussed above should be present in the main tools for assessing adaptive functioning.

Another crucial aspect highlighted by the AAIDD is to refer to tools that "should provide robust standard scores across the three domains of adaptive behavior" (Schalock et al., 2010; p.49): the use of well-standardized instruments yields quite unbiased results. Moreover, being the adaptive behavior context-specific, it will be necessary to use tools that are standardized for the cultural/geographical group to which the individual belongs. In fact, in the evaluation of adaptive functioning, changes are usually made to the tools used to make them applicable in the different cultural contexts (e.g., some items of Receptive or Expressive Subscales in Italian version of Vineland II Survey Interview Form are modified with respect to American version).

Although only in the fifth edition of the DSM, the assessment of adaptive functioning has been included as a criterion for the definition of severity levels of ID, over 200 rating scales have been produced since the 1970s. However, in 2012, Tassé and colleagues established that only four standardized adaptive behavior instruments had characteristics and psychometric adequate properties to be used in the clinical determination of ID. These four instruments are: Adaptive Behavior Assessment System, second edition (ABAS-2; Harrison & Oakland, 2003); Adaptive Behavior Scale – School, second edition (ABS-S: 2; Lambert et al., 1993); Scales of Independent Behavior-Revised (SIB-R; Bruininks et al., 1996); and Vineland Adaptive Behavior Scale, second edition (VABS-2; Sparrow et al., 2005).

Over the years some tools have been updated; furthermore, new tools have been devised to assess adaptive functioning. To date, among the most popular and updated instruments on the international scene, it is possible to include:

- Adaptive Behavior Assessment System, third edition (ABAS-3, Harrison and Oakland, 2015).
- Vineland Adaptive Behavior Scale, third edition (Vineland-3, Sparrow et al., 2016).
- Diagnostic Adaptive Behavior Scale (DABS, Tassé et al., 2017).

The adaptive scales mentioned in these bullet points are better described below.

Adaptive Behavior Assessment System or ABAS

Originally published by Harrison and Oakland (2000), this instrument has been revised with the publication of second (Harrison & Oakland, 2003) and third editions (Harrison & Oakland, 2015). Nevertheless, the third edition has not yet been adapted and standardized in all countries and for all age groups considered in the American version (from 0 to 89 years): for example, Italy adopts the second edition in children and adolescents from 1 to 18 years old (Italian edition Ferri et al., 2014). In the introduction of the latest American version of ABAS, the authors underlined that the ABAS-3 maintains "*all the essential features of ABAS-II and has numerous improvements*" (Harrison and Oakland, 2015; p. 1).

The *ABAS-3* consists of five distinct questionnaire forms:

- *Parent or Primary Caregiver Form 0–5 (from 0 years to 5 years and 11 months*): it examines the adaptive behavior of newborns, toddlers, and preschoolers at home and in other familiar contexts. Parents or caregivers who know the child can complete the ABAS-3 0–5 form.
- *Teacher or Day Care Provider Form 2–5 (from 2 years to 5 years and 11 months):* it assesses the adaptive behavior of toddlers and preschoolers in kindergarten or day care centers. The respondents are generally the teachers, support teachers, or other persons providing care for children.
- *Parent Form 5–21 (from 5 years to 21 years and 11 months):* it examines the adaptive behavior of children and young adults at home or in other familiar settings. Parents or other primary caregivers complete the ABAS 5–21 form.
- *Teacher Form 5–21 (from 5 years to 21 years and 11 months):* it is usually filled in by the teacher or teacher's aide and is used to assess children and young adults who still go to school.
- *Adult Form 16–89 (from 16 years to 89 years and 11 months):* it assesses the adaptive behavior of adolescents and adults at home or in other community settings. Parents or other people who know the examined person can fill it in. The person may also complete it himself/herself, but the scores must be interpreted with caution by the clinician, especially in the case of people with ID.

The respondent of the questionnaire evaluates if the assessed person is capable of a given adaptive behavior, and how often it can be observed through a Likert scale ("never," "sometimes", "almost always"). Furthermore, if the respondent doesn't have enough information about a specific adaptive behavior, he/she must note that his/her answer is only a supposition. Before delivering the questionnaire, the clinician needs to be sure that the respondent has understood all the instructions. It is important to point out that the respondent must answer taking into account the routine and not the potential performance of the exanimated person. Indeed, potential negative issues regarding parent completion of questionnaire include problems with comprehension of items and underestimation/overestimation (deliberate or unintentional) of the person evaluated.

The ABAS-3 investigates the adaptive skills areas, which may slightly differ in different forms (for more details see the User's Manual; Harrison and Oakland, 2015).

For example in *ABAS-3 5–21 Parent Form,* there are:

- *Communication:* the listening, comprehension, and linguistic production skills necessary to communicate with other people are investigated.
- *Community Use*: moving independently outside the home, making purchases, and calling technicians for home repairs are some of the abilities investigated.
- *Functional Academics*: basic pre-academic skills for reading, writing, and math or other skills like calculating the change after a purchase are investigated.

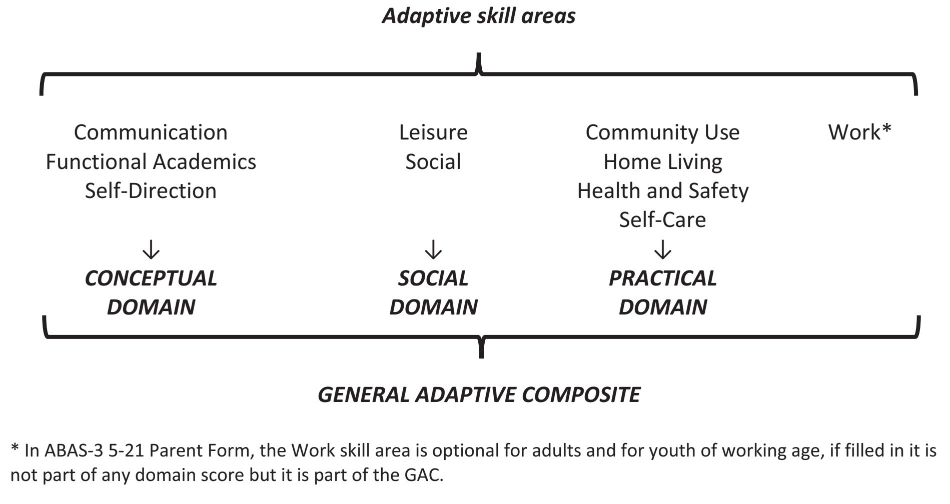

Fig. 17.1 Example of adaptive skill areas, domains, and GAC in ABAS-3 5–21 Parent Form

- *Home Living:* skills needed for cleaning, tidying the house, preparing simple food, and using household appliances such as microwave are looked into.
- *Health and Safety*: this area evaluates the skills necessary for health protection such as following safety rules, keeping out of danger, and using medicines.
- *Leisure:* this area evaluates the skills needed to organize recreational activities or games and follow the games' rules.
- *Self-Care*: skills related to personal care like eating, dressing, bathing, and hygiene are investigated.
- *Self-Direction*: this area investigates the skills necessary for autonomy, responsibility, and self-control such as starting and finishing tasks, respecting time limits, and making choices.
- *Social*: this area investigates the skills necessary to socialize/maintain friendships. The person's abilities to express emotions and use good manners are also investigated.
- *Work*: the skills necessary for a good functioning and good management of both part-time and full-time work are investigated.

The results of each area are converted into scores with mean of 10 and standard deviation of 3. The ABAS-3 also generates three domains (Conceptual, Social, and Practical) and a General Adaptive Composite (GAC) (see Fig. 17.1). Both the domains and the GAC are expressed in standard scores (mean (M) = 100, standard deviation (SD) = ±15) and percentile rank. A qualitative description of the scores ("extremely low," "low," "below average," "average," "above average," "high") is also available to facilitate the interpretation of the results in both of the domains – including the GAC – and adaptive skill areas.

The standard scores of each domain and GAC help clinicians in making appropriate clinical decisions in ID according to DSM-5 criteria. No less important are the scores of the adaptive skill areas: they may provide further important implications for clinical practice to better plan intervention programs with specific goals.

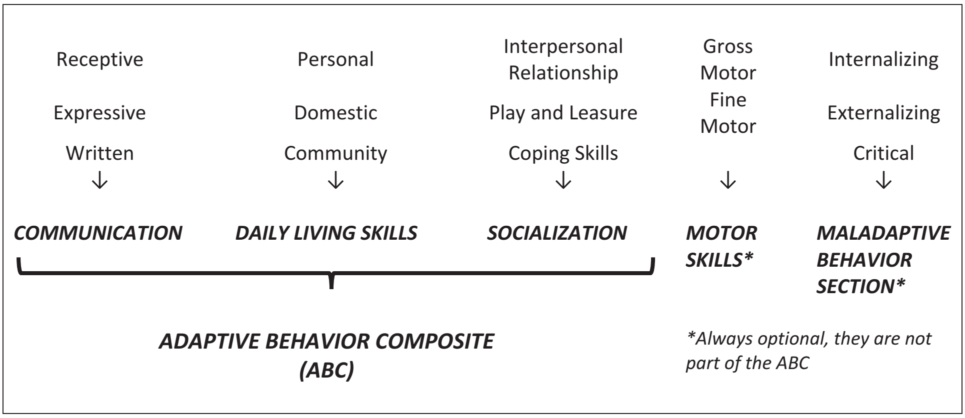

Fig. 17.2 Example of adaptive domains, subdomains, and ABC in VABS-3 Interview Form or Parent/Caregiver Form

The Vineland Adaptive Behavior Scales or VABS

The Vineland Adaptive Behavior Scales (VABS) represent the most used measure of adaptive behavior skills from birth to geriatric age. Since its first publication, the instrument allows to assess one person's development of independence and social responsibility, by using a semi-structured interview carried out with a person closed to the patient.

The Vineland Adaptive Behavior Scales have been recently released in its third edition (VABS-3) (Sparrow et al., 2016). The last edition consists of three forms:

- Interview Form: from 0 to 90+ years old.
- Parent/Caregiver Form: from 0 to 90+ years old.
- Teacher Form: from 3 to 21 years.

In the Interview Form, the interviewer does not read the items to the respondent, but uses open-ended questioning to help the caregiver to better describe specific behaviors. In the Parent/Caregiver Form and Teacher Form, the items are read and scored by the respondent who fills in the questionnaire.

As the previous edition, the investigated domains are: Communication, Daily Living Skills, Socialization, Motor Skills, and Maladaptive Behavior. However, in VABS-3, Motor Skills and Maladaptive Behavior are always optional. In fact, while Vineland Adaptive Behavior Scales 3 (VABS-2) included the Motor Skills domain in the computation of the Adaptive Behavior Composite (ABC) for children younger than 7 years, this is not true for any age on the VABS-3. This is one of the biggest changes of this new version which aligns with the adaptive domains (Communication, Social, Practical) encoded by DSM-5 (APA, 2013) and by AAIDD (Luckasson et al., 2002; Schalock et al., 2010, Schalock & Luckasson, 2021) (for a better definition, see section "History of Adaptive Behavior").

For each domain and ABC, raw scores are normalized in standard scores (M = 100, SD = ± 15) with lower scores indicating greater functional impairment.

Each domain is made up of subdomains which differ slightly depending on the Form (Interview or Parent/Caregiver versus Teacher) (see Fig. 17.2). Raw score of each subdomain is converted into normative data (M = 15, SD 3).

For example, Interview Form and Parent/Caregiver Form consist in:

- *Receptive subdomain*: it investigates how the individual listens and pays attention and what he/she understands.
- *Expressive subdomain*: it investigates how the individual uses words and phrases to provide information.
- *Written subdomain*: it investigates writing and reading skills from 3 years old.
- *Personal subdomain*: it explores how the individual eats, dresses, and takes care of personal hygiene.
- *Domestic subdomain*: it investigates how the individual takes care of the house from 3 years old.
- *Community subdomain*: it investigates how the individual orients him/herself, uses money and computer, and carries out work activities from 3 years old.
- *Interpersonal Relations subdomain:* it explores how the individual interacts with others.
- *Play and Leisure subdomain:* it investigates how the individual plays and manages free time.
- *Coping Skills subdomain:* it investigates how the individual manifests a sense of responsibility and care for others from 2 years old.
- *Gross-Motor subdomain*: it investigates how the individual uses arms and legs for movement and coordination.
- *Fine-Motor subdomain*: it explores how the individual uses hands and fingers when manipulating objects and drawing.

Each subdomain is composed of items that investigate the adaptive behaviors of the individual in a very detailed way. The clinician, in case of the Interview Form or the respondent, in case of Parent/Caregiver Form of Teacher Form, determines/evaluates if the assessed person is capable of a given adaptive behavior.

Assignment criteria are slightly different from the ones in VABS-2. In both versions, each item can be scored from 0 to 2; however, for example, in VABS-2, a score of 1 was assigned when a behavior was “sometimes” or “partially” observed, while in VABS-3, a score of 1 is assigned when behavior is observed “sometimes.” A VABS-2 rating of “partially” allowed for the possibility that prompting of the behavior may have occurred; in the VABS-3, the behavior must occur spontaneously. Furthermore, there are also other more minor changes such as relocation of items between domains and updates to the language or the calculation of starting point (basal) or stop point (ceiling) (for more details see the User’s Manual; Sparrow et al., 2016).

In conclusion, VABS-3 are the leading instrument for supporting the diagnosis of ID, specified by AAIDD and DSM-5. The tool can be used to take track of possible changes due to growth or intervention and to understand if a person needs specific support. In all their version, VABS represent the most used measure of adaptive functioning both in clinical practice and research, because of their high internal consistency, test-retest reliability, inter-interviewer reliability, and inter-raters reliability.

Scales of Independent Behavior – Revised

As well as Vineland Scales, another test with an adequate standardization sample is the *Scales of Independent Behavior (SIB)* that has been introduced by Bruininks and colleagues (Bruininks et al., 1996).

In 2012, Tassé and his colleagues (2012) have revised the instrument, publishing the *Scales of Independent Behavior – Revised (SIB-R)* that represent one of the main standardized adaptive behavior instruments with characteristics and psychometric properties sufficient to be used in the clinical determination of intellectual disability. It contains norms for individuals from 3 months to over 80 years old and investigates cognitive abilities, social skills, physical disabilities, and needs of support. The SIB-R may be administered in a structured interview or by a checklist procedure in which the respondent completes the questionnaire. The SIB-R contains 14 subscales that fall into four main clusters: social interaction/communication skills, personal living skills, community living skills, and motor skills. It investigates the presence of eight areas of problem behavior, too. Scores range from 0 (never does) to 3 (does very well-almost always). SIB-R provides a Broad Independence Standard Score a 4 Domain Standard Scores (M = 100, SD = ±15).

Diagnostic Adaptive Behavior Scale

The Diagnostic Adaptive Behavior Scale (DABS, Tassè et al., 2017) assesses adaptive behavior in people from 4 to 21 years old. It is a standardized test based on the tripartite model of adaptive behavior that includes conceptual, social, and practical domains (see section "Adaptive Behavior: Assessment"). Compared to other adaptive behavior scales, the DABS was specifically constructed to provide information around the decision point for identifying the presence or absence of significant impairment in adaptive behavior for the diagnosis of ID.

The DABS is a semi-structured interview that is conducted with a respondent who well knows the person assessed. The scale includes 500 items that are rated with a score range from 0 to 3: 0 = No-rarely or never does it; 1 = Yes-does it with reminders or assistance but rarely or never independently; 2 = Yes-does it sometimes independently – but sometimes needs reminders or assistance; 3 = Yes-does it always or almost always independently – never or rarely needs reminders. Also available as an exceptional rating is the "No Score." The "No Score" should be used only if the assessed person has a lack of opportunity due to cultural, gender, and/or geographic/regional factors, a lack of opportunity due to environmental constraints, or if the respondent has no direct knowledge of individual's typical performance.

The scale provides standard scores (M = 100, SD = ±15) for conceptual, social, and practical adaptive skills and an overall adaptive behavior score that measures the global adaptive functioning.

Other Measurements for Assessing Adaptive Functioning as Part of Scales of Evaluation of Psychomotor Development

Adaptive Behavior in the Denver Developmental Screening Test and the Denver II

The Denver Developmental Screening Test (DDST) (Frankenburg et al., 1967) is one of the most popular measures of developmental problems in young children. Since its first publication in 1967, it has been standardized in over 12 countries. In 1992, a revised version, named Denver II (DDST II), has been published and nowadays it is used in public health clinics, private practice, and clinical research (Frankenburg et al., 1992). Furthermore, the American Academy of Pediatrics Council on Children with Disabilities has Denver II on its approved screening tools list.

The DDST II consists of 125 tasks and is a quick screening in the examination of the pediatric patients to determine whether infants and preschool children are achieving developmental milestones. It can be administered to children from birth to 6 years of age. The scale is both an observational assessment and an assessment based on parental report. It is important to underline that DDST II is not a QI Test or a diagnostic tool. Furthermore, it does not allow to predict later development; then, if a child fails the DDST screening, a more formalized assessment (i.e., with the Bayley Scales of Infant Development; Bayley, 2006, 2019) is recommended.

DDST II provides an organized clinical impression in four main domains:

1. *Social and Emotional:* getting along with people, smiling at people, caring for personal and other people emotions, etc.
2. *Language/Communication:* hearing, understanding, using words, etc.
3. *Cognitive:* learning, thinking, problem-solving, etc.
4. *Movement/Physical Development:* sitting without support, putting block in cup for fine motor and jumping for gross motor, etc.

Scoring depends on age and ability of child and each item is scored as pass, fail, or refused.

Even though DDST II represents an overall evaluation of developmental delay, it can give information also about adaptive behavior in children. For instance, the Movement/Physical Development Domain may be used as an indicator of practical skills during daily life (i.e., in the "4 years range," the item "pours, cuts with supervision, and mashes own food" reminds the subscale "Home" in the VABS-2; see section "Vineland Adaptive Behavior Scales - VABS").

To conclude, even if not diagnostic by itself, this test is useful for detecting children (such as those with HIV, hypoxic-ischemic encephalopathy, or ID) who have global problems or who fail in a specific domain, extrapolating information also about adaptive functioning. The instrument can also be used to track childrens' development over time.

Adaptive Behavior in Bayley-III and the Bayley-4

The Bayley Scales of Infant and Toddler Development (BSID) is an individually administered instrument originally developed by psychologist Nancy Bayley to assess the development of children aged 1–42 months (Bayley, 2006). Since its first publication, the scale has been revised different times and is nowadays on its fourth edition (Aylward, 2020). The third and the fourth edition are the most used versions during both clinical practice and research activity.

The *Bayley-III* (BSID-III) assesses infant and toddler development across five main domains: Cognitive, Language (Receptive and Expressive), Motor (Gross and Fine), Social-Emotional, and Adaptive. Assessment of the first three scales is conducted using items administered directly to the child. Assessment of the latter two scales relies on primary caregiver interview. Each subscale can be administered independently, then the instrument is very useful also in multidisciplinary evaluations. The instrument allows to identify children's strengths and weaknesses, to establish if a deeper assessment is required, and to take track of development changes and progresses of an eventual intervention.

The Bayley-III employs the Parent/Primary Caregiver Form of the ABAS-2 (Harrison & Oakland, 2003) as its Adaptive Behavior Scale. Thus, the items included on the Parent/Primary Caregiver Form of the ABAS-2 are the same as those included on the Adaptive Behavior Scale of the Bayley-III. The Bayley-III manual underlines that the scale is based on (1) the conceptualization of adaptive behavior promoted by AAIDD (see section "History of Adaptive Behavior") and (2) the legal and professional standards applicable to disability classifications, provided by the DSM IV-TR (APA, 2000).

The Bayley-4 (BSID-4) has been introduced to conduct developmental assessments in order to identify children with developmental delay so that early intervention services could be provided. As the previous version, it contains five core domains (see above) that are administered to infants and toddlers from 16 days to 42 months of age. Compared to BSID-III, the new version includes questions for the caregiver. For instance, adaptive behaviors on the Bayley-4 are measured solely via caregiver report because self- or teacher-report obviously cannot be obtained for children in this age range. Moreover, BSID-4 takes approximately 30% less time to complete the assessment than the previous editions. In addition, while scoring on BSID-III is dichotomous (1, 0), in BSID scoring is polytomous

(2, 1, 0), where 1 means that the skill or behavior is emerging. Another main difference is that in BSID-4 *the adaptive behavior scale utilizes Vineland Behavior Assessment System* rather than ABAS-2 one. More specifically, the Bayley-4 Adaptive Behavior Scale consists of 120 items selected from the Vineland-3 (Sparrow et al., 2016).

It is interesting to notice that the three domains of the Bayley-4 Adaptive Behavior Scale, namely Communication, Daily Living Skills, and Socialization, are compatible with the adaptive behavior areas specified as necessary for the diagnosis of ID by the AAIDD (Schalock et al., 2010) and the DSM-5 (APA, 2013). In fact, the terms conceptual, practical, and social used by AAIDD and DSM-5 correspond to the domains of Communication, Daily Living Skills, and Socialization of the Vineland-3 (and the Bayley-4). Deficits in these areas reflect the impact that the adaptive skill deficit has on the individual's day-to-day function. On the Bayley-4, severity is reflected by standardized scores.

To conclude, the Bayley Scales is an useful tool to early identify ID, to assess the principle domains of development, such as adaptive behavior, and to investigate changes over the growth.

When Standardized Scales Cannot Be Used

In some cases, adaptive behavior standardized assessments cannot be used, for example, when there are not reliable or closed people who can answer for the patient's adaptive functioning. In these situations, other information regarding adaptive functioning can be adopted:

1. *Direct observation*: What does the person really do? How does the person interact with other people? How much is the person able to take care of him/herself?
2. *External sources of information*: School records, medical information, previous cognitive, and psychological evaluations.
3. *Interviews* with closed respondents who are not able to complete a standardized assessment, but can give qualitatively important data.

When structured evaluations cannot be performed, the examiner should use multiple types and sources of information combined with clinical judgment. It is important to remember that adaptive behavior is different from problem behavior. More specifically, behaviors that interfere with one person's daily life (i.e., a child throwing objects to seek adults' attention) are defined as maladaptive behaviors and not as the absence of adaptive behavior (i.e., the same child could be able to more maturely interact with meaningful others, but could not exhibit this skill in certain situations). The clinician, when using direct observation, should be cautious in order not to overestimate or overlook individual's disability. To this purpose, clinical expertise and specific trainings are essential when working in the field of ID.

Adaptive Behavior in Some Neurodevelopmental Disorders

Adaptive Functioning in Individuals with Autism Spectrum Disorder (ASD)

Autism Spectrum Disorder (ASD) is a group of neurodevelopmental disorders characterized by deficits in social-communication skills and the presence of repetitive or restricted patterns of behaviors and/or interests. The estimate prevalence of ASD in the American population is 1:54 (Maenner et al., 2020). As the word "spectrum" suggests, individuals with ASD show a wide heterogeneity in core symptoms severity, in cognitive and language level as well as in adaptive functioning.

Researchers have shown that this heterogeneity is also reflected in clinical outcomes. Early diagnosis and early treatment based on ABA (such as Early Intensive Behavioral Intervention (EIBI), Pivotal Response Training (PRT), or Naturalistic Developmental Behavioral Intervention (NDBI) such as Early Start Denver Model (ESDM), Cooperative Parent Mediated Therapy (C-PMT); Lovaas and Smith, 2003; Koegel et al., 1999; Dawson et al., 2010, Valeri et al., 2020) has increased the percentage of individuals with ASD with a good level of functional and adaptive independence in adulthood. However, there is still a great number of individuals with ASD (at least a half) who fail to reach good outcomes in terms of independence showing vulnerabilities during their entire life (Billstedt et al., 2005; Eaves & Ho, 2008; Howlin et al., 2004; Tsatsanis, 2005).

It is well-known that IQ and language level are consistently correlated to positive outcomes in ASD (Billstedt et al., 2005; Howlin et al., 2004). However, the role of adaptive functioning is less clear. Findings from a longitudinal study that lasted 20 years have shown that the correlation between IQ and adult success in individual without cognitive impairment is weaker than thought. On the contrary, these authors found that the adaptive skills are more associated with good outcomes compared to IQ and language level in this portion of population. In fact, some individuals with ASD could have a high IQ, but limited adaptive skills, while others with borderline cognitive and good level of independent life-skills could reach good outcome rating.

However, the role of adaptive level in predicting adult outcomes has been still not fully explored. In a relatively recent review, Magiati and her colleagues (2014) examined the relation between several variables measured in childhood and adult outcomes of individuals with ASD. None of the 25 studies included in this review has examined the presence of relationships between adaptive level in childhood and adult outcomes. These results showed a tremendous lack of research on the relation between adaptive functioning and adult outcomes, thus showing a great importance to further explore this relation in future research. Nonetheless, we are aware of the important role of IQ and language level in predicting adult outcomes; a better knowledge of the role of adaptive functioning will allow researchers to predict the role of patterns of IQ, language level, and adaptive functioning more precisely.

For example, having a good level of daily living adaptive skills in childhood could be crucial for a child with ASD and severe cognitive impairment. Those skills could be related to his functional independence in adulthood, to parental burden (by easing parents in daily assistance), and therefore to personal and familiar quality of life. Furthermore, those abilities could contribute to other related abilities such as those involved in a job. Being able to organize daily routine in childhood could be related to the ability to organize work routines and demands in adulthood. On the contrary, the same adaptive daily living skills could be less important for a child with ASD without cognitive impairment where higher-level abilities are expected. Other skills, such as “fine-grained” communication and socialization skills, could play a major role in reaching a satisfactory life for adult people without cognitive impairment when compared to people with cognitive impairment.

The future exploration of the role of adaptive functioning in predicting adult outcomes could bring to a better definition of intervention plan in childhood, thus improving the quality of life of individual with ASD and their families. However, this kind of information is actually limited.

In the following sections, we will shortly review adaptive profile of individuals with ASD in cross-section and longitudinal studies and his predictors. The review of literature is not intended to be exhausting, given the limited space. We will just describe main studies to depict a picture of autism adaptive profile.

Adaptive Profile of Individuals with ASD

The greatest part of the studies on adaptive functioning in ASD has been conducted with Vineland Scales (i.e., Paul et al., 2004; Tomanik et al., 2007). Most studies have shown that people on the spectrum show deficits in adaptive functioning independent from cognitive level. These studies agree to define a typical “autism profile” characterized by a marked impairment in socialization, weakened delay in adaptive communication, and a relative strength in daily living skills (Bolte & Poustka, 2002; Carter et al., 1998). However, all the scores are usually under the average.

Some authors have found that the impairment in adaptive functioning may vary according to the level of cognitive ability. An adaptive level below the average has been found in individuals with ASD with higher functioning (i.e., Perry et al., 2009; Saulnier & Klin, 2007), while individuals with lower functioning and cognitive impairment showed an adaptive behavior on par with cognitive level or, sometimes, above (i.e., Perry et al., 2009). Furthermore, the gap between IQ and adaptive skills in individuals with higher functioning could be enlarged with the growth; some studies have shown that this discrepancy between IQ and adaptive level increases with the age (Szatmari et al., 2003).

Concerning change in adaptive functioning over the time, the heterogeneity of ASD has complicated the possibility to depict trajectories of adaptive functioning. While a static picture of autism profile has been defined over the time in several studies, there is still dearth of longitudinal studies on adaptive functioning in ASD. However, two major studies provide important information that help to predict the adaptive functioning over the time.

A relatively recent study from Szatmari and his colleagues (2015) has allowed to partially fill this gap in knowledge. In a large sample (416 children with autism) followed from approximately 3–6 years old, they found three different groups based on baseline Adaptive Composite Score on VABS-2 and the trajectory over the time: Group 1 with lower functioning and worsening trajectory (around 30% of the sample), Group 2 with moderate functioning and stable trajectory (around 50%), and Group 3 with higher functioning and improving trajectory (around 20%). However, these results are limited to a global measure of adaptive level (Adaptive Composite Score) and do not provide any information on specific scales (Communication, Socialization, and Daily-living skills). Furthermore, this study is limited to a preschool sample, while the trajectory of adaptive behaviors could further modify over the years.

A wider and deeper investigation comes from Baghdadli and her colleagues (2018), who followed a group of 106 individuals with ASD for 15 years approximately from 4 years to 20. Considering results as a whole, the authors found that adaptive functioning was below the average all over the time. However, they found that adaptive functioning showed significant improvement over the time in socialization, communication, and daily-living skills in approximately 20% of the population, confirming results from Szatmari's study. Interestingly, improvement in this portion of population was significant as predicted by lower autism symptoms and higher language/intellectual levels at time of inclusion. Surprisingly, adaptive level at baseline did not predict adaptive level in the last timepoint, thus making hard a prediction of the trajectory based on the first adaptive assessment. However, the results from this study must be considered carefully, given that 80% of the population included had a coexistent intellectual disability.

Taken together, the research here shortly summarized the need to focus on adaptive functioning in all the spectrum independently from age, cognitive level, and autism symptoms. The most consistent finding is that all people on the spectrum experience some trouble in keeping pace with typical social/cultural standards of personal independence. This is well-known by families of individuals with ASD. Research suggests that adaptive functioning (in particular daily living skills) is a significant predictor of family quality of life (Gardiner & Iarocci, 2018) in adolescence. This stage of life is crucial in individuals with ASD. While a great number of services and intervention are now available for children with ASD, services for adolescents and adults are somehow limited and/or available only for people with high socioeconomic level. Furthermore, while some social routines (such as group participation) could be mediated by the presence of a caregiver (teacher, therapist, parent) during childhood, adult-mediation, it is not socially accepted during adolescence and adulthood. These factors could further increase the gap on reaching independence between individual on the spectrum and individuals with typical development.

Summing up, there are a large number of studies that cast light on the critical role of adaptive functioning. Focusing on adaptive functioning during treatment in earlier stage of treatment would help to increase all abilities that could be important for the people we are working on. However, given that intervention resources could be limited, it is important to choose adaptive skills that could be relevant for that specific person in order to live as much as independent in his social group.

Factors That Could Affect Adaptive Behavior in ASD

The knowledge of factors that could affect adaptive behavior in ASD could help in designing effective intervention plan to improve adaptive level of individuals with ASD.

The most consistent predictors of a good adaptive functioning are cognitive and language level (Szatmari et al., 2015), while the role of ASD symptoms is less clear with studies finding mixed results (Perry et al., 2009). Despite their importance, IQ and language level seems to have small effects on adaptive functioning in individuals without ID, while other research suggests that executive functioning could have greater effects (Pugliese et al., 2015). Recent studies (12 years follow-up) showed that executive functioning when assessed in preschoolers could predict adaptive level in Communication, Daily Living Skills, and Socialization skills (Pugliese et al., 2015). Deficit in executive functioning, such as ability to self-monitoring, problems in inhibition or shifting, are frequently reported in people on the spectrum (Christ et al., 2007; Hill, 2004; Luna et al., 2007; Kenworthy et al., 2008). Self-monitoring refers to the skills to monitor one's own behavior to reach a predefined goal and modify one's behavior accordingly. Deficit in this area has been related to some ASD symptoms such as repetitive behaviors, perseverative responding, and joint attention deficit (Hill, 2004). Inhibition is the ability to suppress an automatic response voluntarily and deliberately. Difficulty in inhibition is often connected with some deficit in ASD such as ability to turn-taking during conversations with others. "Shifting" is the skill to intentionally move thoughts and actions in response to changes in environment. Also, this ability has been linked with some deficits in individuals with ASD (Granader et al., 2014; Rosenthal et al., 2013) such as lack of flexible thinking, difficult to cope with new social situations, or difficulty with change in environment resulting in "meltdowns." These abilities may significantly impact relationships of individuals with ASD throughout the lifespan. Focusing intervention on these abilities could lead to higher adaptive level, especially in individuals without ID.

Interestingly, an ultimate factor that could affect the adaptive functioning is the presence of siblings in the family. Individuals with siblings experienced increasing adaptive growth trajectories in longitudinal studies when compared to individuals without siblings (Rosen et al., 2021). The result from this study emphasizes the role of siblings in increasing adaptive skill in most individuals consistently with literature describing positive effect of siblings on development (see work on theory of mind, social communication, and nonverbal communication (i.e., Matthews & Goldberg, 2018; Ben-Itzchak et al., 2019)).

Adaptive Functioning in Individuals with Williams-Beuren Syndrome

Williams-Beuren Syndrome (WBS) is a rare disorder (1:7500) related to a de novo hemizygous microdeletion on chromosome 7q11.23. The deletion usually ranges from 1.55 Mb in 95% of cases to 1.84 Mb in 5% of cases (Osborne et al., 2001; Bayés et al., 2003; Schubert, 2009). A common feature in most of the individuals with WBS is the presence of hyper-sociability. A global developmental delay, with relative spared language skills and deficit in visuospatial skills, is usually found (Alfieri et al., 2017; Vivanti et al., 2018).

Despite less renowned, also individuals with WBS share several problems in reaching an independent life. By following Elison and her colleagues (Stinton et al., 2010) in one of the widest studies on outcomes, only 8% of 92 adults with WBS included in the study lived completely independently. The remaining participants were living in residential accommodation for people with intellectual disabilities (39%) or with their parents (53%). Furthermore, only 7% of participants had a regular employment with a regular payment, while the remainder were employed in “special job,” in voluntary unpaid job, or unemployed. Interestingly, despite their hyper-sociability, about a third of the individuals included in the study have poor abilities to create and maintain friendship relationships and a half of them were described as having a poor comprehension of the concept of friendship.

Similarly to what happens in ASD, also in WBS IQ is one of the major predictors of good outcomes in independent life, particularly concerning self-care, social impairment, and occupational functioning. Individuals with higher IQ tend to reach higher satisfaction in described areas. Furthermore, this study has also found that Vineland Adaptive Behavior Composite (ABC) plays a major role in self-care, social impairment, and occupational functioning, as well as in behavioral impairment and physical health problems.

Taken together, these data highlight the difficulties of individuals with WBS in reaching a satisfying independent life. However, research on this topic is still scarce and further investigation would help describing adaptive profile associated to good outcome in this syndrome.

In the next sections, we will review the research on adaptive profile of individuals with WBS in cross-section and longitudinal studies, which are the predictors of adaptive level. Again, we will just describe main studies to depict a picture of WBS adaptive profile, without any intention to be fully exhaustive.

Adaptive Profile in Individuals with WBS

In a recent review, most of the individuals with WBS shared a global adaptive profile below the normal range both in preschoolers and in schoolers, with a wide range of functioning for all ages considered in this study. While some individuals showed functioning profoundly or severely impaired, others have an adequate or moderately low adaptive level (Hahn et al., 2014; Howlin et al., 2010; Mervis & John, 2010; Mervis et al., 2001).

The analysis of adaptive profile in preschoolers with WBS has shown mixed results. Differently from what happens in ASD, pattern of strengths and weaknesses differs from one study to another and tends to modify over the years. These differences could be due in part to the different assessments used in investigation, and in part to modification in adaptation to evolutionary tasks.

The main studies on adaptive functioning in preschoolers have used both old and new version of Vineland as well as ABAS-2. While some authors (Kirchner et al., 2016) did not find any relevant differences between scales in adaptive levels (16 preschoolers, with mean age of 28.7 months) by means of ABAS-2, others found uneven pattern of strengths and weaknesses. For example, Hahn and her colleagues (2014) have highlighted a profile characterized by strengths in communication and socialization (18 prescholeers, with mean age of 47 months), using Vineland Adaptive Behavior Scales – Interview Edition, Survey Form. Furthermore, other authors (Hamner et al., 2019) showed a relative point of strength in socialization (but not communication) by means of the parent report form of VABS-2, in a sample of 18 children with mean age of 47 months, while others (Alfieri et al., 2021b) found only strength in communication (but not in socialization) by means of the Vineland Adaptive Behavior Scales – Interview Edition, Survey Form. Beyond heterogeneity of tools used, the main limitation of these studies is the limited sample presumably due to the rareness of the disorder.

However, the results of the studies become more consistent by moving from preschoolers to scholars. Most of the research show that socialization and communication domains are usually found above other domains (Mervis et al., 2001; Mervis & Klein-Tasman, 2000). Interestingly, all the studies in scholars’ sample have used the same tool (Vineland Adaptive Behavior Scales – Interview Edition, Survey Form), accounting for the unevenness of results in research on early stage of life. Moving to studies on adulthood, a different profile emerged, with socialization that remained a strength, while Daily Living Skills and Communication fall in the lowest areas of functioning (Cherniske et al., 2004; Howlin et al., 2010).

As per ASD, longitudinal studies on adaptive functioning are limited also in WBS. As far as we know, only three longitudinal studies have been conducted. Fisch et al. (2010) found a relative stability in functioning after 2 years in children and adolescents. Differently, Mervis and Pitts (2015) found a significant decrease of adaptive functioning after 3 years follow-up (in particular, in Motor Skills and Community Living skills, while Communication and Socialization were more stable). Howlin and colleagues (2010) found a significant improvement in Socialization and Daily Living adaptive skills in the longer study available (12-year follow-up), suggesting that some adaptive skills could improve over time. Concerning group trajectories, Mervis and Pitts (2015) found that many children (around 42%) showed a significant decline, while only a smaller proportion (7%) of their participants had a significant improvement.

One of the most known characteristics of individuals with WBS is the hyper-sociability and the interest in people. For that reason, WBS has been considered a disorder on the "polar opposite" of autism for a long time (Schultz et al., 2001). However, recent investigation has revealed that WSB and ASD show more similarities than differences (Alfieri et al., 2022). In fact, children with ASD and those with WBS show some kind of deficit in socio-communicative abilities: problems in shared attention, showing or giving objects in preschool age; troubles in social relationships, pragmatic language, and emotional awareness in school age (Vivanti et al., 2018). Furthermore, despite relative preserved language abilities, only expressive skills in adaptive profile were higher mental age, while receptive skills were found significantly lower, thus indicating difficulties in comprehension including pragmatic skills (Alfieri et al., 2017).

For that reason, cross syndrome studies have been conducted in order to assess similarities and differences between adaptive profile of individuals with ASD and WBS (Hamner et al., 2019, Alfieri et al., 2021a; Alfieri et al., 2022). Interestingly, results from these studies showed that, when matched for age and cognitive level, individuals with ASD and WBS were globally similar on adaptive level. Some differences emerge only in preschoolers in communication (Alfieri et al., 2021b) and socialization (Hamner et al., 2019), but these differences were not found in scholars. These results further emphasize the difficulties in social-communicational skills of individuals with WBS. While the hypersociable personality should persuade that individuals with WBS would have poor problem with socialization, this characteristic seems to have a good impact on their social relationships only in early stages of life. However, when friendship and other relationships become more complex and demanding, difficulties emerge also in this population so much that no significant difference between individuals with ASD and WBS emerges in this research (Alfieri et al., 2021a). This is confirmed from data on outcomes of adult individuals with WBS where around 30% fail to have stable relationship with other people. Interestingly, a similar proportion of individuals with WBS show social-communication problems during childhood (Klein-Tasman et al., 2007, 2009, 2018) in structured assessment conducted with gold standard tools for autism diagnosis.

Factors That Could Affect Adaptive Behavior in WBS

The most consistent predictor of adaptive behavior in individuals with WBS is IQ (Mervis et al., 2001; Alfieri et al., 2021a). However, also other features have been considered for their relationship with adaptive functioning WBS such as the ability to request help when completing tasks and low persistence in completing tasks for preschoolers. Considering "hot executive functioning," Phillips (2008) reported that difficulties in emotion regulation are related to lower adaptive functioning in preschoolers (especially in Motor Skills and Personal Living Skills) beyond and above intellectual level. Finally, other useful information is derived from Mervis & John, (2010), who showed that difficulties in sensory regulation are related to poorer adaptive functioning both in children and adolescents.

Adaptive Functioning in Individuals with Fragile X Syndrome

Fragile X Syndrome (FXS) is a genetic disease inherited through X chromosome, included since 2001 among Rare Genetic Syndromes as it occurs in only 1/4000 males and 1/8000 females (Salcedo-Arellano et al., 2019). It was first described in 1943 by Martin and Bell, from which the condition takes its second name (it is also called "Martin-Bell Syndrome"). However, the molecular basis of FXS was discovered only in 1991, when the FMR1 gene (Fragile X Mental Retardation 1) located on the long arm of the X chromosome and whose mutation gives rise to the Syndrome, was isolated for the first time (Corona & De Giuseppe, 2018).

FXS is actually considered the most common inherited cause of ID, the second most prevalent cause after Down syndrome, and the most common monogenic cause of ASD.

The condition is caused by an abnormal expansion in the number of trinucleotide CGG (cytosine-guanine-guanine) located in the 5' UTR in *FMR1* at Xq27.3. More specifically, it is the result of the expansion of the CGG repeat in each generation moving from the permutation range of 55–200 repeats and expanding to a full mutation when passed by a mother to her children (Nolin et al., 2003). FXS patients have more than 200 repeats of this codon. Interestingly, people with permutation (55–200 repeats), although not affected by XFS phenotype, may exhibit other medical, psychiatric, and cognitive symptoms that can interfere with their daily life but also with their children's adaptive functioning (Moser et al., 2021). Very common medical problems in premutated people are Fragile X Associated Tremor/Ataxia Syndrome (FXTAS) and fragile X-associated primary ovarian insufficiency (FXPOI).

FMR1 gene encodes the Fragile X Mental Retardation Protein (FMRP), which binds several mRNAs, mainly in the brain and testicles, which are the most affected areas. Indeed, people with FXS exhibit language delay, hyperactivity, anxiety and mood disorders, cognitive deficits, learning disabilities, and macroorchidism in males. Girls are usually less affected than boys and only 25% of FXS women have ID.

Much of what has been published about the link between the genotype of people with FXS and the degree of neurobehavioral functioning is based on the measure of the CGG trinucleotide levels and the consequent quantity of FMRP produced (Garber et al., 2008). However, adaptive behavior is one of the most reliable indicators for assessing outcome in children with developmental disorders, such as Fragile X Syndrome, because it represents a more significant estimation of real-life skills.

In the following paragraphs, we will shortly review adaptive profile of people with FXS in longitudinal and cross-section studies. Factors that may influence adaptive behavior in FXS will be analyzed too.

Adaptive Profile in Individuals with FXS

Research on adaptive behavior, overall and within behavior domains (i.e., communication, socialization, daily living, and motor skills), has identified three main possible development trajectories in people with FXS: (1) declines over time (i.e., Klaiman et al., 2014), (2) normal development until the age of 10 and then decline or stabilization (i.e., Fisch et al., 1999), and (3) steady increase from early childhood until adolescence (i.e., Hatton et al., 2003). Those different outcomes may be influenced by the different ages of people included in the various research samples, types of standardized scales and scores used (i.e., standard vs. raw scores), and by the presence/absence of comorbidities in the FXS individuals who have been studied.

However, results from the most recent longitudinal studies (i.e., Hahn et al., 2015) agree that middle childhood is a critical age period for adaptive behavior in FXS. A considerable number of children with FXS lose the adaptive behavioral skills previously learned both in relation to their peers and in absolute terms. The biggest decline can be observed in the socialization and communications domains, in line with the pragmatic, receptive, and expressive language difficulties observed in people with FXS (Abbeduto et al., 2016).

In contrast, daily living abilities (i.e., housekeeping, using public transportation, using community services, using mobile-phones, etc.) seem to be a relative strength also with growth (Hatton et al., 2003).

Factors That Could Affect Adaptive Behavior in FXS

The first research on behavioral functioning in FXS focused on the correlation between FMRP expression and phenotypes outcomes. For instance, Cohen et al. (1996) in a study comparing people with full mutation versus *FMR1* mosaicism showed that individuals with complete FXS had lower adaptive functioning, a result that was interpreted to be due to the amount of FMRP produced. However, biological factors cannot explain alone the adaptive behavior patterns observed in people with FXS. Then, other contributors to adaptive behavior should be taken into account, such as cognitive abilities. Several studies showed that IQ scores tend to decline over the time and a positive correlation between performance on intelligence tests and adaptive behavior scores has been observed, especially in women (Glaser et al., 2003). The biggest interrelationship has been underlined between IQ scores and the Adaptive Behavior Composite measured with VABS.

Furthermore, in confirmation of the importance of context factors explained in section "Adaptive Behavior: Assessment", it has been observed how home environment is one of the most significant predictors for long-term adaptive functioning. Parental expectations, parenting skills, home facilities, and emotional climate influence adaptive functioning more than anything else. Then, the finding of a positive correlation between lack of adaptive skills in FXS children and severity of premutation in their mothers is not surprising (Mooser et al., 2021).

In addition to cognitive abilities, the co-occurrent presence of ASD influences adaptive functioning. For instance, Smith and colleagues (2012) in a cross-syndromes study showed that individuals dually diagnosed with FXS and ASD displayed a more severe impairment in social and communication domains than people with FXS only.

Summing up, people with FXS exhibit adaptive behavior deficits that can be due to biological factors, IQ level, comorbidity with other diseases, and environmental factors. Home environment is the most significant predictor of adaptive behavior in people with FXS.

Conclusion

Adaptive behavior refers to the skills requested to function in everyday life and to cope with different life demands. It comprehends social interaction, communication, practical, and motor skills, which are all important to living a life worth living.

The current definition of ID includes deficits in both intellectual and adaptive functioning with degree of disability assigned according to adaptive behavior impairment. For this reason, adaptive behaviors should be always evaluated during ID assessment. Standardized and reliable tools should always be used. Identifying weaknesses and strengths in one person's adaptive functioning is essential to better understanding specific disorders and for the development of novel interventions. In fact, it has been observed that in different neurodevelopmental disorders, there is a regression in adaptive behavior skills that inevitably interferes with the possibility to gain independence in adulthood. This acknowledgment rises an important question: is the decline in adaptive behavior possible to prevent?

Researchers and clinicians have the important responsibility to answer this question and implement new and early intervention strategies.

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Part IV

Treatment Methods in Clinical Child Psychopathology

18

Applied Behavior Analysis: Conceptual Foundations, Defining Characteristics, and Behavior-Change Elements

Skylar C. DeWitt, Andrea M. Stephens,
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The discipline of behavior analysis is made up of three branches, including (a) behaviorism (the philosophical worldview of behavior analysis), (b) the experimental analysis of behavior (the study of fundamental principles and processes of behavior), and (c) applied behavior analysis (ABA; the application of a behavioral worldview and basic principles toward solving problems of societal importance; Morris et al., 2013). Individuals who maintain this worldview, study the science of behavior analysis, and apply these concepts and principles are known as behavior analysts. Behavior analysts acknowledge that anything a person says or does is behavior, regardless of whether it occurs publicly (i.e., is observable) or privately (i.e., is not observable). Further, behavior analysts recognize that most behavior serves a particular purpose and is primarily influenced by the environmental variables that occur prior to and following the behavior. Behavior analysts conduct research in pursuit of developing and evaluating evidence-based practices for improving our field's approach toward promoting socially significant behavior change. Although ABA-based procedures are an empirically supported treatment that has the potential to mitigate core and associated features of autism spectrum disorder (Reichow, 2012; Roane et al., 2016; Smith & Iadarola, 2015), it is important to note that the principles underlying this therapeutic approach are similarly effective when applied to other populations, settings, and behaviors.

The purpose of this chapter is to introduce the reader to the (a) origins and conceptual basis of ABA, (b) defining characteristics of a behavior-analytic approach, and (c) fundamental behavior-change elements used by applied behavior analysts. Our overview includes demonstrations of how the science of behavior analysis has been applied to address various behavioral concerns.

Origins and Conceptual Basis of Applied Behavior Analysis

It could be said that the field of ABA formally began in 1968 with the founding of its flagship publication, the *Journal of Applied Behavior Analysis* (*JABA*); however, its origin and conceptual foundations are the culmination of events initiated many years before the founding of the journal. To be fully understood, ABA must be considered in the context of the philosophy and basic research traditions from which it evolved and remains connected today.

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B. F. Skinner is widely regarded as one of the founders of the science of human behavior, contributing to some of the first publications on the philosophy of the science of behavior (i.e., behaviorism) and its basic science (i.e., the experimental analysis of behavior; Morris et al., 2013). Skinner's theoretical work and basic research were primarily influenced by ideas and empirical findings proposed by several pioneers, including Charles Darwin, Edward Thorndike, Ivan Pavlov, and John B. Watson. For instance, Thorndike's "Law of Effect" (Thorndike, 1911) played a significant role in Skinner's behaviorism by explaining how consequences are critical variables that influence the future occurrence of behavior. Further, Skinner used components of Watson's "Behaviorist Manifesto" to inform the philosophy of behaviorism, which emphasizes the environment's influence on shaping and maintaining behavior (Rakos, 2013). Skinner's *radical* behaviorism differs from traditional behaviorism in that it includes all human behavior, including behavior that cannot be overtly observed (i.e., covert behaviors and private events such as thoughts, feelings, and emotions). Skinner posited that all human behavior, including covert behavior, is subject to the same laws and principles of behavior as observable, overt behaviors (Heward & Cooper, 1992).

Beyond his contributions to the philosophy of behavior analysis, Skinner's approach toward conducting research was characterized by careful observation of the dependent variable (i.e., behavior) and systematic manipulation of the independent variable (e.g., reinforcement). In particular, his research aimed to demonstrate basic concepts and principles of behavior through a data-driven examination of functional relations (e.g., schedules of reinforcement; Ferster & Skinner, 1957). Much of the research conducted in the experimental analysis of behavior by Skinner and his contemporaries elucidated many of the basic concepts and principles of operant learning.

Researchers who applied basic principles and processes to modify human behavior were vital to the founding of ABA. Morris and colleagues (2013) conducted a systematic literature review and identified 36 articles published between 1959 and 1967 that formed the methodological and applied foundation that contributed to the emergence of ABA. The results indicated that although several case studies applied operant conditioning strategies to modify human behavior (e.g., Azrin & Lindsley, 1956; Bijou, 1955; Fuller, 1949; Gewirtz & Baer, 1958; Lindsley, 1956), it is likely that "The psychiatric nurse as a behavioral engineer" (Ayllon & Michael, 1959) formally marks the beginning of ABA as it reported data of individuals that were based on objective, direct observations of behavior. Much of the early research in ABA focused on the reduction of problem behavior; however, by the 1980s, ABA research shifted beyond simply modifying problem behavior with powerful (but arbitrary) consequences (i.e., behavior modification) and shifted to a model that aimed to determine why behaviors are occurring (i.e., understanding the functions of behavior) in order to replace problem behavior with appropriate behavior (Dietz, 1978). With this shift, a more individualized approach toward intervention was popularized, in which clinicians implemented function-based interventions to address behavior change. Additionally, clinicians reduced their reliance on punishment-based procedures and instead focused on identifying reinforcement-based interventions to increase appropriate, functionally equivalent replacement behaviors (Mace, 1994).

As a discipline today, ABA clinicians use the principles of behavior to inform behavior change in a meaningful and socially valid way for their clients (Furman & Lepper, 2018; Slocum et al., 2014; for more discussion on social validity in ABA, refer to the Dimensions of ABA section below).

Defining Characteristics of a Behavior-Analytic Approach

The field of ABA is distinctively different from other areas of clinical practice. In an attempt to explicitly describe these differences, we provide an overview of the dimensions of ABA within the framework provided by Baer et al. (1968) and discuss several other characteristics unique to a behavior-analytic approach.

Dimensions of Applied Behavior Analysis

Baer et al. (1968) described ABA as a self-examining, self-evaluating, discovery-oriented research procedure for studying behavior. Specifically, the authors noted that seven defining dimensions must be present to ensure that effective practices are developed, implemented, and evaluated. In particular, ABA must be *applied, behavioral, analytic, conceptually systematic, technological, effective,* and *generalizable*. This values-based approach fosters a unique sense of accountability among clinicians practicing ABA, as it provides a set of expectations to be met in practice. When reviewing each dimension below, we describe how they translate into practice.

Applied

Behavior-change goals must be practical and important to the society in which they are implemented (i.e., socially relevant). Skills learned via ABA are expected to translate to positive behavioral change in client settings encountered throughout their lived experience (e.g., in the home, at school, during play). Before a behavior-change goal is set, the clinician should ask themselves, how important is this behavioral change for the client and their daily life? For example, a client with language difficulties should receive an intervention that targets this skill deficit by teaching functional communication such that it will occur across people (e.g., teacher, parent, relative) and situations (e.g., school, home community).

Behavioral

Behavior is the subject matter and the target of any ABA intervention; the goal of any intervention is to produce meaningful behavior change. A target behavior (e.g., a tantrum episode) must be observable and measurable to ensure that progress can be monitored and tracked in a meaningful and evidence-based way (e.g., a graph detailing a clear decrease in the behavior). In the previous example of tantrums, specific behaviors such as hitting and kicking or destruction of work materials are easily measured due to their distinct occurrences. This level of specificity serves as a benchmark in ABA interventions, as it allows the clinician to more accurately track trends in client behavior, monitor treatment progress, and know when they ought to make changes to treatment plans.

Analytic

An ABA intervention strives to demonstrate a causal relationship (i.e., functional control) between an independent variable (IV; e.g., behavioral intervention) and a dependent variable (DV; e.g., behavior of interest), where the implementation of, or a change in, the behavioral intervention results in a desirable change in the behavior of interest. The effects of an intervention are commonly evaluated using a single-subject or "within-subject" design methodology in which an individual serves as their own control (i.e., the occurrence of behavior before intervention serves as the control and the clinician compares this period of responding to the level of behavior after experiencing the intervention). This methodology favors repeated measures of individual behavior and more easily allows for replicating treatment effects. This is a valuable approach for evaluating clinical recommendations and monitoring the influence of prescribed interventions, as it sets the occasion for ongoing clinical decision-making. For example, imagine a clinician implementing a behavior reduction procedure for a client who throws their toys to gain attention from their caregiver. In this situation, the clinician should record data on the child's toy-throwing behavior both prior to and after the intervention is implemented. In order to understand whether the intervention is effective, the clinician should evaluate the change in toy-throwing behavior from the baseline phase to the post-intervention phase. If the clinician really wants to be certain the intervention is responsible for the behavior change, they might even consider briefly removing the intervention to see if behavior returns to baseline levels (so long as this is safe and the environment can tolerate a brief increase in the target behavior). If this reversal produces baseline levels of responding, then the clinician can reverse back to the intervention, recapture treatment effects, and be confident that their prescribed intervention is, in fact, responsible for the observed treatment effects.

Conceptually Systematic

Behavior-change procedures should be consistent with the field's concepts and principles. For example, a clinician looking to promote appropriate classroom behavior in a client might look to the extant literature on implementing the Good Behavior Game (Barrish et al., 1969), a procedure that reinforces a child's on-task behavior during instructional time. This procedure is based on principles of operant conditioning, such that the client will learn to engage in appropriate on-task behavior and abstain from inappropriate behavior during classroom time altogether. Alternatively, an intervention developed independent of an existing conceptual system is not expected to translate to meaningful behavior change over time. Even if the procedure does result in behavior change, it would be difficult to understand why. Thus, it is crucial for ABA clinicians to maintain contact with the professional literature to ensure they are developing interventions in a way that aligns with our field's current conceptual systems and are considered best-practice and evidence-based procedures.

Technological

Behavior-change procedures (i.e., treatment plans) are operationally defined and described in such a way that they can be implemented consistently and replicated by others. This is particularly important for cases in which multiple clinicians and technicians are involved in implementing the intervention prescribed to an individual, as it ensures that therapeutic practice is consistent across all forms of implementation. ABA clinicians are ethically obligated to ensure this expectation is met in the development of any treatment plan or procedure. For example, a clinician may be tasked with writing a procedure designed to fade instructional prompts with a client. In this procedure, the clinician would detail each individual step in the fading procedure, including steps to take when the client responds incorrectly.

Effective

Behavioral interventions should produce meaningful and socially valid behavior change. In other words, the resulting behavior change must be sufficient and relevant enough to be of practical value. *Social validity* is measured by assessing the significance of treatment goals (i.e., considering whether a behavioral goal is desired by the society in which the client lives), the acceptability of treatment procedures (i.e., does the client and their caregiver consider the intervention procedures to be acceptable), and the importance of treatment effects (i.e., is the client and their caregiver satisfied with the results of the treatment; Kazdin, 1977; Wolf, 1978). For example, a behavioral intervention designed to teach a client who attends school in a large and sprawling facility to navigate hallways efficiently would likely be of high social validity for that client. Alternatively, this same intervention may have low social validity for a home-schooled client. ABA clinicians are expected to consider the social validity of behavior -change procedures prior to designing such programming.

Generalizable

Generalized behavior change occurs across different contexts (e.g., in a variety of settings, across multiple caregivers), is durable, and persists over time (i.e., maintenance). While skills are often taught in a clinical environment and with a small number of clinicians, skills are considered to be truly "learned" when they appear in a generalized manner. For example, consider a client who has been taught to request bathroom breaks. If this skill was taught in a clinical setting, but has consistently translated to the client successfully requesting bathroom breaks from their teachers at school, then it has generalized. As such, ABA clinicians are expected to consider the potential for skills taught in a clinical context to translate to the natural environment and provide steps to facilitate this process as a critical feature of the behavioral intervention plan.

Characteristics of Applied Behavior Analysis

In addition to the dimensions of ABA defined above, there are unique characteristics of ABA that offer a framework for effectively designing and individualizing behavior-change programs to meet the specific needs of each case (Behavior Analyst Certification Board, 2014). First, the focus on the four-term operant contingency allows for a precise understanding of the constellation of variables involved in the behavior-change program. Second, methods for selecting a target response and unit of measurement are based on the unique features of the behavior. Third, identifying and delivering consequences are done in a careful and systematic manner. Finally, the intervention's influence over the target response is evaluated in a manner that allows for the isolation of causal variables and a clear understanding of the intervention's impact. We provide further details on each of these characteristics and their importance within an ABA approach below.

Understanding the Operant Contingency

As previously described, *operant behavior* is behavior that is selected and maintained by environmental consequences. Operant behavior is different from a reflex in that it has been learned and shaped as the result of consequences in an individual's environment that have made the behavior more likely to occur in the future (Skinner, 1965). It is important to examine what may be motivating an individual to emit a behavior (*motivating operations*), what setting events occur directly before the behavior (*antecedents*), and what occurs directly after the behavior (*consequences*). Together with the behavior of interest, the prior elements (motivating operations, antecedents, behavior, and consequences) comprise the *four-term operant contingency* used by clinicians to predict, analyze, and establish new behaviors. The elements of the four-term contingency will be described below as it pertains to response acquisition.

Motivating Operations Motivating operations are environmental variables that alter the effectiveness of stimuli, events, or objects as *reinforcers* (a change in an individual's environment that occurs directly after a behavior that increases the future frequency of that behavior) or *punishers* (a change in an individual's environment that occurs directly after a behavior that decreases the future frequency of that behavior). Pertaining to response acquisition, clinicians aim to analyze and set up *establishing operations* (environmental variables that increase the effectiveness of stimuli, events, or objects as reinforcers); in other words, establishing operations influence what is motivating an individual to emit a behavior in that moment (Laraway et al., 2003). For example, if an individual is hungry and deprived of food because they did not eat breakfast (the establishing operation), they may be more likely to emit a behavior to obtain food (such as ordering food at a restaurant), as obtaining food is likely valuable to them in that moment to relieve the hunger.

Antecedents Antecedents are stimuli, events, or circumstances that immediately precede a behavior. Antecedents are essential to analyze as it is likely that the behavior of interest occurred under those antecedent conditions previously and will likely occur again in similar setting conditions in the future if reinforcement is available (Miltenberger, 2004). Using the previous example of an individual who is experiencing food deprivation (establishing operation), antecedents to ordering food may include a server approaching the table the individual is seated at and asking what the individual would like to order.

Consequences Consequences are stimuli, events, or circumstances that immediately follow a behavior. Consequences that are directly related to the establishing operations and antecedents are likely to have a significant influence on the frequency at which the behavior will occur in the future (Vargas & Vargas, 1991). In the context of response acquisition, consequences that immediately follow the response may act as a reinforcer if the consequence increases the likelihood of the response occurring again in the future. In the example of the food-deprived individual, if the server responds by saying they are out of food (e.g., "sorry, our kitchen is closed") and does not bring a grilled cheese, the individual is not as likely to emit the response in the future than if the server responds to the individual by saying they will get them the grilled cheese (e.g., "sure thing") and brings the grilled cheese minutes later. Affirming access to the sandwich and delivering it to the individual may act as reinforcers of the behavior, increasing the frequency of asking for the sandwich at this restaurant in the future.

Selection of a Target Response

Several important factors are considered by ABA clinicians in determining what behaviors to target for intervention. When starting services (and continuing throughout the duration of services), behavioral assessments consisting of interviews, direct observations of behavior, and other tests are administered to clients and their caregivers. These behavioral assessments aim to gather important information regarding not only behaviors to target for intervention, but also the relevant environmental variables that may be influencing the behaviors so that an effective intervention can be introduced to address them (Matson & Minshawi, 2007).

After completing the behavioral assessment, clinicians assess several variables to ensure a response is appropriate to target, including the behavior's social significance and relevance. Concerning the former, behaviors targeted for intervention must reflect the needs of the client and receive approval from relevant stakeholders (e.g., caregivers, teachers, bosses, etc.). Concerning the latter, behaviors targeted for intervention must be relevant to the client and positively impact their quality of life. For a behavior to be considered relevant, it must allow the individual to access reinforcement in their environment outside of services (i.e., their natural environment). For instance, it would be inappropriate and irrelevant to teach an adult client to complete an academic task if their overall goal of therapeutic services is to promote independence in a workplace setting where that academic task is not needed. Further, clinicians often aim to teach behaviors to clients that will allow them to access new environments and reinforcement (e.g., crawling, driving, navigating, reading) or to teach behaviors that will lead to new, untrained behaviors occurring in untrained settings (e.g., training choice, self-management strategies; Bosch & Fuqua, 2001; Mahoney et al., 2007; Rosales-Ruiz & Baer, 1997).

Once a behavior is identified in assessment, determined to be socially significant, and recognized as relevant, clinicians operationally define the behavior. The description of the behavior must include observable and measurable features to be considered an operational definition. Once defined, any person looking at the definition should be able to observe others and definitively say if the behavior occurred or did not occur. To help with this, ABA clinicians provide examples and non-examples of the behavior in their operational definitions. An example operational definition for requesting a break is as follows: any instance in which the individual vocally states a phrase asking for a break or time out from activities during classroom instruction time. Examples of requesting a break include instances in which the individual raises his hand and vocally asks for a break (e.g., "may I have a break please?") and instances in which the individual approaches the classroom instructor and vocally asks for a short break, time out, recess, or time to breathe. Non-examples of asking for a break include instances in which the individual does not vocally request a need for a break and walks out of the classroom or requests to go home.

Measurement

To ensure beyond a subjective doubt that behavior change is occurring, clinicians in ABA take objective data (i.e., measurements) on the target response. Measurement of behavior is a crucial aspect of evaluating the treatment characteristics' control over the nature of the response. Behavior can be measured in several ways, and the selection of measurement criteria is largely dependent on the topography and function of the target response and the goal of the overall program. For instance, if a clinician taught a new response to a student consisting of raising their hand to obtain a teacher's attention, the clinician would likely initially choose to take data on how often this new response occurs (i.e., measuring frequency or rate). In other instances, it may be more appropriate to measure how long a behavior occurs (i.e., *duration*), how long it takes for the response to occur after the presentation of an instruction (i.e., *latency*), or the amount of time between occurrences of the target response (i.e., *interresponse time*). Lastly, clinicians may use permanent products, such as homework assignments, quizzes, or other changes to the environment that can be directly observed after the occurrence of the response, to measure performance (LeBlanc et al., 2016). For instance, if a clinician teaches a child how to write their name, they may measure performance by examining the sheets of paper the child wrote on for accuracy in spelling (e.g., percent of letters written accurately). For a skill to be considered acquired, clinicians teach, measure, and monitor the target responses until a predetermined mastery criterion is met (e.g., Billy will use a pencil to correctly write his name within two lines of a wide-ruled notebook page with 100% accuracy across three consecutive trials).

Establishing, Selecting, and Delivering Consequences

During response acquisition training, the target response is reinforced to increase the future frequency of its occurrence. To reinforce a behavior, clinicians deliver reinforcers immediately following the target response. Preferences for reinforcers differ across clients and may even fluctuate on an individual basis. Reinforcers can take various forms and can include tangible items (e.g., favorite toys, food), activities (e.g., playing a game, swinging), and social interaction (e.g., praise, conversations). Reinforcers can also be established through continuous pairing of an unconditioned or conditioned reinforcer (e.g., food, favorite toy) with a previously neutral item (e.g., tokens, praise) until the neutral item begins to function as a conditioned reinforcer (Longano & Greer, 2006; Peterson et al., in press). To select which stimulus is most preferred by the client, clinicians conduct stimulus preference assessments to identify items that are likely to function as reinforcers (Heinicke et al., 2019). At the beginning of response acquisition training, reinforcers are often contrived and delivered immediately after the target response. As the response is acquired, clinicians systematically transition from reliance on contrived, arbitrary reinforcers to the use of naturally occurring reinforcers, (i.e., vocal praise or completion of the activity itself) to promote maintenance and generalization of the responsein the everyday environment (Briggs et al., in press; Stokes & Baer, 1977).

Performance Evaluation

As noted previously, evaluation of behavior change is typically done via a within-subject design where the subject serves as their own control. Within-subject designs are generally preferred over other methods (e.g., between-group designs), given their purpose is to evaluate the effects of the intervention with a particular individual (Cox, 2016). In a within-subject design, repeated measurements of the target behavior (i.e., dependent variable) are collected and compared across a pre-treatment phase (i.e., baseline phase) and treatment phase (i.e., independent variable) to determine if the intervention produces desirable behavior change.

Throughout the assessment and treatment process, data are graphed on a regular basis (e.g., during every treatment session) in order to monitor client progress and evaluate treatment effects. The graphed data are analyzed using visual inspection methods, which allows the clinician to assess trends and variations within the data (e.g., increasing, decreasing, stable). Continuously monitoring the data provides the clinician with ongoing information regarding the effectiveness of the intervention. Based on the patterns of responding, clinicians determine whether treatment should continue as is (i.e., is effective) or whether it needs to be modified (i.e., because it may be ineffective). Clinicians use the data to inform their clinical decision-making and increase the likelihood of producing desirable behavior change and achieving the behavior-change goals of the client.

Fundamental Behavior-Change Elements

As mentioned above, ABA involves the application of well-established concepts and principles serving as fundamental components within behavior-change programming. In particular, applied behavior analysts have developed a technology for teaching behavior, improving features of existing behavior, determining maintaining variables of maladaptive behavior, and designing function-based treatments to reduce problematic behavior. Although much of the response acquisition and behavior reduction technology has been discovered with individuals diagnosed with developmental disabilities, it has also been extended to and demonstrated to be effective in early childhood, regular education, and college classrooms and in workplaces, homes, and other various settings. In the following sections, we provide an overview of commonly used response acquisition and behavior reduction procedures.

Response Acquisition

A significant focus in ABA services is building individuals' skill repertoires. Socially important skills vary on a case-by-case basis according to the needs and goals of the client and their caregivers. For instance, a young child may be taught to appropriately request an item or activity from caregivers, whereas an adult may be taught to complete work tasks so they can obtain integrated, competitive employment. Regardless of the behavior being taught, ABA clinicians use the principles of behavior to reinforce new responses and refine aspects of existing behavior (e.g., teaching a verbal request for items if an individual is already requesting items via pointing). The following section will provide an overview of essential elements ABA clinicians use when training new responses.

Teaching Strategies

The strategies used to teach responses typically differ depending on multiple factors, including the topography of behavior, goals of teaching, and client preferences. Despite their differences, many teaching strategies incorporate basic components based on the principles of behavior, including establishing stimulus control and using prompting, shaping, and chaining. The basic tenets of these strategies are described below.

Establishing Stimulus Control When teaching or refining behavior, clinicians aim for behavior to occur in the presence of some antecedent stimuli, but not in the presence of other antecedent stimuli. In a classroom setting with a teacher present, clinicians may teach students to raise their hands and wait to be called on before speaking. If a student were to be in a situation where it would not be appropriate to gain their teacher's attention (e.g., when the teacher is busy with another student), this hand-raising behavior would not be productive in getting the teacher's attention (Torelli et al., 2017). As such, clinicians aim to arrange relevant antecedent stimuli that signal when behavior should or can occur and result in reinforcement (when at school with a teacher present, raising one's hand allows for access to the teacher's attention). The ultimate goal of this programming strategy is to gain *stimulus control*, which occurs when aspects of behavior are changed by the presence of antecedent stimuli. When a behavior is likely to result in reinforcement, the antecedent stimulus present is referred to as discriminative stimulus (e.g., the teacher in a classroom setting is a discriminative stimulus for hand-raising behavior); however, when a behavior is not likely to result in reinforcement, the antecedent stimulus is referred to as stimulus delta (e.g., absence of the teacher in a classroom setting or when a student is alone at home is a stimulus delta for hand-raising behavior). When a behavior occurs in the presence of a discriminative stimulus, but not in the presence of a stimulus delta, a behavior is said to be under stimulus control (Sidman, 2008).

Using Prompts and Prompt Fading When teaching behaviors, *prompts* are often used to help clients perform a targeted skill correctly. These prompts can occur in many forms (e.g., verbal, physical, models, visual aids, and gestures) and are often presented according to their intrusiveness. For example, a gestural prompt (e.g., pointing at an object needed to complete a behavior, such as a pencil for writing) is considered less intrusive than a physical prompt in which a clinician would physically assist the client to complete a behavior (e.g., holding a client's hand and helping guide the pencil). However, the goal of using a prompt is to increase the likelihood that the client will engage in the correct response, so the least intrusive but most effective prompt is necessary to accomplish this. Prompts are often not presented as the sole (or long-term) intervention when teaching skills; rather they are meant as short-term aids that are to be faded out in order to promote independence (Quigley et al., 2018).

Shaping Complex Behavior Shaping involves reinforcement of successive approximations of behavior and is another strategy for teaching behavior. Clinicians often begin by reinforcing some behavior already in a client's repertoire that is similar to the behavior goal. For instance, a clinician might first reinforce touching a sock if the behavior goal is for the child to put on a sock. Next, the clinician would reinforce picking up the sock. After this, the clinician would reinforce each instance of behavior that got closer and closer in the form to the behavior goal (e.g., grasping sock with two hands, bringing sock to foot, placing the foot in the sock, and pulling the sock over the foot), while not reinforcing instances of behavior that are not closer in the form to the behavior goal (e.g., throwing sock, putting a sock on hand, etc.). Further, shaping can be used to modify aspects of the behavior once learned, such as how often it occurs and for how long it occurs. Shaping has been used to teach or modify several behaviors, including feeding (Hodges et al., 2017) and academic task engagement (Athens et al., 2007).

Chaining Sequences of Behavior Together Like shaping, chaining also involves the breakdown of behavior into simple steps. Unlike shaping, chaining explicitly involves a *behavior chain*, or sequence of responses in which one response follows the other, serveing both as reinforcement for the previous response in the chain and setting the occasion for the next step of the chain. Using the same putting-on-a-sock example as above, the behavior chain consists of the following steps: pick up the sock, grasp sock with two hands, bring the sock to the foot, place foot in the open end of the sock, and pull the open end of the sock over foot until the closed end of the sock reaches the toes and the open end of the sock is above the ankle. Instead of reinforcing successive approximations (as in shaping), clinicians use *task analyses* (consisting of the breakdown of steps for the behavior goal) to help identify what responses make up the behavior chain. Then, chaining strategies are then used to teach the goal behavior.

Three main variations of chaining strategies are used by clinicians, including forward chaining, backward chaining, and total task chaining. In forward chaining, clinicians first teach the client to perform the first step of the task analysis (e.g., pick up sock) and complete the rest of the steps for them. Once the first step is mastered by the client, the clinician then allows the client to perform the first step and teaches the second step in the chain (e.g., grasp sock with two hands). This continues until the entire behavior chain is performed independently by the client. In backward chaining, the clinician performs all steps of the chain until the last step (e.g., pull the open end of the sock over the foot until the closed end of the sock reaches the toes), in which the clinician teaches it to the client. Once the last step is successfully performed by the client independently, the clinician performs each step until the second to last step and teaches this step (e.g., place the foot in the open end of the sock) and allows the client to perform the last step independently. This process is again repeated until the client performs the entire behavior chain independently. Lastly, in total task chaining, the clinician teaches the client the entire behavior chain until the client is able to perform each step with independence (Bancroft et al., 2011; Slocum & Tiger, 2011).

Behavior Reduction

Treating problem behavior has been a major concern of applied behavior analysts since the field's inception (e.g., Wolf et al., 1964). The advent of functional analysis (FA) methodology (Iwata et al., 1982/1994) resulted in an important shift in intervention development and treatment philosophy. Most importantly, the determination of the conditions that maintain problem behavior during an experimental FA allows clinicians to develop effective function-based interventions to replace the problem behavior with a functional, more appropriate alternative behavior.

Development of a Function-Based Intervention

A function-based intervention is developed in phases, generally beginning with an indirect assessment of problem behavior (e.g., caregiver interviews designed to capture first-hand accounts of client problem behavior). Next, a clinician will often conduct a descriptive assessment in which they observe the client’s problem behavior and generate hypotheses about the function. Following this data collection, an FA is often conducted. While an in-depth explanation of FAs is beyond the scope of this chapter (see Dozier et al., 2022, for coverage of the topic), it is important to understand that once the variable(s) responsible for the maintenance of problem behavior is discovered, interventions can be derived to (a) decrease the motivation to engage in the problem behavior, (b) eliminate the reinforcer for the problem behavior, or (c) provide the reinforcer for an alternative response. In fact, previous research has shown that interventions based on the outcome of FAs are more effective than those that are not (Didden et al., 1997; Iwata et al., 1994) and have resulted in a decrease in the reliance on punishment contingencies for reducing problem behavior (Pelios et al., 1999). Next, we will review some common function-based intervention approaches that may use the outcomes of an FA to inform antecedent- and consequent-based intervention approaches.

Antecedent-Based Interventions

In antecedent-based behavioral interventions, events or conditions that occur prior to a specific behavior are manipulated with the intention of eliminating or reducing the specific behavior (Smith, 2011). This style of intervention is generally used after conducting an FA to identify the function of the behavior, as this allows the clinician to design the intervention in a way that will reliably affect the behavior of concern through the manipulation of variables like motivating operations (Michael, 2004). Motivating operationss are generally broken down into two categories: establishing operations, which increase the effectiveness of a reinforcer, and abolishing operations, which decrease the effectiveness of a reinforcer (Laraway et al., 2003). For example, a clinician might use this approach to create an intervention for a child who disrupts a classroom in order to receive attention by instructing the teacher to regularly provide attention to the child before any disruptive behavior occurs to decrease the value of attention following disruptive behavior (thereby serving as an abolishing operation). As a result, the child’s disruptive behavior is likely to decrease given that they are already receiving the attention and there is little to no motivation to engage in other behavior to get it. In the previous example, the teacher’s attention would be provided "freely" or not based on the child’s behavior (i.e., noncontingently). Noncontingent reinforcement is an antecedent-based intervention that consists of the presentation of a reinforcer regardless of the occurrence of a specific behavior (in this case, providing attention regardless of disruptive behavior), that generally occurs on a set schedule.

Consequent-Based Interventions

Consequent-based interventions often utilize procedures based on concepts of reinforcement, extinction, and punishment with the intention of reducing the targeted problem behavior. Differential reinforcement is a common procedure in ABA that includes several variations distinguished by the relationship between the newly taught behavior and the problem behavior. A clinician’s decision regarding which variation of the DR procedure to use often depends on the main goal for the problem behavior; for example, if the goal is to eliminate the behavior by introducing a functionally equivalent alternative behavior, then a DR procedure may best suit the intervention (Hanley & Tiger, 2011).

Extinction involves withholding reinforcement for a given response (e.g., problem behavior). Like with antecedent-based interventions, the function of the target behavior must be identified before implementing an extinction procedure (Vollmer et al., 2021). Once the function is identified (e.g., social-positive, social-negative, and automatic reinforcement; Iwata et al., 1994), extinction procedures can be designed to precisely address the problem behavior.

Finally, another approach to consequent-based interventions is the use of punishment procedures. Punishment involves the contingent presentation of an aversive stimulus or removal of a reinforcing stimulus (i.e., positive and negative punishment, respectively) to decrease the likelihood that a specific behavior will occur again in the future (Lerman & Toole, 2011). Although clinicians in our field adhere to The Principle of Least Restrictiveness (Vollmer et al., 2011) when selecting and prescribing interventions, if it is determined that a punishment procedure is required, it is best practice for the procedure to first receive formal approval from a Human Rights Committee before implementation is deemed appropriate and ethical. Punishment procedures are generally designed to mirror contingencies that occur throughout one's natural environment. Negative punishment-based procedures such as a time-out or point loss in a token system are often prescribed for this reason. In sum, punishment is rarely relied on as an intervention strategy now that the field embraces a function-based intervention approach when treating problem behavior.

Maintenance and Generalization

As stated previously, a key goal of behavioral intervention is to produce changes in client behavior that persist over time (i.e., maintained) and occur across different contexts (i.e., generalized). Oftentimes, a goal is for the performance to transfer across relevant (non-training) environments and perhaps even to other (untrained) ways of behaving, as a behavioral technology would have limited clinical value if it failed to produce durable and useful changes in responding.

To increase the likelihood that a behavior will maintain over time and generalize across contexts, it is important to create an environment that supports behavior change at the onset of treatment. A clinician may use schedule thinning, a procedure in which a clinician programs for generalization and maintenance by systematically reducing reinforcement (e.g., gradually increasing the number of appropriate responses required for reinforcement) in order to expose the client to conditions that more closely resemble those which they are likely to encounter in their natural environment (Briggs et al., in press; Hagopian et al., 2011). In addition, a clinician may plan strategically for the desired behavioral outcome by selecting target behaviors that will arise under naturally occurring reinforcement contingencies in the environment. In other words, a clinician may design treatment in such a way that the client will encounter similar situations in their everyday life, and the natural consequence for correct responding resembles the contrived consequence encountered in treatment. For example, if a client is taught via behavioral intervention to request help when frustrated as a pathway to receiving assistance, it is likely that this behavior will be met with a similar consequence when used in their natural environment following treatment.

Concluding Remarks

In this chapter, we provide a general overview of the historical and conceptual foundations of ABA, cover characteristics that are unique to this discipline, and review some commonly used behavior-change elements while demonstrating the range of ABA's application to various issues of social importance. We hope this information serves as a useful resource for those interested in learning more about ABA and its areas of application.

Our reason for providing general coverage of ABA is that our field's science is robust and clinical approaches and best-practice recommendations are ever-changing (Briggs & Mitteer, 2021). Therefore, it is worth noting that our field's approach toward program development and procedural implementation is far more complex and intricate than the general description of program components described here. As a result, our field requires highly skilled case managers (i.e., Board Certified Behavior Analysts; BCBAs) and advanced support staff (i.e., Board Certified Assistant Behavior Analysts; BCaBAs) to provide close oversight of the case and ongoing supervision and training of front-line staff (i.e., Registered Behavioral Technicians; RBTs) in order to promote timely clinical decision-making and ensure the integrity of program implementation.

Another reason for this close oversight is because, more often than not, behavioral interventions are relatively intensive and occur over an extended period of time (Virués-Ortega et al., 2010). As a result, it is typically critical for caregivers (e.g., parents, school personnel) to be very involved with the planning and implementation of the behavioral intervention outside of the clinical setting (e.g., at home, in school). To address this, there have been recent advancements to the caregiver training literature (e.g., Matson et al., 2009), which include suggestions for improving access to and practicality of this support and training (e.g., via telehealth; Yi & Dixon, 2020).

In closing, if this introductory chapter on ABA piqued your interest and you are considering whether you might pursue a career path in this field, it is worth noting that a recently released jobs report has indicated that demand for behavioral services far outweighs the professionals available to offer behavioral services, suggesting that applied behavior analysts are in high demand across the country (BACB, 2021). Therefore, this career field is promising given the upward mobility (e.g., RBT to BCaBA to BCBA to BCBA-D), transferability (BACB certification/licensure recognized within nearly every state), and job satisfaction it provides (Plantiveau et al., 2018).

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Functional Assessment

Joshua Jessel and Catherine Jessel

Problem behavior is a common concern among clinicians who work with children diagnosed with intellectual and developmental disabilities or psychiatric disorders. Problem behavior encroaches on the safety of the child and those in their immediate surrounding and chronic problem behavior can have a substantial impact on a child's quality of life (Chiang & Wineman, 2014; Kamio et al., 2013). The topography of problem behavior can vary on an individual basis including more common variants such as aggression, self-injurious behavior, or property destruction to idiosyncratic variants such as elopement, pica, and fecal smearing. That is to say, there are not necessarily any topographical identifiers for defining the occurrence of problem behavior and behavioral interventions have been designed to address operant mechanisms regardless of how the problem behavior is formally expressed.

One of the biggest developments in the assessment and treatment of psychologically based problems in children is functional assessment. Functional assessment is a general term that encompasses any pretreatment evaluations of problem behavior that are intended to improve a clinician's understanding of the influence of any possible environmental determinants for said problem behavior. The assumptions being that primary causes for problem behavior can be found in the proximal environmental events and an appeal to these operant mechanisms as an explanation for the problem behavior is sufficient to develop treatment. If a child is exhibiting problem behavior, a clinician can use a functional assessment to investigate potential causes in antecedents that have historically evoked and consequences that have strengthened problem behavior to individualize subsequent treatment procedures. Appreciation for the clinical utility of functional assessment for informing treatment has grown to the point of a nationwide mandate for its use in severe cases (Individuals with Disabilities Education Act, 1997, 2004).

Clinical utility broadly refers to the importance of a set of procedures for improving the socially relevant treatment outcomes of a client. When applied to functional assessment, it means that clinicians should select the assessment methods that best inform the design of the most effective and

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acceptable set of treatment procedures (Hayes et al., 1987). In that regard, a functional assessment can only be validated as having clinical utility by evaluating the subsequent treatment it has informed. Therefore, a functional assessment is more than just an analytic tool for identifying relations between environmental events and problem behavior (i.e., contingencies). There are a seemingly infinite number of contingencies that can be assessed if clinicians were so inclined: from general classes that are believed to impact the average child to the everyday events specifically experienced by a particular child. The purpose of the functional assessment is not to determine what *can* influence problem behavior. If that were the case, clinicians would spend an absurd amount of time exposing the child to an endless catalog of potential contingencies. The purpose of a functional assessment in clinical practice, and indeed its usefulness, is determined by its ability to (a) identify the ecologically relevant contingency in a reasonable amount of time and (b) influence the clinician's decision-making process when developing a treatment package (Kratochwill & Shapiro, 2000).

The arduous task begins for the clinician when determining under what circumstances a functional assessment is necessary and has clinical utility. That is because there is no decisive set of rules that inform decisions of when to use a functional assessment and the clinician is typically left to rely on their professional judgment. Concluding that a functional assessment should be conducted to improve treatment outcomes is not an inconsequential decision to make considering the time and resources that must be diverted toward individualized supports. Furthermore, many functional assessment methods require specialized training with supervision from a Board Certified Behavior Analyst (BCBA) or licensed psychologist. A concrete decision-making process may, therefore, hold particular value for clinicians and help guide evidence-based practice.

Guiding Evidence-Based Practice of Functional Assessment

Evidence-based practice requires a multifaceted approach that is informed not only by the external scientific literature but by the clinician's expertise and client-specific values (Smith, 2013). Determining the need and level of services for a particular client is a highly specialized and individualized process, which integrates the experiences of the clinician and client in each case with the extant evidence for particular behavioral procedures. Whenever a clinician is presented with a child who exhibits problem behavior, they should be asking themselves five main questions to determine whether or not a functional assessment is necessary and appropriate given the situation:

1. Have universal strategies failed?
2. Is the topography of problem behavior dangerous?
3. Is the occurrence of problem behavior socially impactful?
4. Will the functional assessment result in a unique and more effective intervention?
5. Is the functional assessment feasible given the current staff and resources?

These five questions are designed to inspire critical interpretations of potential treatment paths and improve a clinician's confidence that the appropriate procedures were considered. However, the questions are by no means meant to be a staunch set of rules, as if answering a certain number in the affirmative necessitates the use of a functional assessment. Evidence-based practice is meant to be flexible, allowing the clinician to make informed decisions on a case-by-case basis. Because there are no objective criteria for informing the decision to conduct a functional assessment, the questions are intended to guide the decision-making process and ensure that the clinician reviews all relevant information before implementing any subsequent procedures.

Have Universal Strategies Failed?

All children are likely to experience difficult situations in their lifetime and may resort to problem behavior in an attempt to return to a historically reinforcing environment. In fact, problem behavior is highly prevalent when children first transition away from the home to the classroom setting (Powell et al., 2007). These transitions in early childhood can create challenging moments that depend on healthy coping strategies; however, even if these strategies are lacking, problem behavior for most children is still likely to return to characteristic levels once sufficient experience with the novel context and contingencies has occurred. That is because universal strategies for reducing problem behavior in groups tend to work (Reinke et al., 2014) and if they didn't, each child would require costly individualized services. Therefore, a child may simply require exposure to contingencies that favor appropriate behavior, and general strategies such as differential reinforcement with praise and classroom rewards usually suffice.

A functional assessment becomes a viable consideration when universal classroom and general behavioral strategies have been used unsuccessfully. Consistent and sustained problem behavior is potentially indicative of a far more chronic issue and may not be so easily addressed with an improvement in classroom milieu. Therefore, a clinician who is presented with a child who has been known to exhibit problem behavior across multiple contexts with professionals trained in behavioral management over long periods of time may come to the conclusion that traditional reinforcement-based strategies have failed and further individualized supports informed by a functional assessment will be necessary to achieve intended goals.

Is the Topography of Problem Behavior Dangerous?

Some problem behavior is manageable and to be expected. A child may cry when a toy is removed and others may get into fights with classmates at school, to some limited extent. However, severe problem behavior can interfere with a child's ability to create lasting friendships or even attend a classroom with other students. The topography of problem behavior can become so dangerous that it necessitates the use of mechanical, physical, or pharmacological restraints (Trader et al., 2017). Severe SIB often falls into this category of dangerous topographies because any response, regardless of how often it occurs, could result in irreparable physical harm (Schroeder et al., 2002). For example, even a single instance of eye gauging could result in permanent blindness.

Dangerous problem behavior has also been found to be sensitive to a variety of environmental variables, making functional assessment an important consideration. That is because the topography of problem behavior is not associated with a particular function in most cases. Hanley et al. (2003) reviewed the functional assessment literature, delineating between five general classes of reinforcement that dangerous behavior was found to be sensitive to (i.e., escape, attention, tangible, automatic, and multiply controlled). The authors found that in most cases dangerous behavior was unlikely to have clear indicators of function determined by the topography. In fact, problem behavior has been known to be sensitive to far more idiosyncratic variables and individualized contingencies (Jessel et al., 2016; Schlichenmeyer et al., 2013). This diversity in functions of dangerous problem behavior creates a unique barrier for clinicians attempting to develop an intervention. In these situations, functional assessments may be an indelible tool for sifting through the convoluted variables that could influence dangerous problem behavior.

In some cases, the topography of problem behavior may not be directly harmful to the child, but places them in a dangerous situation. For example, a child may exhibit the problem behavior of eloping from certain contexts without consent of the adult. Although elopement could be as innocent as leaving a workstation to play with preferred toys in a classroom setting, it is not difficult to envision the danger of elopement from a caregiver's home at night, near a busy intersection, or a public area with many strangers. Aside from the potential to place a child into a dangerous position without adult supervision, elopement shares the same aforementioned concern regarding functional heterogeneity (Falcomata et al., 2010; Piazza et al., 1997; Traub & Vollmer, 2019). That is, a treatment's efficacy is directly related to behavioral function and not behavioral topography.

Is the Occurrence of Problem Behavior Socially Impactful?

This is not to say that the topography needs to be dangerous to be considered a concern. The frequency with which problem behavior occurs could also influence the necessity of a functional assessment. For example, screaming may not result in any physical injury, but if it occurs frequently throughout the day, the child may have to receive services isolating them from others because of the potential for disrupting classroom activities. Furthermore, the constant screaming in the home could create a stressful environment for other family members, thereby influencing the quality of caregiver relationships. Determining the level of social impact is not limited to, and can be influenced by, multiple factors beyond the risk of severe injury.

The intensity of problem behavior could also be initially low, but remains a concern considering the potential for harm if the intensity were to increase to unsafe levels. A child may chronically hit a caregiver at a young age without causing any significant bodily harm. Although caregivers may find this behavior to be a nuisance for the time being, without proper intervention the problem behavior is likely to shape up and become more difficult to manage as the child grows up. The common misconception being that problem behavior is something that a child will "grow out of," when in fact early problem behavior is far more indicative of increased risk of isolation from peers and exclusion from community activities (Horner et al., 2002).

There may be other dimensions beyond frequency, intensity, and severity of problem behavior that could be socially impactful. The clinician needs only to become informed of the restrictiveness of the environment and intensity of services that are or will be required to manage problem behavior in determining whether or not a functional assessment seems appropriate. In addition, this question is highly influenced by the subjective experiences of those involved to ensure that the behavioral services provided will directly result in meaningful improvements in the child's life. The totality of determining what behavior change would be considered *meaningful*, and how the change is achieved, exists on three main levels regarding the intended goals, appropriateness of the procedures, and satisfaction with potential outcomes (Wolf, 1978). The question of social impact is intended to provide the clinician with the mindset of providing relevant services that others will find acceptable for improving their current circumstances.

Will the Functional Assessment Result in a Unique and More Effective Intervention?

The functional assessment is designed to reduce assumptions regarding environmental influence over problem behavior. Therefore, its purpose is to identify relevant variables that are not readily known by the clinician to be included in any subsequent intervention. By its very nature, the term *function-based* intervention refers to the value of conducting a functional assessment for informing treatment procedures. This infers that in many cases a functional assessment will result in a unique and more effective intervention for problem behavior. Without a functional assessment, the clinician is left to speculate on relevant environmental variables contributing to problem behavior and may have to wait to happen on a set of effective intervention procedures through the highly inefficient process of trial and error. Beyond the process being inefficient, the treatment designed without a functional assessment is often less effective (Heyvaert et al., 2014; Campbell, 2003) and could even worsen problem behavior if the procedures used are contraindicative of the function (Iwata et al., 1994d). Therefore, it is highly important for a clinician to understand the conditions under which a functional assessment will be truly informative of a given set of environmental circumstances.

Of course not all problem behavior may be influenced by enigmatic environmental variables in need of further investigation. Furthermore, interventions for problem behavior may be quite homogenous in some contexts that the results of functional assessment would have nothing to contribute to the specific circumstances. For example, Saini et al. (2019) conducted a meta-analysis of the behavioral intervention for inappropriate mealtime behavior. While inappropriate mealtime behavior can encompass an eclectic array of potential topographies of problem behavior (e.g., aggression, swiping food, tantrums, food refusal), the authors found that (a) treatment procedures tended to rely on a standard practice of praise for cooperation and escape extinction for problem behavior regardless of if a functional assessment was conducted and (b) pretreatment functional assessments were unlikely to improve the efficacy of the behavioral intervention. This question that a clinician will ask themselves is a reminder to remain committed to focusing on that which can inform treatment design.

Is the Functional Assessment Feasible Given the Current Staff and Resources?

Depending on the functional assessment used, some models may be resource heavy and time-consuming (Iwata & Dozier, 2008). Clinicians may find it difficult to conduct a functional assessment in given circumstances. Feasibility may be a concern for clinicians working in more rural areas with large caseloads where they may have difficulty finding the time or resources to devote to an individualized assessment for each of their clients. However, the consideration of feasibility is continuously becoming difficult to defend as the functional assessment technology develops with elements of practicality of particular interest.

In some cases, it may be possible for the clinician to supervise the functional assessment via telehealth while it is being implemented by a caregiver (Wacker et al., 2013). Recent trends in the utilization of virtual meetings afford the clinician the ability to train caregivers and observe therapy sessions from anywhere in the world. Supervising the functional assessment via telehealth reduces travel that may be necessary when the child is admitted to an inpatient or outpatient clinic, while also ensuring the functional assessment is conducted in the ecologically relevant context of the child's home.

Even though virtual services have the potential benefit of reducing costs (Lindgren et al., 2016), concerns regarding feasibility may still remain for some clinicians. That is because caregivers will have to be trained and coached on how to implement potentially complex procedures and the clinicians will not be available to help in case of emergency, a perceptible risk when working with children who exhibit problem behavior. In such circumstances, problem behavior cannot be fully addressed until the clinician has the necessary resources available to arrange the environment in a manner they deem safe. Thus, feasibility should be a consideration for all clinicians before conducting a functional assessment. It is important to point out that concerns regarding the feasibility of conducting a functional assessment are carried over into the decision on implementing a subsequent intervention. A clinician is not to assume that an intervention will be any more safe, necessary, or feasible. Therefore, answering this question in the negative does not infer that an intervention should be introduced immediately in place of the functional assessment. This is especially considering that a functional assessment will often improve the socially relevant qualities of an intervention.

Functional Assessment Models

After determining that a functional assessment is necessary and should be conducted for the problem behavior of a given child, the clinician must then choose between a particular model to implement. Functional assessment is an umbrella term that could refer to different models depending on two properties of the procedures. First, the results of a functional assessment can be interpreted based on direct observation of the problem behavior or based on verbal reports. This is dependent on if the clinician (a) chooses to schedule to see the child and problem behavior with their own eyes or (b) is comfortable obtaining information regarding problem behavior via questioning of those who experience the problem behavior, such as caregivers. Second, the environmental events believed to be influencing problem behavior can be systematically manipulated in an experimental design or there may be no systematic changes involved. Of course, any systematic changes will inevitably involve direct observation of problem behavior as well (i.e., the clinician would not ask the caregiver to conduct a formal analysis with their child without some form of direct supervision). This allows for a potential of three functional assessment models based on the combination of those two procedural properties.

Indirect Assessment

The indirect assessment is the least intrusive model in that it does not include direct observation of problem behavior or systematic manipulation of environmental events. Indirect assessments do not require any contact with the client being evaluated and typically involve family members, caregivers, teachers, direct support personnel, or other professionals who interact with the individual. Indirect assessments can include a variety of methods such as interviews, checklists, and questionnaires (Sturmey, 1994). The overall goal is to ascertain information regarding the context in which problem behavior occurs or hypotheses regarding variables contributing to problem behavior from the verbal reports of others who have direct experience with the specific client of interest.

There are two general categories of indirect assessment depending on how information is gathered (i.e., closed-ended and open-ended). Closed-ended assessments prespecify options from which the respondent can choose and score using a legend, while open-ended assessments allow free-form responses and require more interpretation on the part of the clinician. For example, The Questions About Behavioral Function (QABF) includes 25 questions with a four-point rating scale pertaining to the problem behavior (Paclawskyj et al., 2001). Each question on the QABF is assigned a potential function (i.e., attention, escape, physical, tangible, and nonsocial) such that a score in the affirmative would contribute to a higher score implicating those variables as relevant to the occurrence of problem behavior. These scores can be interpreted to suggest potential function for the target behavior, with the highest scoring categories reflecting the most likely function.

Clinicians may often consider the closed-ended, indirect assessment as the primary means of identifying behavioral functions for multiple practical benefits. That is, there is often no formalized training or sophisticated knowledge of behavior analytic principles needed to implement the closed-ended approach. In addition, the questionnaires can often be completed in quite an efficient amount of time without the necessity of observing or evoking problem behavior. Nevertheless, reservations exist when considering using indirect assessments to replace other functional assessment models because of the lack of an empirical demonstration of environmental control over problem behavior and limited information regarding the individual circumstances that can be obtained with closed-ended questioning. Clinicians may find it more beneficial to use indirect assessments to inform rather than replace further assessments.

Open-ended assessments include interviews in which there are no prespecified options, providing the respondents with the opportunity to present descriptive information regarding particular experiences with the problem behavior of interest they may have had in the past. Open-ended assessments allow the respondents to provide additional context and details that are not collected in a closed-ended assessment, such as specific antecedents or consequences that the child has historically been exposed to. For example, Hanley (2012) developed an open-ended interview that consists of 20 questions designed to guide the respondent to provide qualitatively rich information regarding the context in which problem behavior occurred. The goal of the open-ended interview was not to identify function, but to inform the design of the subsequent functional analysis. In other words, the open-ended interview establishes a caregiver-informed test condition to be validated as a relevant context influencing problem behavior during a subsequent functional analysis. Any limitation regarding the treatment utility of the indirect assessment is therefore avoided when the assessment is used as a supplemental procedure to other more direct methods of assessment.

Descriptive Assessment

Rather than obtaining information regarding problem behavior through secondary means of reports from others, descriptive assessments involve direct observation of problem behavior. There are several formats of descriptive assessments, providing significant flexibility to practitioners using this method. However, similar to indirect assessments, the descriptive assessment continues to avoid the systematic manipulation of environmental events. The descriptive assessment tends to collect information regarding problem behavior as it occurs in the context of interest, aiding the clinician in recognizing (a) antecedents that precede problem behavior, (b) range of topographies of problem behavior, and (c) consequences that follow problem behavior.

Ecologically relevant descriptive assessments involve no interference with naturally occurring events in the observed setting and can be conducted at select times of the day or during specific activities in which problem behavior is reported to occur at higher rates. In ideal situations, each instance of problem behavior that is observed can be recorded in a continuous fashion, along with any correlated environmental events (Bijou et al., 1968). During the observation, the clinicians can decide to collect information using closed or open-ended methods. For example, a clinician may use an ABC format to collect information on observed antecedents, behaviors, and consequences (Groden, 1989). An ABC assessment with closed-ended options will have prespecified events and behaviors to choose from. This will limit the clinician’s recordings to a selection of target problem behavior (e.g., aggression, property destruction, self-injury) and generic antecedents (e.g., instruction provided, diverted attention, removal of tangible) and consequences (e.g., escape from instructions, access to attention, or access to tangible) to simplify interpretability. The open-ended options, often referred to as an ABC narrative, will leave availability for the clinician to expand on any specifics to the encounter with problem behavior that may not be represented in a standard list.

Observations of problem behavior during descriptive assessments can also be supplemented using conditional probability analyses to quantify correlations between problem behavior and particular environmental events (Vollmer et al., 2001). A conditional probability analysis calculates a probability of events given the occurrence of a target problem behavior. The temporal proximity of antecedents and consequences informs the identification of potential naturally occurring contingencies. The conditional probability is then compared to the background probability, which refers to the chances of an event or behavior occurring independent of any other variables. While conditional probability analyses can provide more precise interpretation of data collected in a descriptive assessment, it is important to point out that it is quite effortful and requires specialized training to conduct. It also requires the initial data collection to be accurate and extensive enough to provide the quantifiable information needed for clinicians to analyze.

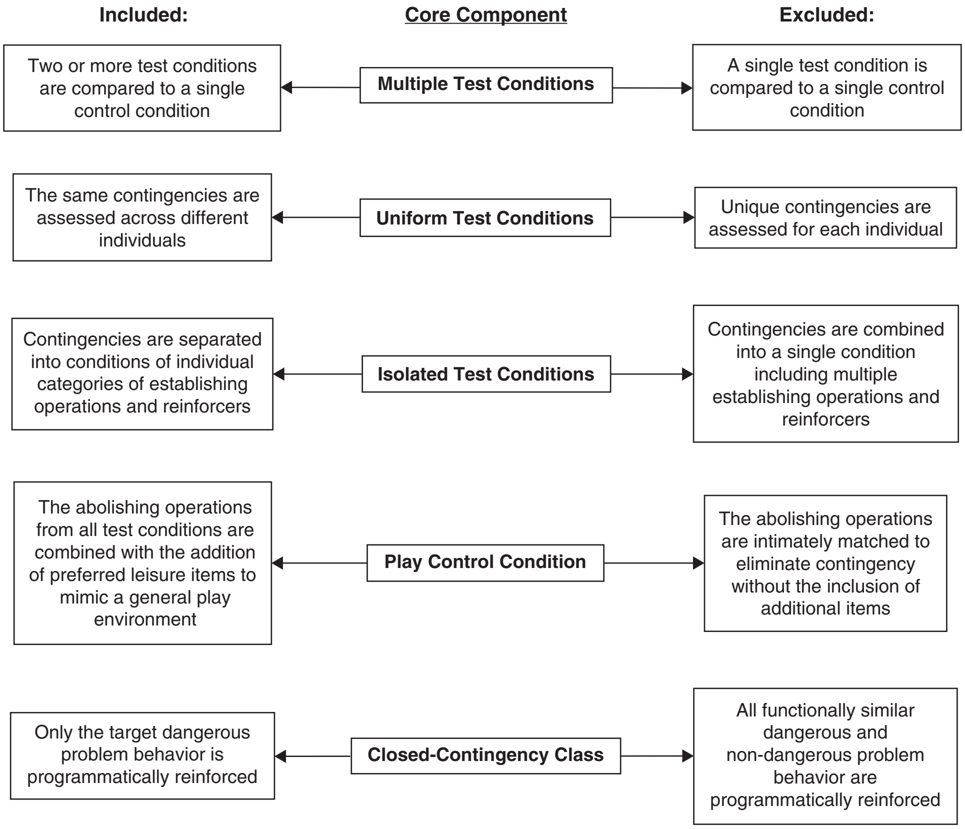
Although potentially reducing ecological relevance, descriptive assessments can be structured to increase contact with problem behavior and improve the efficiency of the assessment period. That is to say, clinicians can request caregivers or staff to introduce the child to contexts that are reported to result in problem behavior. As an example, Anderson and Long (2002) systematically introduced a child and caregiver dyad to four general conditions and asked the caregiver to respond to problem behavior as they naturally would. The researchers were attempting to arrange commonly presented antecedents to observe interactions of problem behavior and caregiver consequences. The results indicated that problem behavior could be observed in a semi-structured environment without having to spend extended amounts of time waiting for the environmental events to naturally arrange in the presence of problem behavior.

It is important to point out that exposure to certain environmental events does not necessarily infer that a contingency is contributing to the occurrence of problem behavior. Environmental events can be present in close temporal approximation to problem behavior without influencing its continued occurrence as evocative events or reinforcers (e.g., saying “god bless you” does not commonly reinforce sneezing but does tend to closely follow the response). Therefore, descriptive assessments, whether supplemented with quantified correlations or structured to ensure the child readily contacts certain antecedents and consequences, share the similar concern with indirect assessments regarding empirical demonstrations of control. For that reason, descriptive assessments may find better use as a collective process informing continued assessment.

Jessel et al. (2020b) designed a brief contingency probe that unsystematically arranges the context reported by the caregivers to be problematic as a way of calibrating (i.e., minor modifications to antecedents, behaviors, consequences) a hypothesized contingency to be evaluated in a subsequent functional analysis. The authors employed a three-part functional assessment process (i.e., open-ended indirect assessment, brief contingency probe, functional analysis) that collectively obtained qualitative information from each child to support the identification of a unique and individualized contingency contributing to problem behavior. The brief contingency probe allows the clinician to introduce potentially relevant conditions and directly observe the child’s reaction to these events. The benefit being that unsystematic changes can be made in real time to improve (a) operational definitions of problem behavior or (b) ecological relevance of the contingency. That is, the brief contingency probe can be used collectively with other functional assessment methods to improve the precision of functional interpretations, which may better inform treatment outcomes.

Functional Analysis

The functional analysis is the only model to include the direct observation of problem behavior and systematic manipulation of environmental events, thereby giving it the status as the most informative approach. Indirect assessments force the clinician to rely on the experiences of others and their ability to describe those experiences to develop hunches regarding functional accounts of problem behavior; whereas descriptive assessments can only go so far as to provide indications of environmental variables in the temporal vicinity of problem behavior but not the level of their influence. The functional analysis raises the clinical expectations to an empirical demonstration of controlling variables, creat-



Two or more test conditions are compared to a single control condition

A single test condition is compared to a single control condition

The same contingencies are assessed across different individuals

Unique contingencies are assessed for each individual

Contingencies are separated into conditions of individual categories of establishing operations and reinforcers

Contingencies are combined into a single condition including multiple establishing operations and reinforcers

The abolishing operations from all test conditions are combined with the addition of preferred leisure items to mimic a general play environment

The abolishing operations are intimately matched to eliminate contingency without the inclusion of additional items

Only the target dangerous problem behavior is programmatically reinforced

All functionally similar dangerous and non-dangerous problem behavior are programmatically reinforced

Fig. 19.1 Core procedural components of the functional analysis

ing a far more conservative account of what environmental events are contributing to problem behavior. The clinician can be more confident that a functional relation has been identified after conducting a functional analysis because they have (a) observed and measured the problem behavior for themselves and (b) used a single-subject experimental design during the assessment period.

From a methodological perspective, the functional analysis need only those two defining properties (i.e., direct observation and manipulation) and does not require adherence to a specific set of procedures. Some of the earliest demonstrations of functional analyses were particularly unique and used a more investigational approach (Lovaas et al., 1965; Lovaas & Simmons, 1969). However, a specific set of procedures began to emerge in the applied research literature as the functional analysis technology grew in popularity. The progressive development toward a standard set of procedures was likely a product of the ease of implementation and improved dissemination among researchers in applied laboratory settings. Contemporary functional analysis formats are now defined by the inclusion and exclusion of five core procedural components because they reflect adherence to a particular standard model (Jessel et al., 2020a). All five of the core components are presented and summarized in Fig. 19.1.

The first core component is the inclusion of multiple test conditions in a single functional analysis. The clinician may be interested in multiple contexts or separate contingencies that could influence problem behavior and conduct a functional analysis with a test condition for each of those contingencies, which are then compared to a single control condition. To improve the efficiency of the functional analysis, the test conditions and the control condition are typically rapidly alternated in a multielement design. Any functional analysis that excludes this core procedural component is implemented with a single test condition that is compared to a single control condition. Reducing the functional analysis to a maximum of two conditions (i.e., one test and control) comes with the added benefit of eliminating analytic clutter that could impair discrimination of conditions, which is more likely to occur when the child is presented with multiple and varying alternating contexts (Iwata, Duncan et al., 1994b).

The second core component arranges a functional analysis to include a standardized set of contingencies assessing generic classes of reinforcement for every child regardless of individual differences. Functional analyses with these uniform test conditions often include at least one test condition assessing the influence of positive reinforcement and another assessing negative reinforcement. What defines the inclusion of this core component is that these two test conditions will not vary between participants. During the condition assessing positive reinforcement, the clinician will provide generic statements of concern or common reprimands contingent on problem behavior. The negative reinforcement condition, on the other hand, will include the presentation of academic instructions. While using a set of uniform test conditions could potentially reduce effort in training clinicians in conducting the functional analysis (i.e., the clinician need only be trained on how to conduct one functional analysis that is then implemented with all children), it is likely to impact the ecological validity of the procedures. Functional analyses that exclude this core component instead introduce test conditions that are specifically informed by the child's experiences based on open-ended interviews and observations (e.g., Jessel et al., 2016). Doing so creates an individualized functional analysis that must be designed based on an intimate understanding of a specific history of reinforcement that could be contributing to the problem behavior. Therefore, a clinician conducting the functional analysis with unique test conditions in place of uniform test conditions will improve the probability of assessing variables relevant to the individual.

The functional analysis could include a third core component whereby classes of reinforcement contingencies are separated into isolated test conditions, even if they are reported to naturally co-occur in the child's environment. A clinician who includes this procedural component is committed to attempting to understand the independent effects of each reinforcement contingency. For example, a child may exhibit problem behavior when their activities are interrupted and a clinician may be interested in isolating the type of request, such as interruptions with requests to do something else or interruptions with requests to simply not engage with a certain activity (Hagopian et al., 2007). Teasing apart minute differences in arrangements of isolated contingencies may be interesting from a conceptual standpoint; however, it is unlikely to improve treatment outcomes (Slaton & Hanley, 2018; Slaton et al., 2017; Holehan et al., 2020). A functional analysis that excludes this core component instead assesses the contingency as it naturally occurs in the child's environment, which is inevitably going to be a synthesis of multiple contingencies. A noted strength of including synthesized contingencies is the focus on the problem as a whole as it exists for the child and caregivers.

The fourth core procedural component of a standardized functional analysis is the inclusion of an omnibus control condition that arranges items and events to be representative of a general play context. Praise is provided on a time-based schedule and the child is given noncontingent access to highly preferred activities. The play control attempts to eliminate problem behavior by creating an environment we would typically associate with a child's enjoyment. Practitioners who conduct a functional analysis with multiple test conditions will often conduct a play control to improve analytic efficiency. The alternative excluding this procedural component would be to implement individualized control conditions that are matched to each test, with the contingency being the only difference between the test and control conditions (i.e., contingent delivery of reinforcers in the test condition; noncontingent delivery of the same reinforcers in the control condition). For example, the clinician may be attempting to isolate the effects of attention and tangible reinforcement. The play control would allow the clinician to rapidly alternate all three conditions (attention, tangible, control) instead of a pairwise comparison of attention reinforcement with an attention-specific control and tangible reinforcement with a separate tangible-specific control. Of course, if the clinician were to assess a synthesized contingency in a single test condition (attention and tangible reinforcement) during the functional analysis, a single matched control with the identical synthesized reinforcement could be included without negatively impacting analytic efficiency while reducing potential confounds introduced in a play control. Therefore, when a practical option, the matched control is a far more experimentally rigorous procedural component.

The fifth and final core procedural component is designed to require low inferences regarding the function of the severe problem behavior by incorporating a closed-contingency class. A clinician conducting a functional analysis with a closed-contingency class will only reinforce the target problem behavior and, if multiple topographies of problem behavior are of interest, the clinician is committed to conducting multiple functional analyses specifically addressing each. This is juxtaposed with a functional analysis conducted with an open-contingency class, whereby all topographies of problem behavior that are assumed to be functionally related are reinforced. Using an open-contingency class is often considered when attempting to improve the practical utility of the functional analysis because it can reduce the probability of exposure to severe problem behavior (Jessel et al., 2021; Warner et al., 2020). Thus, the feasibility of conducting a functional analysis, especially in settings such as homes and classrooms, can be largely impacted by the decision to open the contingency class and reduce opportunities for escalation to dangerous and uncontrollable bursts of problem behavior.

Functional Analysis Formats

The functional analysis that embodies all five core procedural components has come to be termed the standard format and was introduced into the literature nearly 40 years ago. Iwata et al. (1982/1994a) conducted the standard functional analysis with nine participants admitted to an inpatient hospital who exhibited severe SIB. The researchers included three uniform test conditions assessing sensitivity of the rate of SIB to general classes of reinforcement (attention, escape, automatic) compared to a toy play control using a closed-contingency class.Although a highly replicated set of procedures in the applied literature, the standard format has often been regarded by clinicians to be burdened by multiple barriers to its widespread adoption in practice (Hanley, 2012; Oliver et al., 2015; Roscoe et al., 2015). For example, in one of the most extensive epidemiological collections of 152 applications, the authors found the standard functional analysis to require a mean of 6.5 hrs to conduct, reaching as high as 16.5 hrs (Iwata et al., 1994c). Considering that more efficient functional assessment methods exist without having to expose the child to hundreds of instances of severe SIB (e.g., indirect assessments), clinicians are unlikely to use a functional analysis that could pose a safety risk and requires days, if not weeks, to complete. Multiple functional analysis formats have since been developed to improve practical utility by adopting a different measure of problem behavior (Sigafoos & Saggers, 1995; Thomason-Sassi et al., 2011), reducing the number of sessions conducted (Northup et al., 1991), reducing the session duration (Wallace & Iwata, 1999); all the while maintaining the core procedural components of the standard functional analysis (see Fig. 19.2 for a summary of these modifications).

For example, Thomason-Sassi et al. (2011) evaluated the interchangeability of the measure of latency with rate for interpreting functions of problem behavior. Participants experienced the functional analysis with all five core components; however, the measure of latency allowed the researchers to terminate sessions after a single instance of problem behavior by measuring the time in which the response occurred from the beginning of the session. A functional relation was, therefore, determined based on the brief latencies to problem behavior observed in the multiple test conditions compared to

Format	Description	Core Components	Practical Importance
Standard	*Full functional analysis with repeated sessions and extended durations using rate as a measure of problem behavior*	☑ Multiple Test Conditions ☑ Uniform Test Conditions ☑ Isolated Test Conditions ☑ Play Control Condition ☑ Closed-Contingency Class	☐ Efficiency ☐ Safety ☐ Ecological Relevance ☐ Cost Effectiveness
Brief	*Abbreviated version of the standard conducted with a maximum of two sessions per condition*	☑ Multiple Test Conditions ☑ Uniform Test Conditions ☑ Isolated Test Conditions ☑ Play Control Condition ☑ Closed-Contingency Class	☑ Efficiency ☐ Safety ☐ Ecological Relevance ☐ Cost Effectiveness
Latency-Based	*Reduces sessions to a single instance of problem behavior and replaces the measure of rate with latency*	☑ Multiple Test Conditions ☑ Uniform Test Conditions ☑ Isolated Test Conditions ☑ Play Control Condition ☑ Closed-Contingency Class	☑ Efficiency ☑ Safety ☐ Ecological Relevance ☐ Cost Effectiveness
Trial-Based	*Trials conducted as they naturally occur and replaces measure of rate with percentage of trials*	☑ Multiple Test Conditions ☑ Uniform Test Conditions ☑ Isolated Test Conditions ☐ Play Control Condition ☑ Closed-Contingency Class	☐ Efficiency ☐ Safety ☑ Ecological Relevance ☐ Cost Effectiveness
IISCA	*Begins with an open-ended interview to inform a single test condition evaluating a unique, synthesized contingency using an open-contingency class compared to a matched control*	☐ Multiple Test Conditions ☐ Uniform Test Conditions ☐ Isolated Test Conditions ☐ Play Control Condition ☐ Closed-Contingency Class	☑ Efficiency ☑ Safety ☑ Ecological Relevance ☑ Cost Effectiveness

Fig. 19.2 Variations of the functional analysis

the extended latencies observed in the play control condition. The use of latency improved the efficiency of the standard functional analysis by 73% and reduced the instances of problem behavior observed during the entire functional analysis process to as few as three responses.Other functional analysis formats were designed to improve practical utility by avoiding the use of the core procedural components of the standard functional analysis (Hanley et al., 2014; Jessel et al., 2016). Hanley et al. introduced what has become known as the interview-informed synthesized contingency analysis (IISCA). The IISCA requires only a single test condition assessing a unique contingency informed by an open-ended interview with the caregiver, which is then compared to a matched control with the same reinforcers provided noncontingently. In addition, all topographies of problem behavior, including non-dangerous precursors, are targeted during an IISCA in an open-contingency class (Slaton et al., 2017). The IISCA can be conducted in 15 min (Jessel et al., 2020b) and multiple variations exist that can reduce other practical barriers further (Metras & Jessel, 2021).

Special Considerations

Application of Functional Assessment Models

The functional analysis is often recommended to be used because of its unique ability to raise the level of understanding of environmental contributors to problem behavior from what would be conjecture (indirect assessments) or correlational (descriptive assessments) to an empirical demonstration of control. Clinicians often share this standard of care with other health professionals in that simply asking or observing a client is hardly ever recognized as a sufficient assessment for serious ailments. This is not to say that indirect and descriptive assessments should be abandoned. Quite the contrary, indirect and descriptive assessments are vital for informing the procedures of a functional analysis. In fact, a functional analysis should not be conducted without those preceding assessments. Therefore, an evidence-based approach to functional assessment involves obtaining qualitatively rich information regarding a particular child before the implementation of an individualized functional analysis assessing a unique contingency. This ensures a highly informed process that incorporates immediate clinical experiences with best scientific evidence when implementing the functional assessment. Although the different functional assessment models were historically developed independent of one another and were often given hierarchical status based on perceived effort (i.e., begin with the indirect assessment and only conduct the descriptive assessment and functional analysis when necessary), clinicians may benefit from seeing the functional assessment as a collective set of tools not to be disentangled from one another.

There are, of course, exceptions to using this collective approach to functional assessment when a functional analysis cannot be conducted. Pragmatic boundaries do exist and a clinician may find themselves in a position whereby the putative contingencies cannot be systematically manipulated. Sleep-interfering behavior (e.g., tantrums, verbal protests, elopement from the bedroom) serves as a particularly relevant example because the act of falling asleep (i.e., behavioral quietude) is considered operant behavior, while the reinforcement it produces is the complex physiological change to sleep (Bootzin, 1977). A functional analysis cannot be conducted because escape from sleep is essential in defining the contingency and sleep as a reinforcer cannot be systematically presented or removed.[1] Furthermore, the intricacy of the environmental variables that could be interacting with each other to establish (e.g., insufficient sleep, poor-quality sleep) or signal (e.g., lighting, room temperature, sleep dependencies) the onset of sleep makes it difficult to determine what variables should and can be evaluated in a functional analysis.

Information regarding environmental variables that contribute to sleep-interfering behaviors can still be obtained through other functional assessment means and would still serve an essential purpose for informing subsequent function-based intervention. Jin et al. (2013) developed an indirect assess-

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[1] This is not to say that a clinician is unable to conduct a functional analysis of problem behavior to escape from the bedroom. However, this functional analysis can only identify an isolated piece of the contingency, not in its entirety regarding escape from sleep. Therefore, a clinician may be able to develop strategies for reducing elopement from the bedroom, but this does not infer that it will improve the child's sleep.

ment that included open-ended questions targeting specific variables that could be contributing to delayed sleep onset, sleep-interfering behaviors, and night awakenings. The authors used the information from the interviews to design an individualized treatment package for each of the three participants, which involved enhancing behavioral quietude and eliminating any contingencies that could be supporting the sleep-interfering behavior. This function-based comprehensive approach helped to improve sleep and reduce the use of sleep aides such as medication or parent presence. Therefore, while clinicians may not be able to conduct a functional analysis of problem behavior in all situations, other functional assessment models seem like a sufficient alternative that can inform effective and socially validated treatments in those cases.

Automatic Reinforcement

Results of functional assessments implicating a socially mediated function for problem behavior tend to be a preferred outcome because it suggests a level of control that can be exerted by clinicians over the maintaining variables. In one of the most common function-based treatments for socially mediated problem behavior, the reinforcers historically contributing to problem behavior are withheld and reserved for only the occurrence of an appropriate form of communication (Hagopian et al., 1998; Jessel et al., 2018; Rooker et al., 2013). A special consideration emerges when the functional reinforcers for problem behavior are not so easily controlled and are a unique property of the response itself; such is the case of automatic reinforcement.

Problem behavior sensitive to automatic reinforcement will occur across a wide variety of conditions and is not influenced by others. That is because the operantly maintained problem behavior is assumed to be producing its own source of reinforcement. An indication that problem behavior is automatically reinforced includes its continued occurrence when the child is left alone. Although the properties of automatic reinforcement are difficult to discern—the categorization of problem behavior as being maintained by automatic reinforcement is more so a default designation rather than an informative implication of a particular function—clinical utility can still be improved through the use of functional assessment methods to delineate different subtypes of automatically reinforced problem behavior (Hagopian et al., 2015, 2017).

Indirect and descriptive assessments will first guide the clinician to postulate that the problem behavior is sensitive to automatic reinforcement using verbal reports from caregivers and direct observation, respectively. However, these approaches are limited to informing general hunches regarding the influence of automatic reinforcement. Further assessment with a functional analysis is required to delineate three subtypes depending on patterns of problem behavior observed during the systematic comparison of an enriched environment in one condition (i.e., child-directed play with highly preferred items) and a second condition devoid of external stimulation (i.e., alone or ignore condition without preferred items).

Potentially, problem behavior that is automatically maintained will be reduced when the child is presented with highly reinforcing stimuli in the enriched environment, indicating a categorization of Subtype 1. This differentiated pattern of responding suggests that problem behavior, although maintained by automatic reinforcement, is sensitive to environmental stimulation and that preferred items can successfully compete with the functional reinforcers produced by the problem behavior. In a second outcome, problem behavior may not be sensitive to enhanced stimulation in the environmental enrichment condition and problem behavior will continue to occur in both conditions. These patterns of undifferentiated and elevated levels of problem behavior across conditions of the functional analysis are indicative of a Subtype 2 categorization. The final delineated subtype, Subtype 3, is dependent on whether or not the child exhibits self-restraint (e.g., sitting on hands, covering limbs with blankets).

Problem behavior during the functional analysis may be reportedly low across conditions when the child has access to self-restraint and only observed when that self-restraint is blocked.

Conducting a functional assessment to delineate these three subtypes of automatically reinforced problem behavior is important to consider because the results may have implications for treatment (i.e., clinical utility). For example, problem behavior sensitive to the stimulation in an enriched environment (Subtype 1) would inform the design of a treatment that incorporates noncontingent access to preferred items that will compete with the automatic reinforcement produced by the problem behavior (Hagopian et al., 2015). On the other hand, such a treatment with reinforcement alone is unlikely to be effective when addressing Subtype 2 problem behavior and multiple components including response blocking or punishment will be necessary. Thus, functional assessment methods have widespread applicability for understanding operant influence of socially mediated and automatically reinforced problem behavior.

Conclusions

Functional assessment methodology has been a staple of behavioral intervention of problem behavior for decades because of its ability to inform effective action on the part of the clinician. The goal of the functional assessment is to provide the clinician with an operant understanding of environmental events contributing to problem behavior using indirect assessment, descriptive assessments, functional analysis, or any combination of those three broad methods. Although certain pragmatic boundaries may dictate the use of some methods over others, the functional assessment is a diverse set of procedures and is a sufficiently flexible technology that allows the clinician to assess environmental-behavioral relations in a wide variety of contexts. It is for these reasons that clinicians guided by evidence-based practice will often rely on functional assessment to inform the design of any further treatment for problem behavior.

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Cognitive Behavioral Therapy (CBT) with Children and Adolescents

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Cognitive behavior therapy (CBT) is a diverse group of interventions targeted at identifying and addressing thoughts and behaviors that maintain psychological problems and promote more functional behaviors and thoughts. The goal of CBT is to achieve symptomatic and functional improvement, usually within a limited number of sessions (i.e., 8–20 sessions). CBT was initially developed to treat adults suffering from different mental health disorders (Clark, 1986; Kozak & Foa, 1997). However, during the last 30 years, CBT has also been adapted to treat various mental health problems in children and adolescents. Treatment manuals for internalizing and externalizing disorders have been developed, including anxiety (e.g., Kendall & Hedtke, 2006), obsessive-compulsive disorder (e.g., March & Mulle, 1998), depression (e.g., Brent & Poling, 1997), posttraumatic stress (Cohen et al., 2012) and conduct problems (e.g., Forgatch & Patterson, 2010). An increasing number of studies have supported the effectiveness and feasibility of CBT for children and adolescents. CBT has been found to be effective across different disorders, when delivered in various formats (group, individual), with varying degrees of parental involvement, for different purposes (treatment, indicated prevention, universal prevention), and in different contexts (mental health clinics, schools, public health centers, child welfare institutions).

Cognitive behavioral therapists need to master various competencies, and findings suggest that increased therapist competence is associated with improved therapy outcomes (Kuyken & Tsivrikos, 2009; Podell et al., 2013). As such, specialized training and experience are necessary for effective delivery of CBT. Learning strategies such as role-play, self-experiential work, or modelling are effective ways to enhance CBT skills (Bennett-Levy et al., 2009). Accordingly, CBT training and practice should not only rely on theoretical knowledge but also include active learning strategies to increase therapist competence.

In this chapter, the theoretical framework, the therapeutic relationship, and the therapist's attitude in CBT are described. Next, general CBT components as well as behavioral and cognitive techniques

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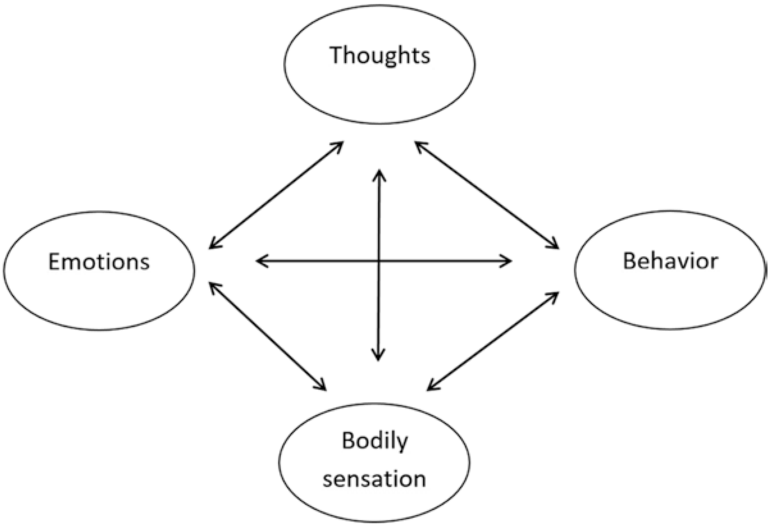
are explained. Further, the evidence base of CBT for internalizing and externalizing disorders is discussed. Finally, we will elaborate on issues to consider when using CBT with children and adolescents and ways of adapting the treatment to the child's developmental level.

Theoretical Framework

Cognitive behavioral therapy originates from behavioral traditions and the early work of Skinner (1938), Pavlov (1927), and Watson (Watson & Rayner, 1920), as well as the cognitive theory of Aron Beck (1976, 1979). The early proponents of behaviorism introduced the idea that behavior can be measured and changed, whereas cognitive theory highlights how thoughts and perceptions influence feelings and behavior. During the 1980s and 1990s, behavior therapy and cognitive therapy merged into CBT. Since then, a range of disorder-specific CBT models has been developed. A common factor across disorder-specific CBT models is that they emphasize the role of cognitive and behavioral mechanisms for the understanding and maintenance of psychological problems.

Cognitive behavioral therapy can be described as a group of therapies with a common theoretical framework. The cognitive diamond (Fig. 20.1) is a transdiagnostic model which is frequently used to describe the key principles of CBT. It illustrates the interplay between behavior, thoughts, emotions, and bodily sensations and how they continually and reciprocally influence one another. The cognitive diamond also illustrates how psychological problems are maintained, and how changes in any of the four components might help to break the "vicious circle" of psychopathology. Therapeutic interventions are tailored to identify connections between feelings, thoughts, and behaviors and are directed at reducing distress, changing unhelpful thoughts, and alleviating behaviors. Therapists work together with children, adolescents, and/or parents to observe, identify, and experience how the four components are connected to and influence one another. CBT aims to help the client adjust thoughts or behaviors that maintain the problem in question and replace them with more functional behaviors and thoughts.

Fig. 20.1 The cognitive diamond



Therapeutic Relationship and Therapist's Attitude

An inherent element in CBT is the assumption that cognitive distortions (i.e., styles or patterns of inaccurate thinking; Friedberg et al., 2012) and behavior may be changed through dialogue between therapist and client. Aron Beck (1979) emphasized that the relationship between the client and therapist should be based on *collaborative empiricism* and *guided discovery*. In the term collaborative empiricism, collaboration refers to "shared work" involving active participation and contribution from both client and therapist (Kazantzis et al., 2013), whereas empiricism highlights that the client's beliefs are seen as hypotheses to be tested (Beck, 1979). The term-guided discovery describes how the dialogue between therapist and client guides the client to explore cognitive processes. A well-known method that supports the process of guided discovery is Socratic dialogue (Padesky, 1993). Socratic dialogue attempts to help clients evaluate their reasoning (Chessick, 1982). Through systematic questioning and a nonjudgmental attitude, the therapist tries to understand the client's view and help the client discover illogical reasoning and explore solutions (Overholser, 1993; Padesky, 1993). In Socratic dialogue, the therapist asks questions that foster reflection and exploration, such as "What would you advise a friend who told you something similar?" "Have you ever noticed a problem like this before?"; "How did you deal with it then?"; "What other ways could you look at this situation?". In this manner, Socratic dialogue guides the client through a cognitive exploratory process. The idea is that the client has the capacity to change and that the therapist through questions and positive attitude supports the client in this process of change. However, as pointed out by Overholser (1993): "Systematic questioning should not be used when the client is unlikely to benefit from a cognitive exploratory process. Young children are too concrete to appreciate the complexities of the Socratic method." (p. 72). Accordingly, Socratic dialogue might be a useful approach when working with adolescents, but must be simplified when used with younger children. This is further elaborated in the last section of the current chapter. Furthermore, in CBT with children and adolescents, the principle of guided discovery is integrated in other techniques such as behavioral experiments, exposures, problem-solving, and cognitive restructuring adapted for use with children. Children and adolescents may for example be invited to actively investigate the accuracy and usefulness of their beliefs by "playing the role of a thought detective" (Friedberg & McClure, 2015).

CBT is characterized by collaboration among the child or adolescent, their family, the therapists, and in some cases school or kindergarten personnel. The presence, immediacy, and transparency when delivering the intervention have been pointed out as critical elements in the therapeutic relationship in CBT (Friedberg et al., 2013). More specifically, CBT therapists should attend to what is happening here and now in treatment, tolerate negative emotional states and discomfort, and stay in contact with the child or adolescent through emotionally arousing experiences. Furthermore, transparent communication should be integrated in all dialogue with the child, adolescent, and/or parents. Transparency is an important principle in CBT and is ensured in various ways, for instance, through psychoeducation, clear communication of the structure of CBT, and explanations of the rationale for the different methods applied (Friedberg et al., 2013).

General CBT Components

Assessment and Systematic Evaluation of Outcome

In CBT it is recommended that standardized and empirically validated instruments are used to assess symptoms. The assessment is usually carried out at pretreatment in order to measure the intensity of symptoms and repeated at evaluation points and at the end of therapy. The aims are to monitor progress and to evaluate whether the treatment has yielded the intended results. Systematic assessment of symptoms using standardized symptom rating scales has been shown to optimize therapists' ability to accurately assess treatment response and remission (McGuire et al., 2019). With children and adolescents, the assessment includes self-reports, parent reports, teacher reports, and/or standardized clinical interviews. For information on assessment tools for children and adolescents, the reader should consult the evidence base update on assessment tools for children and adolescents (Becker-Haimes et al., 2020). There are also several handbooks available that summarize the validity and reliability of various assessment tools (e.g., McLeod et al., 2013).

Case Conceptualization

Case conceptualization is a short summary of a child's developmental history, core cognitions, emotional responses, coping strategies, and behaviors. Developing a case conceptualization is a necessary foundation in CBT. It is typically created in a collaboration between the therapist, the child/adolescent, and his/her parents during the initial phase of treatment. It serves to create hypotheses about the development of the problems and maintaining mechanisms (Murphy & Christner, 2006). Case conceptualization helps therapists and clients to specify the target of treatment. As such, a well-formulated case conceptualization is helpful in order to individually tailor the interventions (Kuyken et al., 2009). There are various models of CBT case conceptualizations. A thorough discussion of these models is beyond the scope of this chapter. For further discussion on case conceptualizations, readers may consult the above-mentioned references.

CBT Structure

Cognitive behavioral therapy is organized according to an overall structure which describes the progress of treatment. Furthermore, the session structure describes the specific content to be covered in each session.

The overall treatment structure in CBT includes three phases: an initial phase, a middle phase, and a final phase. During the initial phase, the patient's motivation and expectations for treatment are assessed, the therapeutic alliance is built, goals are specified, and psychoeducation is provided. In the middle phase, cognitive and behavioral strategies are implemented. In the final phase, the therapist prepares the client for termination and emphasizes relapse prevention (Beck & Beck, 2011). Furthermore, most CBT manuals follow a session-by-session guide of the content to be covered throughout treatment. For instance, in the treatment of anxiety, the overall treatment structure typically starts with psychoeducation, followed by setting goals for treatment, introducing cognitive techniques, carrying out exposures, before ending treatment with a session focused on maintenance of treatment gains (Barrett, 2005; Kendall & Hedtke, 2006; Rapee et al., 2019). Cognitive behavioral therapy also involves homework assignments between sessions to practice and reinforce skills and to generalize these skills to everyday life situations. The treatment structure is usually presented to the child, adolescent, and/or their parents in the initial session to ensure predictability and transparency regarding the progress of treatment. The overall treatment structure is considered a framework to guide therapists and patients through treatment. However, therapists are advised to have a flexible approach and consider individual adaptations whenever needed. Some children might need certain interventions to be repeated, whereas others reach their goals early and treatment may be ended sooner than planned.

The session structure is a guiding outline that helps therapists organize and prioritize what they do in CBT sessions (Friedberg & McClure, 2015). Judith Beck (1995) described six components in CBT sessions: (1) check in; (2) homework review; (3) setting the agenda; (4) the actual session content; (5) homework assignment; and (6) feedback from child, adolescent, and/or parents on their perception of the session.

Psychoeducation

Psychoeducation is intended to provide a common understanding between patients and therapists of the treatment model and the rationale for the therapeutic interventions. Psychoeducation also aims to provide knowledge about the patient's disorder. Accordingly, the content of the psychoeducation varies depending on the presented problem. For instance, in the treatment of disruptive behavior, parents typically receive psychoeducation about child development and how different parenting practices affect children's behavior (Forgatch & Patterson, 2010; Webster-Stratton & Reid, 2003), whereas in the treatment of PTSD, information on traumatic stress, trauma responses, and reminders are important subjects to be covered (Cohen et al., 2012). The therapist tries to engage the parents, child, or adolescent in the psychoeducation through the use of various approaches such as illustrations, videos, discussions, examples, or metaphors. Psychoeducation is introduced in the early stages of treatment and repeated throughout treatment whenever necessary. Accordingly, psychoeducation serves as a supportive technique throughout the treatment process and might help to demystify the symptoms, modify inaccurate beliefs, and reduce the shame, guilt, or anger related to the child's or adolescent's disorder (Friedberg et al., 2012).

Setting Goals

An important element in the initial phase of CBT is to define what the child, adolescent, and parents want to achieve during the treatment. In order to succeed with CBT, it is essential that the child or adolescent is involved in the process of setting goals, and that the goals are consistent with the child's understanding of the problem. It is important to note that the child's goals for therapy might be different than the goals of their parents. For instance, parents might want their adolescents to do more homework. However, the adolescent might find this goal to be demotivating and uninteresting. In such cases, an important part of therapy is to positively reformulate and identify goals that are motivating for the child or adolescent, while at the same time taking the parents' concerns seriously. In this example, the therapist and adolescent might find that the adolescent is motivated to achieve better grades, have more fun at school, or perhaps have fewer conflicts with their parents around homework.

In parent management training, the parents define goals for their children and work towards these goals through making changes in their own parenting. Parents are trained to specify the goal and to positively formulate what behaviors they want to see more of, and to use specific parenting techniques such as rewards in order to achieve their goals (Webster-Stratton & Reid, 2003).

Whether the therapy is directed mainly at children, adolescents, parents, or families, the goals should be clear, achievable, measurable, and positively formulated. The acronym SMART (Specific, Measurable, Achievable, Relevant, and Time-Bound) might be a useful reminder in the goal-setting process. Stallard (2019) wrote:

> A good goal should be clearly and positively defined (specific) and which can be readily assessed (measured) to determine progress. The target should be motivating but not too large to feel impossible (achievable). Goals should be important to the young person (relevant) and be achievable within a reasonable timeframe (timely). (p. 24)

Monitoring Behaviors, Emotions, and Cognitions

In close cooperation with the patient, CBT therapists use methods aimed at observing and recording the individual's behavior, thoughts, and emotions. This process is a key element in most CBT treatments and is carried out in order to increase the patient's awareness and to ensure a common and thorough understanding of the problem in question (Friedberg et al., 2012). Monitoring behavior, thoughts, and emotions provide information on the intensity and frequency of unhelpful thoughts, emotional reactions, and unwanted behavior, how these interact, under which circumstances they occur, and how they are maintained. It serves to direct treatment and is regarded as a necessary procedure to create change and to make use of more helpful strategies.

Behavioral monitoring aims to identify the antecedents and consequences of a certain behavior. The individual or other observers such as parents or teachers might carry out the monitoring. First, the behavior in question is specified, next, the frequency of the behavior is registered as well as its antecedents and consequences. The technique is especially useful in the treatment of behavioral or anger problems where it helps identify triggers for unwanted behavior and reinforcing consequences (Hanley et al., 2003; Miltenberger et al., 2021).

Self-monitoring of cognitions and emotions may help children and adolescents to become more aware of their thoughts and beliefs and how these are associated with particular situations and emotions. In order for a child or adolescent to be able to word their own thoughts and feelings, it is usually necessary to have a thorough psychoeducation where the therapist introduces a simple classification system for feelings (e.g., mad, sad, worried, and happy; Friedberg et al., 2012). Furthermore, a visual rating scale such as the fear thermometer (March & Mulle, 1998) might be helpful to describe the intensity of the feeling. The therapist should work together with the child to identify thoughts and feelings in different situations. For instance, for a socially anxious boy, a relevant situation might be that he was asked to read out loud in the classroom. The therapists should direct the conversation around the situation in order to investigate what feelings and thoughts were present in that situation. Next, when the child begins to understand how his or her inner states can be categorized and worded, self-monitoring of cognitions and emotions might start. In the treatment of depression and anxiety, self-monitoring is often carried out as homework assignments. In the treatment of depression, adolescents might be instructed to pay attention to situations that have made them feel sad, or to feel happier, during the week (e.g., Curry et al., 2005). In the treatment of anxiety, the child or adolescent is typically instructed to pay attention to situations that have made them feel worried or anxious (Rapee et al., 2019). A common variant is to use a three-column table where the child or adolescent (1) describes the situation, (2) categorizes the feeling and rate the intensity of the feeling on a scale, and (3) writes down what thoughts went through their head in this situation.

Behavioral Techniques

Reinforcement of Desired Behavior

Reinforcement of desired behavior is theoretically founded in the operant conditioning paradigm, which suggests that a behavior is strengthened or weakened by its consequences (Skinner, 1938).

Accordingly, unwanted behavior might be maintained by its consequences (e.g., removal of distress, attention from others). In the same manner, the frequency of desired behaviors might be increased through positive reinforcement or through response cost (i.e., removal of a privilege or reward). In line with these principles of behavior modification, parents of children with disruptive disorders are taught how they can increase desired behaviors and reduce the number of unwanted behaviors in their child. In the early stages of parent management training, parents define a number of desired behaviors they want to see more of and reward the behavior by encouragement and/or reward systems in order to increase the frequency of such behaviors (Forgatch & Patterson, 2010; Webster-Stratton & Reid, 2003). When the number of desired behaviors increases, the frequency of unwanted behaviors usually decreases. However, the parents might still need strategies to cope with unwanted behaviors. Accordingly, in the later stages of treatment, parents practice how not to reinforce negative behavior. Mild problem behaviors might be handled by not paying attention to them, thus removing the reinforcing consequence of the behavior, or by paying attention to other desired behaviors that are incompatible with the unwanted behavior. More severe problem behaviors might be managed through removing a reward or privilege (i.e., response cost).

Reinforcement or rewards are also important elements in CBT treatment of other disorders and might help motivate children or adolescents to carry out behaviors necessary for change to occur. For instance, a child may achieve rewards after carrying out exposures in anxiety treatment or depressed adolescents may learn to reward themselves after doing an activity from the activity plan.

Behavioral Experiments and Exposures

Behavioral experiments and exposures are treatment components where the child or adolescent learns to face situations they have previously avoided. These are key elements in CBT for anxiety disorders, including OCD and PTSD, but might also be used in the treatment of various other disorders.

The term *behavioral experiments* is derived from the cognitive wing of CBT, where the aim of the experiment is to test a cognition through a real-life experience (Clark, 1989; Wells, 1997). It is especially relevant in the treatment of anxiety, where the behavioral experiments are carried out to test the validity of a catastrophic misinterpretation (Bennett-Levy et al., 2004).

The term *exposures* originates from behavioral theories suggesting that fear extinction is achieved through habituation by repeatedly exposing the individual to the anxiety-provoking stimuli (Foa & Kozak, 1986). More recent behavioral theories propose that fear extinction takes place because new learning inhibits access to the previously learnt association (Craske et al., 2008; Craske et al., 2012).

There is a general agreement that learning through experience is a powerful therapeutic strategy in the treatment of anxiety (Bennett-Levy et al., 2004; Kendall et al., 2005). Both behavioral experiments and exposures aim to help the child and adolescent recognize that the feared situation does not represent “real danger”.

In the treatment of anxiety disorders, repeated exposures are a core feature of treatment. In order to succeed with the exposures, the child or adolescent needs to understand the rationale for the exposures. In other words, the child needs to understand that going through discomfort in repeated exposures will help them overcome their anxiety, and that continued avoidance will make the anxiety worse in the long run. Accordingly, the rational for exposure should be thoroughly explained during psychoeducation, using metaphors and examples adjusted to the child’s developmental level. Through collaboration, the therapist and the child go through possibly anxiety-provoking situations, write them down on a worksheet, and categorize them as easy, medium, or challenging. Then the child places the exposures in a hierarchy, often illustrated as a pyramid, a ladder, or stairs, from the easiest task on the bottom to the most challenging tasks on the top. Once the hierarchy is constructed and the child understands the rationale for the exposure process, the exposures might start on the easiest tasks before gradually moving up the hierarchy. In the initial phase of exposure treatment, exposure tasks are typically carried out during the sessions. After having carried out initial exposures with the assistance of the therapist, the child or adolescent do self-administered exposures between sessions. It is important that the therapist prepare the child for self-administered exposures. This might be done through imaginary exposures in session, by carefully planning when and where to carry out the exposures and by going through the situation with the child beforehand. The therapist should also inform the child or adolescent that they will not be forced to do exposures, but that the therapist will support them and encourage them to carry them out. Furthermore, the therapist and/or parents should reward the child for carrying out exposures. It is important that the child knows what kind of reward he or she will achieve after carrying out the exposure. The therapist might also need to involve parents or other adults in the exposures between sessions. Graded exposure, in which a fear hierarchy is created in collaboration with the child or adolescent and the therapist, is mastered in a stepwise manner. This is the cornerstone of treatment for anxiety disorders, such as specific phobias, separation anxiety disorder, generalized anxiety disorder, and social anxiety disorder. In the treatment of OCD and PTSD, there are special features to the exposures that the therapist should be aware of. However, a discussion of specific features related to the exposure process of the different disorders goes beyond the scope of this chapter. We recommend clinicians to consult disorder-specific treatment manuals and other literature on the issue (e.g., Raggi et al., 2018) before carrying out exposures.

Usually, the exposures are supplemented with some sort of thought challenging. Interestingly, some findings indicate that exposures might be more effective when they also challenge cognitions (McMillan & Lee, 2010). For instance, the therapist might set up the exposures to challenge catastrophic beliefs. The child or adolescent writes down what they expect to happen. After the exposures, the therapist addresses how the child felt, what their thoughts were, what they learned from the exposure, and whether their expected beliefs were confirmed. A similar way of challenging cognitions when doing exposures is anxiety prediction. This simple, yet effective cognitive technique, supplements the exposures by inviting the child or adolescent to predict their level of anxiety before carrying out the exposures (Friedberg & McClure, 2015). Their predicted level of anxiety is typically rated on a scale, such as the fear thermometer. The exposures serve as a test of their predictions, and after the exposure, they rate their actual anxiety. If the actual anxiety turns out to be less intense than they predicted, the therapist might elaborate on this issue and focus on the fact that their anticipations are not always accurate. If their prediction was accurate, or if the feeling was more intense than what they predicted, the therapist might elaborate on the fact that the child was able to carry out the task and tolerate the intense feeling. For instance, in the Cool Kids Program (Rapee et al., 2019) anxiety prediction is a part of the preparation for exposures. The child is asked to describe and write down in their workbook their expectations to a specific exposure and rate their predicted level of distress. Then, after the exposure is carried out, the child is asked to describe and write down what he or she learned, the reward they achieved, and how worried they expect to be the next time they perform the exposure task.

Relaxation Training

Relaxation training is a behavioral technique used in most CBT manuals for anxiety to reduce physiological arousal (Barrett, 2005; Kendall & Hedtke, 2006; Rapee et al., 2019). Relaxation techniques include controlled deep breathing, guided imagery, and progressive muscle relaxation where the individual is taught to tense and relax specific muscle groups. The relaxation procedures are often supplemented with metaphors and imagery such as the belly breathing balloon or safe place used in trauma-focused cognitive behavioral therapy (Cohen et al., 2012).

Behavioral Activation

In the treatment of depression in children and adolescents, behavioral activation is a core component of CBT interventions. The aim is to increase participation in pleasant, mood-enhancing activities. This task can be challenging for depressed patients, as they might have lost interest in many activities that they previously found enjoyable. If this is the case, the therapist should ask for activities that they used to like. Furthermore, it is necessary that the rationale for behavioral activation has been explained through psychoeducation. Depression might be explained as a “downward spiral” of negative emotions, thoughts, and behaviors, and increasing participation in pleasant activities can turn this into an “upward spiral” (Curry et al., 2005).

A common strategy is to use an activity schedule with the days of the week. A list of pleasant activities is created in session and the adolescent chooses the activities he/she would like to increase. Next, the activities are carried out as homework between sessions, recorded on the activity schedule, and brought back to session. Similar to the anxiety prediction procedure described earlier, pleasure prediction is a commonly used cognitive strategy supplementing the behavioral activation. When the activities are written down on the activity schedule, the child or adolescent predicts how enjoyable he/she think the activity will be, using verbal descriptions or a feeling thermometer. After the activity, the child or adolescent should describe or rate how enjoyable he/she experienced the activity to be. This information is used in session to test the accuracy of their beliefs. If the activity was more enjoyable than expected, the therapist can elaborate on the fact that the predictions were inaccurate. If the actual emotional experience was worse than, or as predicted, the therapist can work with the adolescent to elaborate on the mere fact that the adolescent was able to carry out the activity despite their dissatisfaction and lack of motivation. This implies that there are alternative ways of coping, and that it is possible to direct one’s own behavior despite low motivation and negative predictions (Friedberg & McClure, 2015).

Cognitive Techniques

The aim of cognitive interventions in CBT is to increase cognitive flexibility and to foster more adaptive interpretations and thoughts about oneself, others, situations, or problems. The aim is not to eliminate all negative emotions or thoughts. In the current section, we have categorized cognitive techniques into cognitive restructuring techniques and problem-solving interventions.

Cognitive Restructuring

The aim of cognitive restructuring is to identify and challenge cognitive distortions. It is the most common strategy used in CBT programs for internalizing disorders (Fréchette-Simard et al., 2018). Self-instructional techniques are often useful methods where children learn more helpful self-talk that can support them when facing distressing situations. With younger children it is often necessary that the therapist teach the children to create more functional and calming thoughts (Friedberg et al., 2012). Rational analysis is a more advanced way of restructuring cognitions. The therapist coaches the child or adolescent to evaluate the accuracy of his or her own beliefs. This can be done through reattribution, in which the therapist helps the child see their explanations from multiple angles (Friedberg & McClure, 2015). The first step is to identify cognitions that maintain the problem. Through self-monitoring or dialogue, the child and therapist identify anxious or negative self-talk, e.g., “Everyone will laugh at me”, “I am hopeless”. Next, the therapist asks a series of open-ended questions to guide the adolescent's attention toward alternative explanations. Alternative explanations are written down and their plausibility rated. Finally, a conclusion based on all alternative explanations is developed. A similar procedure is decatastrophizing, a common method in the treatment of anxiety (Beck & Beck, 2011). The focus is on challenging the child or adolescent's catastrophic predictions. Through asking questions about their predictions (e.g., "What will most likely happen?"), the therapist guides the child to arrive at a more realistic and helpful belief. It is essential that the child believes in the more realistic thought. Another common method to arrive at more realistic thoughts is a test of evidence (Friedberg & McClure, 2015). This is done through looking for supporting and contradicting evidence for the catastrophic prediction. Once a list of supporting evidence and a list of disconfirming evidence are created, a more realistic conclusion is generated. The conclusion should include evidences that support their catastrophic belief and evidences that disconfirm it.

Problem-Solving

Problem-solving in CBT is a cognitive technique that helps the child or adolescent to define the problem and identify alternative adaptive coping strategies when they face a difficult situation. A common problem-solving procedure is to evaluate the advantages and disadvantages of a specific choice, behavior, or decision (Friedberg et al., 2012). For instance, if a depressed adolescent stays in his or her room when feeling sad, the therapist might address the advantages and disadvantages of this solution. In cases where a child faces tasks or challenges that seem too overwhelming, the therapist can help the child to break them down into smaller tasks (Friedberg & McClure, 2015). The therapist helps the child to analyze the situation and arrive at smaller tasks to cope with the problem. The problem will seem more manageable as each task will move the child closer to a solution (Stallard, 2019). Several CBT manuals offer specific stepwise problem-solving interventions (e.g., Curry et al., 2005; Rapee et al., 2019) where the child or adolescent first identifies the problem and brainstorm possible solutions, before evaluating all the solutions. Finally, the best solution is chosen, carried out, and evaluated.

Empirical Support for CBT in Internalizing and Externalizing Disorders in Children and Adolescents

Internalizing disorders such as anxiety disorders, obsessive compulsive disorder (OCD), posttraumatic stress disorder (PTSD), and depressive disorders represent as a group the most common mental health disorders among children and adolescents (Costello et al., 2005; Merikangas et al., 2010). Likewise, externalizing behavior disorders such as attention deficit hyperactivity disorder (ADHD), conduct disorder (CD), and oppositional defiant disorder (ODD) are among the most common reasons for referral to mental health services for children and adolescents (Smith et al., 2018). Both internalizing and externalizing disorders are associated with numerous adverse developmental consequences for children and adolescents and can lead to emotional, cognitive, social, and academic impairments (Abramowitz & Mahaffey, 2014; Clark et al., 2002; de Lijster et al., 2018; DuPaul et al., 2016; Hammen et al., 2008; Piacentini et al., 2003; Trickett et al., 2011). The high prevalence of internalizing and externalizing disorders and the severe consequences for the individual and the society highlight the necessity of providing evidence-based interventions.

Cognitive behavioral therapy programs for internalizing and externalizing disorders in children and adolescents have been developed during the last 30 years. For these disorders, CBT is documented as a well-supported and evidence-based treatment that improves both symptoms and functioning. Chambless and Hollon (1998) established criteria for determining the standard of evidence that is needed for a treatment to be considered empirically supported, i.e., whether the efficacy of a psychological treatment is well-established, probably efficacious, or possibly efficacious. A treatment is considered well-established when it has demonstrated equivalent or superior efficacy to an alternative treatment in at least two between-group design experiments, demonstrated by at least two independent research teams at two different sites. According to these criteria, cognitive behavioral therapy has solid empirical support and is considered well-established for anxiety disorders, OCD, PTSD, and depressive disorders (Dorsey et al., 2017; Freeman et al., 2018; Higa-McMillan et al., 2016; Weersing et al., 2017). Treatment formats have included individual delivery, group delivery, treatment with or without parental involvement, and for some of the anxiety disorders and OCD also self-administered (self-help materials in booklets or online) or internet-delivered therapy (e.g., Higa-McMillan et al., 2016).

For externalizing disorders, well-established CBT treatments include behavior therapy programs for parents, children and/or teachers, and programs addressing the organizational problems of children with ADHD (Evans et al., 2014; Kaminski & Claussen, 2017; McCart & Sheidow, 2016). Across internalizing and externalizing disorders, CBT is found effective in reducing symptoms of the targeted disorder and increasing remission. Across the different internalizing disorders, the pre-post-treatment effect size for disorder-specific outcome measures has been large, and over half of the youth who started treatment achieved remission. Furthermore, outcomes have been maintained or improved at follow-up, and the attrition during CBT has been low (varying from 6% drop-out for OCD to 15% for depression and PTSD). For externalizing disorders, the effect sizes have been moderate to large for behavioral outcomes (Fabiano et al., 2015), and moderate for disruptive behavior (Battagliese et al., 2015), and with a low attrition rate (<12% for ADHD and CD-ODD).

Effectiveness of CBT in Routine Care

The evidence of empirically supported treatments such as CBT rests mainly on randomized controlled trials (RCTs) conducted in specialized university research clinics. An important question has been how well CBT holds up when transported and delivered in routine clinical practice. Concerns about the generalizability of results from RCTs arise from the assumptions that clients, therapists, and treatment contexts may all differ in important ways between research clinics and routine clinical care (e.g., Weisz et al., 2013b). For instance, studies from research clincs often apply more rigorous inclusion and exclusion criteria, resulting in more homogenous samples compared to clients in routine clinical care. Furthermore, studies from research clinics may apply more extensive traning, supervision and treatment monitoring of therapists and have staff and facilities dedicated to research. As such, treatment programs developed and evaluated under highly controlled conditions in specialized research settings may not produce similar results when delivered in routine clinical practice (Weisz et al., 2013a).

During the last 20 years, a growing number of effectiveness studies in nonuniversity clinics have been published. Findings from such studies provide important information to clinicians and decision makers as to whether empirically supported treatments can be expected to yield the intended results when implemented in routine clinical care.

Importantly, CBT has shown favorable outcomes in routine clinical care for internalizing disorders (Wergeland et al., 2021) and externalizing disorders (Riise et al., 2021), with treatment outcomes (within-group effect sizes and remission) comparable with results obtained in university research clinics. These results show that substantial effects can be obtained when delivering CBT for internalizing and externalizing disordes in routine clinical care, and that clinicians and patients can be confident about the effectiveness of CBT interventions with already established efficacy when delivered in routine clinical care.

The Need for Developmental Sensitive Adaptations of CBT

The first CBT manuals for treating mental health problems among children and adolescents were developed in the early 1990s (e.g., Coping Cat by Kendall & Hedtke, 1992). These manuals were adaptions of CBT to fit the developmental level (cognitive, emotional, social) of school children and adolescents. Later a range of manuals have been developed for different psychosocial problems and disorders in youth, adapted to different age groups, including preschool children (e.g., Rapee et al., 2010). Knowledge about and competence regarding how to deliver developmental-sensitive CBT are critical for *all* therapists who want to do CBT with children and adolescents.

Cognitive behavioral therapy involves active participation from youth in defining the goals for the treatment, practicing new skills between sessions (e.g., coping and self-control skills), and exploring inner mental states, i.e., thoughts, feelings, and physical sensations. Cognitions and cognitive processes are assessed and challenged (i.e., cognitive restructuring), new behaviors and strategies are learned (e.g., problem-solving, relaxation techniques, exposure, behavioral activation), and connections between thought, feelings, and behavior are established. Also, children receive psychoeducation introducing them to CBT rational and methods. All these therapeutic tasks need to be adjusted to the developmental level of the youth.

To explore and challenge one's own thinking requires that the youth can think about his/her own thinking (meta-cognition). Whereas early metacognitive skills have been observed in preschool years (e.g., awareness of the source of one's knowledge), the cognitive and affective abilities required for more advanced meta-cognitive skills (assessing and reflecting upon one's own thought processes) are not fully developed before adulthood (Kuhn, 2000). Thus, the cognitive restructuring, the Socratic dialogue techniques, as well as other cognitive, emotional, and behavioral techniques used in CBT need to be adjusted to fit the developmental level of the child.

Cognitive behavioral therapists need to understand and recognize normative stages in the cognitive development of youth. This is necessary to evaluate whether cognitions and cognitive strategies need to be challenged (whether they are "unhelpful" or not). For example, what is found to be normal cognitive processes among preschool children (e.g., egocentric thinking or "black and white - thinking") is considered as cognitive distortions when working with older adolescents or adults (Grave & Blissett, 2004).

The role of youth developmental status may also impact treatment outcomes from CBT. For example, treatment outcomes have been found to be worse for teenaged school refusal compared to younger children with school refusal, probable due to adolescents with school refusal being more depressed and more social anxious than their younger counterparts (Heyne et al., 2014). However, more generally, treatment effects from CBT seem to be better among adolescents compared to younger children (Grave & Blissett, 2004). An explanation of this could be that psychosocial problems among younger children to a larger degree are caused by lack of knowledge, experience, or skills (e.g., deficiency in social skills), whereas problems in older children and adolescents are more related to cognitive distortions (e.g., such as "nobody likes me", "others think I'm stupid"). This has consequences for the choice of treatment strategies, as treating problems due to lack of knowledge or skills involve psychoeducation and learning new skills, whereas cognitive distortions should be treated with cognitive techniques.

Strategies to Make CBT Developmental Sensitive

In the following, we discuss some common strategies that have been suggested to make CBT developmental sensitive (Friedberg & McClure, 2015; Grave & Blissett, 2004; Haugland, 2011).

Level of Parental Involvement CBT with youth usually includes involvement of parents and other significant persons in the youth's life (teacher, coach, siblings, grandparents, friends) who may also be included in the therapy. Having a systemic approach is considered crucial for a developmental sensitive CBT. Thus, important persons in the youth's life need to be involved in assessment, case formulation, and treatment (Friedberg & McClure, 2015). However, in general, level of parental involvement is lower in CBT with adolescent patients where autonomy and self-determination are important developmental issues. Considerable higher level of parental involvement is found in CBT with young children. In some manuals, parents of preschool children may even participate in parent guidance programs where minimal or no child involvement is included (e.g., Rapee et al., 2010; Webster-Stratton, 2012). In addition to developmental level, the child's diagnosis and presence of parental psychopathology also influence level of parental involvement (Barmish & Kendall, 2005).

Engagement in Treatment Goals Children are here-and-now oriented. This may represent a challenge for their maintenance of treatment motivation, especially if treatment goals are expected to be reached sometime in the future, and if the youth has not been actively engaged in deciding treatment goals. We need to ensure that the treatment goals are in accordance with the youth's experience of the situation, his/her interests, and that the goals comply with important developmental tasks (e.g., establish relationship with peers, learn to be independent).

Frequent Use of Positive Reinforcements Youth motivation may also be maintained through frequent use of positive reinforcement. Therapists, parents, and teachers are encouraged to apply verbal praise (e.g., "you are doing a great job practicing to control your angry outbursts", "I am impressed by the ideas you have on how to make friends with other kids during recess"), to introduce rewarding activities (e.g., having a friend over for the night, choosing what to have for dinner), and administer tangible rewards (e.g., a small toy, a magazine). This is done to reinforce the youth when showing positive behavior, practicing skills, and participating in treatment activities. Importantly, all rewards need to be adjusted to the youth's developmental level, interests, and desires.

Applying Behavioral Techniques Due to the limited cognitive development in prepubertal children, CBT therapists often rely on behavioral techniques (e.g., skills training, modelling, behavioral activation) rather than cognitive techniques, in the treatment of preschool and early school-aged children (Friedberg & McClure, 2015; Shirk, 2001). For example, direct or in vivo exposure to feared object or situations is recommended for young children, instead of imagined or in vitro exposures, because visualization of imagined situations or objects can be challenging for young children (Ollendick et al., 2001). The use of behavioral techniques may also be important since problems in young children may partly be related to deficiencies in knowledge, experience, and skills, rather than cognitive distortions.

Applying Less Complex Cognitive Techniques CBT therapists also use cognitive interventions with children. In the same manner as with adults, youth may demonstrate different types of unhelpful thoughts associated with different psychological disorders ("the cognitive content-specificity hypothesis"; Schniering & Rapee, 2004). For example, depressed youth more frequently express thoughts about being a failure, whereas youth with disruptive behavior more frequently express thought of hostility and revenge. In CBT with youth who are cognitive immature and have limited ability for abstract thinking and metacognition, we often choose less sophisticated and more simple cognitive interventions. These can be to introduce differences between "helpful" and "unhelpful thoughts" and to search for positive self-instructions or identify coping statements. For young children, the positive self-statements should be closely related to the challenge they need to face (e.g., "I am brave who dear to walk past dogs on the side-walk"), whereas for older children, self-instructions or coping statements can be more generalized (e.g., "I am willful and strong and often succeed in achieving my goals"). The more sophisticated levels of cognitive restructuring (e.g., analyzing, synthesizing, and reevaluating one's own cognitive distortions) are used with mature adolescents, whereas less advanced cognitive interventions, such as identifying thoughts and the relationship between thoughts, feelings and behavior, are applied also with younger children (Grave & Blissett, 2004).

Making Interventions Relevant, Engaging, and Fun Not only the content of the interventions, but also how interventions are presented needs to be developmentally sensitive (Haugland, 2011). Limited abilities for logical reasoning and metacognition are compensated by using familiar concepts, words, ideas, and examples from the everyday life and experience of the youth (e.g., "the same way you needed to practice when learning to swim and to ride your bicycle, you also need to practice your CBT anxiety management skills"). Therapeutic goals and technique may be linked to the youth's interests and hobbies (e.g., "to be able to endure disappointments and to achieve success, a football player needs to remind herself about her strengths, skills, and spirit, as well as the goals she wants to achieve"). Therapeutic issues are frequently introduced through metaphors, play activities, analogies, acronyms, and by applying concrete tools and materials (e.g., stories, pictures, films, games, songs, heroes, and cartoons). The last 20 years a range of CBT manuals and guides have emerged with ideas and examples on how to make treatment interesting, engaging, and fun for youth with different developmental levels and with different problems (e.g., Friedberg et al., 2009; Phifer et al., 2017; Stallard, 2019). Through stories, heroes, metaphors, and externalizations, abstract concepts and processes are made concrete and understandable. Negative self-talk can, for example, be identified through computer games where the youth fights with enemies that are trying to make her believe she is worthless, stupid, a failure, and have no control over her feelings, thoughts, or behavior. Metaphors (e.g., "controlling the volcano threatening to burst with anger") may make youth understand complex issues such as ambivalence, negative thoughts, self-control, etc. However, to be engaging and fun, creative techniques need to be closely adapted to the interests and developmental level of the youth. Being too childish, as well as being too advanced, in the choice of heroes, metaphors, activities, etc. will increase the likelihood of losing the youth's interest and failing to engage him/her in the therapeutic process.

Summing Up

CBT is an effective treatment for a range of common mental health disorders during childhood and adolescence. However, the models, interventions, material, and treatment procedures need to be adjusted to fit the developmental level of the individual youth, as well as his/her problem and situation. By implementing developmental-sensitive CBT, therapists increase the likelihood that youth establish and maintain motivation, engagement, treatment alliance, and achieve a positive treatment outcome.

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Classical Conditioning

21

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Introduction

Classical conditioning (also called *Pavlovian* conditioning; Pavlov, 1906) is presumed to contribute to the etiology of mental disorders such as anxiety disorders, and its principles underlie various intervention strategies for childhood psychopathology. How, for example, does a child with a dog phobia develop such an exaggerated fear of dogs? And how can intervention techniques based on classical conditioning mechanisms help to ameliorate psychopathological symptoms? Classical conditioning describes a learning mechanism through which external (e.g., visual, auditory, olfactory, haptic, contextual) or internal (e.g., interoceptive) stimuli become associated with motivationally relevant events, which can be either appetitive (e.g., the delivery of food or a psychotropic substance) or aversive (e.g., pain). Thus, through classical conditioning, individuals learn that certain cues (i.e., so-called "conditioned stimuli") predict pleasant or unpleasant events. Aversive conditioning enables individuals to avoid potential dangers before they occur or to prepare for unpleasant events and thus reduce negative consequences (Domjan, 2005). Conversely, through appetitive conditioning, new stimuli can acquire reward-related motivational salience (Martin-Soelch et al., 2007).

Aversive Conditioning: Learning to Fear

Being able to anticipate and predict potentially dangerous events has been highly advantageous in the evolutionary past. During aversive conditioning (often referred to as "fear conditioning"), an innocuous cue (e.g., a visual stimulus) is paired with an unpleasant *unconditioned stimulus* (US). The US (e.g., a loud noise in experimental studies) is often a motivationally salient stimulus that automatically and naturally evokes a defensive response, which does not require prior learning. If infants are startled by a loud noise or movement, they throw their arms and legs out symmetrically. This reflexive behavior, which occurs naturally in response to the US, is called the *unconditioned response*. After being paired with the US, the innocuous cue becomes a so-called *conditioned stimulus* (CS), which predicts the occurrence of the US and, thus, evokes fear. The CS does not necessarily have to be an external

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cue; internal bodily sensations (e.g., irregular or racing heartbeat, nervousness) can also serve as a CS (Mineka & Oehlberg, 2008). The learned threat response that is elicited by the CS is called the *conditioned response*. Conditioned and unconditioned responses are often similar, but can also be qualitatively different. Under certain circumstances, the conditioned response may even be opposite in direction to the unconditioned response. Prominent examples are drug-like and drug-opposite conditioned responses in drug abuse; this is particularly important for understanding conditioned tolerance and withdrawal symptoms, which will be explained later in this chapter.

The key concepts of classical conditioning can easily be illustrated (see Fig. 21.1). Being bullied at school during childhood and adolescence, for example, can cause significant negative emotional experiences (the unconditioned response). Bullying would be the US in the classical conditioning terminology. After repeated bullying experiences, students may associate the school environment (the CS in the classical conditioning terminology) with “being bullied.” Afterward, the school environment may trigger excessive fear (the conditioned response). This may even terminate in a persistent refusal to go to school and severe mental health problems (Heyne et al., 2014). Similarly, if students are humiliated in a math course by their teacher (this experience would be the US), this could contribute to major learning and attentional problems. In future encounters with mathematics-related challenges (the CS), the previously conditioned aversion may be activated. This could lead to the avoidance of learning, and the affected child will probably not develop enthusiasm for mathematics. Thus, conditioned fear may act as a mediator that could ultimately terminate in persistent math problems throughout the student’s academic career. From a conditioning perspective, it would thus be crucial for teachers to create opportunities in the classroom that allow students to associate positive emotional experiences (i.e., an appetitive US) with learning (i.e., the CS).

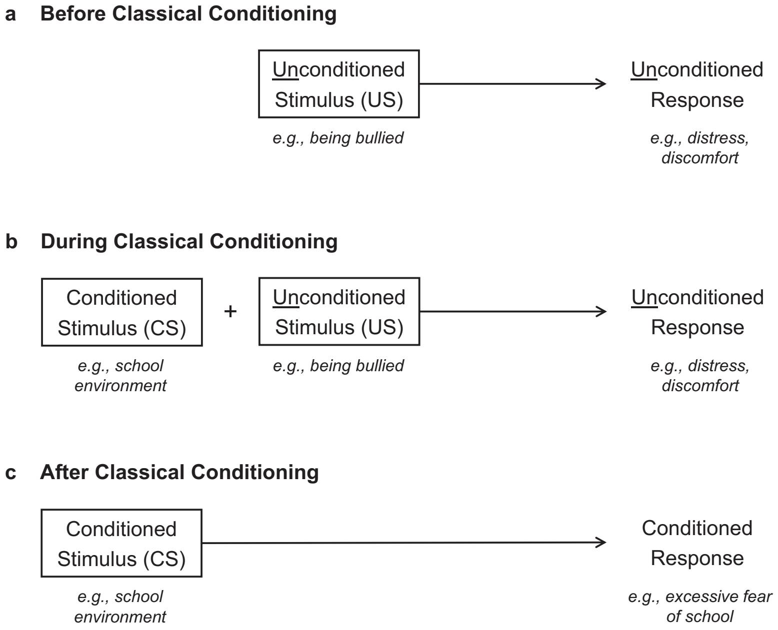

Fig. 21.1 Schematic illustration of classical conditioning. (**a**) Before conditioning, an unconditioned stimulus (US) is an event (e.g., being bullied) that automatically and naturally evokes an unconditioned response (e.g., distress, discomfort). (**b**) When the US (being bullied) is repeatedly paired with certain environmental cues (the conditioned stimuli, CSs; e.g., the school environment), an excitatory CS–US association becomes established. (**c**) After successful conditioning, the CS evokes a conditioned fear response (e.g., an excessive fear of school), even in the absence of the US

Even before researchers began to study classical conditioning extensively in adult humans, mechanisms related to aversive learning were investigated in an 11-month-old child ("Little Albert"); this became famous as the first human fear conditioning study (Watson & Rayner, 1920). In this study, the child "Albert" acquired a robust fear of a white rat after this rat (i.e., the CS) had been paired with an aversive noise (i.e., the US). In addition, it was tested whether fear responses would extend beyond the white rat (the CS). Indeed, "Albert" was also afraid of other animals and objects that were similar to the rat (e.g., a rabbit, a fur coat, and cotton wool). This observation was later called "fear generalization" (Van den Bergh et al., 2021). Generalization of conditioned fear occurs when a threat response, which has been acquired for a particular CS, transfers to other related stimuli that are perceptually, conceptually, or symbolically similar (but have never been paired with the US). Referring to the example above, the child's fear of mathematics could also transfer to other school subjects (e.g., physics). Experimental studies have identified generalization gradients. The greater the physical difference between the CS and the generalization stimulus, the smaller the fear response to the generalization stimulus (Dymond et al., 2015).

From today's perspective, the methodology of the "Little Albert" study raises many ethical concerns and methodological pitfalls (Fridlund et al., 2020). Nevertheless, it became one of the most famous studies in psychology and contributed to the awareness of conditioning principles in young children. The "Little Albert" experiment describes a "single-cue" protocol, as threat responses were conditioned to *one* CS (the white rat). Modern conditioning studies typically apply protocols that involve the presentation of *two* CS types (Lonsdorf et al., 2017). One of the two CSs (the so-called CS+) is repeatedly paired with a US, while the second CS (the so-called CS−) remains unpaired. Larger threat responses (e.g., perceived valence of the CS, heightened autonomic arousal, and activation of the amygdala) to CS+ versus CS− indicate successful fear acquisition. The use of two CS types allows researchers to disentangle excitatory (CS+, "threat") and inhibitory (CS−, "safety") learning processes.

The majority of experimental fear conditioning studies have used neutral visual stimuli like geometric shapes (e.g., Waters et al., 2017) or pictures of faces (e.g., Chauret et al., 2014) as the CS. Male faces seem to be particularly well suited for fear conditioning in adults, due to their relevance in the evolutionary history (Kret & De Gelder, 2012). Chauret et al. (2014) investigated the associability of male versus female faces as the CS in 10- to 17-year-old adolescents. Male (compared with female) faces triggered increased fear ratings in both boys and girls, although CS-evoked skin conductance responses suggested a proneness for "own-sex" faces to become a fear-conditioned CS (Chauret et al., 2014). With regard to the US, most fear conditioning studies in adults have employed highly unpleasant stimuli like loud noise bursts or electric shocks (e.g., Sperl et al., 2016). However, intense stimuli such as an electric shock are not appropriate for fear conditioning research in certain populations, like infants, children, and adolescents. Several researchers have developed US types that are more suitable for these groups, which include an air blast to the larynx (Pine et al., 2001) or a fearful female face paired with a shrieking female scream (Glenn et al., 2012; Lau et al., 2008).

Both contiguity and contingency are important for learning (Papini & Bitterman, 1990; Rescorla, 1988). Contiguity means that the CS and US are connected in time and space. Events that are experienced at a similar time and/or place tend to become associated. Depending on how small or large the temporal and spatial distance between the CS and US is, conditioning is more or less effective. Furthermore, the more often the CS and US are experienced as contiguous, the more strongly they become associated. Thus, contingency refers to the informational value of the CS as a predictor of US occurrence. After successful conditioning, the CS predicts the US with a certain probability. A positive CS–US contingency (i.e., the US is *more* probable with the CS than without it) leads to excitatory conditioning. Conversely, a negative CS–US contingency (i.e., the US is *less* probable with the CS than without it) results in inhibitory conditioning. Finally, if there is zero contingency between the occurrence of the CS and the US, the US does not depend on the presence or absence of the CS. A strong fear of school may develop, for example, if a student experiences bullying at school (contiguity) almost every day (contingency). Fear conditioning typically requires several learning experiences. Nevertheless, experimental research suggests that, under certain circumstances, a single CS–US pairing may actually be sufficient for fear learning (Lipp et al., 2015). Thus, classical conditioning also helps to explain the etiology of trauma-related disorders, which are often triggered by a single terrifying event.

During threatening experiences, both explicit (conscious) and implicit (nonconscious) memory traces are encoded in the brain (Tao et al., 2021; LeDoux, 2014). Some individuals experience distress in certain situations even though they know that they are objectively safe. When threat is processed explicitly, the fearful nature of a stimulus or situation is obviously recognized by an individual. In contrast, implicit threat processing can occur even when a person is not subjectively aware of the threat. Over time, explicit memories often fade or become altered. However, even if somebody forgets about a threatening situation, implicit (nonconscious) memory traces with regard to the threatening event may persist. Confrontations with certain environmental cues or situations can then elicit bodily fear symptoms, even if one cannot explicitly remember the origins of the threat. Implicit threat associations are particularly enduring and resistant to change. The differentiation between explicit and implicit memory processes helps to explain why aversive conditioning events may be responsible for long-lasting experiences of distress, even if one is eventually unable to explicitly recall a threatening event (Alberini & Travaglia, 2017).

In terms of a precise terminology, classically conditioned fear needs to be differentiated from anxiety (Perusini & Fanselow, 2015; Schmitz & Grillon, 2012). When faced with an immediate danger, humans react with hardwired defensive behavior (i.e., the unconditioned response). Fear is part of an alarm reaction (i.e., the conditioned response) in anticipation of an imminent threat that is very close in time. As outlined above, fear can be learned through classical conditioning. In contrast, anxiety is not necessarily elicited by a specific (conditioned) stimulus. Instead, it refers to a rather sustained state of worry about *potential* danger in the future. Unlike fear, anxiety usually does not reliably and validly predict the occurrence of future danger. When moderate, anxiety can be helpful, as it prepares an individual for possible threat. A state of heightened anxiety may *facilitate* the activation of classically conditioned fear.

The Developmental Trajectory of Fear Learning

Despite its origins in the “Little Albert” study, experimental fear conditioning research in humans has mostly focused on adult participants (Biggs et al., 2020; Lonsdorf et al., 2017). However, epidemiological studies show that childhood and adolescence are high-risk periods for the pathogenesis of anxiety disorders (de Araújo Scattolin et al., 2021; Solmi et al., 2021); these observations could be related to altered, age-related changes in the relative importance of excitatory, inhibitory, and generalization mechanisms (Casey, 2015; Ferrara et al., 2021). Children report many fears, and these childhood fears are often part of their normal development (Muris et al., 2000; Weems & Costa, 2005). In most individuals, these fears decrease with age as adolescents learn to differentiate between threat and safety (Gullone, 2000; Lau et al., 2011). This shift can be attributed to improved discrimination learning, as adolescents acquire the ability to better distinguish between excitatory threat cues and inhibitory safety cues. Notably, this developmental change is also visible in basic fear conditioning paradigms. Experimental studies suggest that the magnitude and speed of fear conditioning increase with age from childhood to adolescence and adulthood (Glenn et al., 2012; Jovanovic et al., 2014; Lau et al., 2011; Reinhard et al., 2022; Waters et al., 2017). In particular, children younger than 10 years show diminished differential (i.e., CS+ versus CS−) fear acquisition (Jovanovic et al., 2014), which has been linked to higher anxiety and an altered amygdala–prefrontal circuitry (Gee et al., 2013). In younger children, discrimination between threat and safety seems to rely more on subcortical (e.g., amygdala) activity (Lau et al., 2011). Greater maturation of the prefrontal cortex may contribute to better differential fear conditioning (i.e., threat/safety differentiation) in older subjects (Ferrara et al., 2021). Implicit and explicit threat processing are mediated by (at least partially) different brain circuits (Tao et al., 2021). While implicit threat processing involves mainly subcortical brain regions (e.g., the amygdala), cortical regions are of greater importance in explicit learning (Alberini & Travaglia, 2017; LeDoux, 2014, 2017). Implicit threat learning is especially prominent in younger childhood (Ferrara et al., 2021; Lau et al., 2011); these implicit memories (e.g., childhood trauma) may have great impact on adult behavior, even though adults are often not explicitly aware of these experiences ("childhood amnesia"; Alberini & Travaglia, 2017). With increasing age, explicit learning processes become more dominant, which leads to higher levels of contingency awareness during fear conditioning. In line with this hypothesis, differential fear conditioning increases with age, which has been linked to a decline in threat overgeneralization (Reinhard et al., 2022). Specifically, children (compared with adolescents and adults) require more CS–US pairings (i.e., more learning opportunities) to acquire differential conditioned fear responses (Reinhard et al., 2022; Waters et al., 2017). In addition, after the presentation of safety signals (CS− trials), children are more uncertain about the absence of the US (Waters et al., 2017). At younger ages, this elevated generalization of fear is highly adaptive. Generalization stimuli are typically similar but not identical to the fear-conditioned CS. In terms of a "better safe than sorry" strategy (Van den Bergh et al., 2021), generalization of fear to ambiguous stimuli leads to somewhat cautious behavior in potentially dangerous situations during childhood, which can be highly protective and critical for survival. Overgeneralization of fear, i.e., heightened generalization to a wider range of stimuli similar to the CS, is particularly important when encountering new environments as a child. Nevertheless, it becomes less efficient with more and more experience during adolescence. Concomitantly, discrimination learning is sharpened across development, and generalization of conditioned fear decreases with increased age (Reinhard et al., 2022; Schiele et al., 2016). If, however, a child maintains a tendency to overgeneralize, this could be a critical risk factor in the etiology of anxiety disorders. In line with this hypothesis, overgeneralization of classically conditioned fear has been linked to anxiety disorders in adult patients (Dymond et al., 2015).

Fear Conditioning – A Promising Translational Model for Anxiety, Fear, and Trauma-Related Disorders?

Over the past decades, several theories (De Houwer, 2020; Lissek et al., 2005; Mineka & Oehlberg, 2008; Ressler, 2020) have linked classical conditioning to the etiology and pathogenesis of anxiety disorders (e.g., specific phobias, social anxiety disorder), obsessive-compulsive disorders, and trauma-related psychopathology (e.g., posttraumatic stress disorder, abbreviated as "PTSD"). Given that anxiety disorders are the most frequent mental disorders affecting children and adolescents (Polanczyk et al., 2015), classical conditioning in the context of pathological anxiety and fear is of particular relevance for clinical child psychology.

The "conditioning model" of anxiety disorders suggests that direct experiences (i.e., CS–US pairings) lead to the development of pathological fear and anxiety. Accordingly, a child who has been bitten by a dog (the bite would be the US), for example, should be at elevated risk of developing a phobia of dogs (the dog would be the CS). Being trapped in an elevator (this frightening event would be the US) could be an important traumatic conditioning experience for the etiology of claustrophobia and lead to an exaggerated fear of using elevators (the elevator would be the CS). A young girl who experiences an unexpected panic attack (the US) during a stressful oral examination (the CS) could develop a heightened fear of social situations. Highlighting the role of aversive conditioning events for the subsequent development of psychopathology, adults with social anxiety disorder experienced childhood teasing experiences more frequently (McCabe et al., 2010). A history of teasing or bullying has also been related to earlier symptom onset and additional problems in childhood and adolescence (McCabe et al., 2003), emphasizing the critical role of direct conditioning early in life. Similarly, children experiencing natural disasters, sexual abuse, or serious car accidents (i.e., examples of USs) are at risk of developing PTSD. Child survivors (10–13 years) of a severe lightning-strike disaster (the US) in Illinois reported significantly more numerous and intense fears of storms (the CS) when compared with a matched nontraumatized group (Dollinger et al., 1984). In particular, implicit conditioning leads to a broad range of potential triggers for intrusive memories in trauma-related disorders (Brewin, 2014). A certain noise, smell, word, or image (the CS) that has been associated with the traumatic event (the US) may later elicit reexperiencing or intrusion, with the child not necessarily being aware of the actual trigger (the CS) of the emotional response.

At first glance, classical conditioning seems to have difficulty explaining the symptoms of panic disorder. In this anxiety disorder, patients experience unexpected panic attacks, which often occur in the absence of obvious (external) cues or triggers. Panic attacks literally seem to come "out of the blue." Bouton et al. (2001) have emphasized the critical role of interoceptive conditioning in understanding panic disorder. Through this process, panic attacks are conditioned to internal cues. Internal bodily sensations (e.g., modest changes in heart rate or respiration) that go along with the early onset of a panic attack become a predictor of the full-blown panic attack. These interoceptive sensations become a CS through classical conditioning and might become sufficient to trigger panic attacks in the future (Mineka & Oehlberg, 2008).

The Two-Factor Theory: Learning About Escape and Avoidance

Individuals with anxiety disorders tend to avoid certain and specific things or situations (e.g., attending a party may be hard to tolerate for a patient with social anxiety disorder). Mowrer's (1951) two-factor theory proposes that avoidance and escape behaviors result from both classical and operant conditioning. In the first step, individuals learn through classical conditioning that a particular stimulus (the CS) is followed by an aversive event (the US). Children who have received negative feedback from their teacher (the US) may feel anxious before their next presentation (the CS) in class. In the second step, the individuals learn (through operant conditioning) that escape or avoidance behavior causes a reduction of fear. In the example, these children may feel sick in the morning before their presentation and stay home. In the short term, this leads to a reduction in fear and anxiety. In the long term, however, this avoidance behavior confirms the child's assumption that being at school is "dangerous," which provokes increased anxiety symptoms when preparing for school. Ultimately, this vicious circle may lead to a severe anxiety disorder. As another example, somebody who has experienced a panic attack (the US) in a shopping mall (the CS) may stay home and avoid going shopping.

This theory can also be applied to obsessive-compulsive disorder. Consider a young boy who has a disgust-provoking experience in a dirty school restroom. Just as he is about to use the toilet (the CS), he finds a urine stain (the US) on the toilet seat. Through this experience, the boy might acquire a fear of toilet germs (classical conditioning). Subsequently, he tries to avoid using public restrooms whenever possible. When the use of restrooms at school cannot be avoided after all, he experiences high distress. This negative feeling can be reduced by compulsive hand washing and disinfecting rituals (operant conditioning). The etiology of obsessive-compulsive disorder cannot always be explained exclusively by classical and operant conditioning. In particular, cognitive processes play a major role in many cases (Salkovskis, 2007). Nevertheless, the two-factor model is particularly powerful in explaining the *maintenance* of obsessive-compulsive symptoms.

Biological Dispositions in Classical Conditioning

The two-factor theory helps to explain avoidance and escape behaviors, which are often observed in anxiety disorders. It cannot explain why people are more likely to acquire fear of certain situations or objects (e.g., snakes, spiders) than of other things (e.g., cars, chainsaws). The concept of "preparedness" (Seligman, 1971) suggests that humans are evolutionarily "prepared" to quickly associate certain stimuli or events (the CSs) with an unpleasant outcome (the US). A similar theory emphasizes the CS–US "belongingness," which refers to the conceptual relation between both stimuli (Garcia & Koelling, 1966). Accordingly, certain CS–US stimulus pairs are better associable because they "belong" together, for example because of their semantic or sensory relatedness (Hamm et al., 1989). Lissek et al. (2008) demonstrated elevated fear conditioning in patients with social anxiety disorder (compared with healthy controls) when socially relevant CSs (neutral facial expressions) and socially relevant USs (critical facial expressions combined with verbal insults) were used. Their findings (Lissek et al., 2008) emphasize the importance of considering CS–US "belongingness" (Hamm et al., 1989) in experimental paradigms when researchers attempt to detect classical conditioning patterns that are altered in patients with anxiety disorders.

Supporting the "preparedness" theory, several experiments (Mineka & Öhman, 2002) demonstrated better conditioning to fear-relevant, potentially "phobic" CSs (e.g., illustrations of snakes and spiders) relative to fear-irrelevant CSs (e.g., flowers and geometric figures). Notably, infants as young as 6 months of age show increased pupillary dilation (i.e., high physiological arousal) to spiders and snakes compared with flowers and fish (Hoehl et al., 2017), supporting the notion that certain stimuli are "prepared" to elicit distinct responses, even very early in life. For a long time, there was a debate about the origin of fears that seem to be evolutionarily "prepared." Traditionally, two explanations have been discussed. On the one hand, it has been suggested that humans show an innate fear (Poulton & Menzies, 2002) of certain animals (e.g., spiders, snakes) or situations (e.g., heights), which dissipates with repeated nonnegative experiences throughout childhood (Gullone, 2000; Lau et al., 2011). On the other hand, facilitated conditioning has been assumed to account for fear acquisition, especially for biologically "prepared" CSs (Mineka & Öhman, 2002). Given that many children show fears of spiders and snakes, infants may have an innate predisposition to associate these animals with fear. LoBue and Adolph (2019) argue that both views are too simplistic. Instead, they propose that "prepared" conditioning to evolutionarily relevant stimuli is not necessarily adaptive. Rather, it seems better to *flexibly* learn a particular fear as soon as a specific situation requires it. LoBue and Adolph (2019) argue that children have early perceptual and attentional biases for detecting certain animals like snakes and spiders, for example. When confronted with these animals, the children respond with changes in heart rate, vocalization, exploration, and sometimes even approach behavior. In the past, these behavioral and physiological responses were often mislabeled as "fear," rather than as concomitant responses to the allocation of attentional resources (LoBue & Adolph, 2019). Importantly, their view extends classical conditioning. When infants and children show increased attention to certain animals, such as snakes, this allows them to flexibly develop a fear when the animal is actually dangerous. However, other emotions (e.g., joy) can also be learned if the animal is cute, for example. This flexible adaptation occurs through learning processes, such as aversive (or appetitive) classical conditioning.

The Flexibility of Aversive Conditioning

Does everyone who experiences a threatening or traumatic event develop a serious mental disorder? Certainly not. The presence of multiple cues potentially serving as a CS (so-called "cue competition"; Boddez et al., 2014) and prior exposure to a stimulus (Miller et al., 2022) both help to understand why classical conditioning can be prevented or delayed under certain circumstances. Fear acquisition is most effective when both the CS and the US are *new* to an individual. Latent inhibition describes the phenomenon that prior experiences (i.e., before conditioning) with the to-be CS (without the US) impair subsequent fear conditioning (Miller et al., 2022). In the clinical context, this would mean that people who undergo a highly aversive dental treatment are less likely to develop phobic fear if they have a history of neutral or less aversive experiences at the dentist's office (De Houwer, 2020). Indeed, preventive measures based on latent inhibition seem to be promising in protecting against exaggerated dental anxiety (Miller et al., 2022). Similarly, if a child has had good experiences with a dog (e.g., playing with a dog, petting a dog), this positive learning history can "immunize" (Panitz et al., 2021) the child against later development of dog phobia, even if the child has an unpleasant encounter with a dog later on (e.g., being bitten). Behavioral strategies based on latent inhibition principles may open new avenues for preventing anxiety and related disorders. Not only does pre-exposure to the CS lead to retarded fear learning, but familiarization with the US (known as "US pre-exposure") can also interfere with subsequent conditioning and reduce its effectiveness as a US (Lonsdorf et al., 2017). Depending on prior experience with certain stimuli or situations, a conditioning event can lead to a number of different consequences.

In the aftermath of aversive or traumatic experiences (in the range of hours to days), hyperconsolidation of conditioned associations seems to be critical for the development of anxiety or trauma-related disorders. In particular, emotionally arousing events (e.g., a car accident, rape, or sexual assault) go along with enhanced memory consolidation (LaLumiere et al., 2017). Emotional arousal activates brain systems (e.g., through noradrenergic and glucocorticoid actions) that influence how these memories are processed, stored, and consolidated (Giustino & Maren, 2018; Merz & Wolf, 2017; Sperl et al., 2022). Estradiol status further modulates fear conditioning (Bierwirth et al., 2021; Merz et al., 2018), which could explain why girls and women (compared with males) are more vulnerable to developing anxiety and trauma-related psychopathology (Seligowski et al., 2020). It has been suggested that sex differences in the brain's noradrenaline arousal systems may be responsible for elevated arousal levels in females (Bangasser et al., 2016), which could lead to stronger consolidation of aversive associations.

Exaggerated Fear: Elevated Excitatory and/or Deficient Inhibitory Responding?

Several theories suggest that individuals who are prone to develop pathological anxiety may more easily be conditioned (Lissek et al., 2005; Mosig et al., 2014; Orr et al., 2000). Possibly, heightened excitatory (i.e., elevated and more rapidly acquired fear responses to threat cues) and deficient inhibitory (i.e., a failure to inhibit fear in the presence of safety cues) conditioning may account for facilitated fear acquisition (Dvir et al., 2019). Experimental studies provide mixed support for these hypotheses (Marin et al., 2017; Pöhlchen et al., 2020). Inconsistent findings may arise from many studies employing relatively nonspecific stimuli for CS and US, disregarding the relevance of "preparedness" and "belongingness" (Hamm et al., 1989; Mineka & Öhman, 2002). Based on their meta-analysis, Lissek et al. (2005) reported stronger fear acquisition in patients with anxiety disorders and PTSD compared with healthy controls, but the effects were small. These findings are complemented by a more recent meta-analysis of Duits et al. (2015), which included patients with anxiety disorders, PTSD, and obsessive-compulsive disorder. Relative to healthy participants, patients robustly showed elevated threat responses to conditioned safety cues (the CS− in differential conditioning experiments), indicating an impaired ability to suppress fear and an enhanced fear generalization to safe stimuli.

Generalization of conditioned fear is adaptive during childhood, but usually decreases with increasing age (Waters et al., 2017). A recent meta-analysis (Dvir et al., 2019) explicitly focused on fear conditioning in childhood/adolescence and compared clinically anxious with non-anxious youth. The groups did not differ in differential (i.e., CS+ compared with CS−) fear acquisition. Nonetheless, Dvir et al. (2019) found that anxious (versus non-anxious) youth showed greater threat responses for both danger (CS+) and safety (CS−) cues. Such a response pattern in patients may be interpreted as potentially indicating elevated excitatory responding to threat (CS+) and reduced inhibitory responding to safety (CS−) cues (Craske et al., 2008); this would be in line with the assumption of threat overgeneralization in anxious individuals (Dymond et al., 2015). It should be noted that, in this meta-analysis (Dvir et al., 2019), studies focusing on different anxiety disorders were collapsed; this makes it even more difficult to identify patterns that are related to a specific disorder (Lang & McTeague, 2009).

Fear Conditioning in the Absence of Direct Aversive Experiences

The classical conditioning model suggests that direct aversive experiences (i.e., CS–US pairings) play a critical role in the acquisition of pathological fear and anxiety. Yet, many patients cannot recall direct traumatic US experiences (such as a dog bite) in their past (Moscovitch et al., 2011). Indeed, direct experiences of CS–US associations are actually not necessary for the development of robust conditioned threat responses. Specifically, observational/vicarious learning, verbal information transmission, and imagery-based conditioning are examples of how fear can be conditioned through indirect paths.

Observational fear conditioning describes a learning process through which an individual acquires fear vicariously through watching the fearful response of another person who experiences an unpleasant situation (Haaker et al., 2017). It is important that the observer does not receive any aversive US (e.g., a painful noise or shock). Instead, the US is perceived vicariously by the observed model. The observer acquires a conditioned fear response by watching the model's distress in response to the CS. Marin et al. (2020) experimentally investigated observational fear conditioning in child–parent dyads. Children watched videos in which their parents were fear-conditioned with an electric shock US. Even though the children themselves did not receive a shock, they acquired fear. When exposed to the CS+, the children showed elevated skin conductance responses. Observational learning is of particular relevance for threat learning in children. By observing their parents' responses, children learn what is potentially dangerous and what is not. Observational learning may also, at least partially, contribute to the etiology of anxiety disorders in children. If a child observes the behavior of a parent suffering from an anxiety disorder (e.g., the mother screams when seeing a spider), vicarious learning may promote transmission of this maladaptive fear.

Verbal information is another indirect pathway for fear acquisition (Muris & Field, 2010). If parents provide threatening information about certain stimuli or situations, childhood fears may develop and eventually become a serious anxiety disorder. Telling a child that a certain animal is dangerous (e.g., "Watch out, the dog could be dangerous!") may elicit a mental representation of threat (the US), which becomes associated with characteristics (the CS) of this animal (e.g., a dog in a park) through classical conditioning. Muris et al. (2013) demonstrated successful transmission of verbal information from mothers to their offspring. The mothers provided information about a novel animal to their children. Half of the mothers talked about disgusting attributes of the animal. Disgusting characteristics were used because disgust (in addition to threat) plays a critical role in animal phobias. The other half of the mothers referred to neutral information about the animal. The children in both groups saw the same drawing of the novel animal. Notably, the children reported significantly elevated levels of disgust and fear of the animal when they had received disgust-related information. The results suggest that parental communication may also play a crucial role in the transfer of fear within families.

Finally, an imagined aversive event is sufficient for *de novo* fear conditioning (Mertens et al., 2020). In a study by Mueller et al. (2019), participants were trained to produce unpleasant mental images (e.g., experiencing pain when stepping on a thumbtack) upon presentation of a specific cue. Most importantly, the CS+ was never paired with any physical US, but only with the aversive imagery. Remarkably, the CS+ elicited a robust subjective and physiological fear response. Clinically, it is therefore possible to develop a dog phobia even if never bitten by a dog. When encountering dogs, the mere imagination of a dog bite (the US) could be sufficient for fear learning. In children, the imagination of dangerous animals or monsters (the US) could lead to strongly pronounced fear and avoidance of certain situations (the CS). Similarly, distressing images of oneself in an aversive situation at a party (the US; e.g., “people are laughing and pointing at me”) may contribute to the development and maintenance of social anxiety disorders (Clark & Wells, 1995). Intrusive mental images associated with aversive events are particularly important in the pathogenesis of obsessive-compulsive disorders (Maloney et al., 2019). A boy who meets a stranger and shakes the person’s dirty or sweaty hand (the CS) may have images of becoming contaminated with harmful germs (the US). Subsequent handshakes may now trigger obsessive thoughts, which can be reduced by ritualized handwashing behavior (compulsions) and/or avoidance.

Altogether, different pathways can explain how fear can be acquired, even in the absence of a direct aversive experience. Conditioning processes that do not require direct CS–US pairings are highly adaptive. In the example of dangerous spiders or snakes, it would not make sense to require being bitten or killed by these animals for successful fear acquisition.

Nature Versus Nurture in Pathological Fear

Some individuals are predisposed (e.g., based on their genetic background and early life experiences) to developing psychopathology throughout their life (Bowers & Ressler, 2015; Parsons & Ressler, 2013). The children of mothers with anxiety disorders and PTSD are at elevated risk of experiencing mental health problems (Hartzell et al., 2022; Schreier et al., 2008). For example, maternal PTSD increased the risk of PTSD in the offspring of Holocaust survivors (Yehuda et al., 2008). In principle, environmental information experienced by an ancestral generation can be transferred to descendants by social transmission and biological inheritance. Indirect conditioning experiences of the child (e.g., observational fear learning and verbal information from the parents, see above) are possible pathways for social transmission. In addition, *in utero* exposure to maternal stress and fear is another indirect mechanism that may explain the transmission of mental health risks across generations (Yehuda et al., 2005). When considering biological inheritance, *in utero* exposure must be differentiated from preconceptional experiences of the ancestral generation (Dias et al., 2015). In humans, (epi-)genetic inheritance and effects of social transmission are difficult to disentangle. Intriguingly, research in mice suggests that transmission of fear-conditioned behavior may, at least partially, contribute to the transgenerational transmission of risk for mental health problems (Dias et al., 2015). Dias and Ressler (2014) used olfactory conditioning to train mice to become afraid of a particular odor. Note that the mice were fear-conditioned *before* the conception of their offspring. Impressively, their offspring showed enhanced odor-potentiated startle, which was interpreted as an increased behavioral sensitivity to this odor. Critically, this effect persisted across two generations, even though the pups had never been exposed to this odor before testing. These results suggest that traumatic experiences can affect people so indelibly that impacts can even be observed on their children.

Fear Extinction: A Model for the Treatment of Pathological Fear and Anxiety

Excessive fear and anxiety are core symptoms of anxiety and trauma-related disorders (Ressler, 2020). A better understanding of fear inhibition is critical to improving the efficacy of therapeutic interventions for patients with exaggerated threat responses. Fear extinction is considered to be a key learning mechanism in exposure therapy (Craske et al., 2018; Raeder et al., 2020). In the laboratory, fear extinction paradigms are widely used to experimentally study the reduction of fear (Milad & Quirk, 2012). During fear extinction, the previously conditioned CS+ (and the CS−) are presented without the US. Repeated unreinforced CS+ presentations result in a decrease in conditioned fear responses. Hence, the conditioned responses become “extinguished” (Milad & Quirk, 2012). It is important to emphasize that the original excitatory CS–US association is *not* erased during extinction learning (Craske et al., 2022). Instead, the CS+ acquires a new inhibitory meaning during extinction (i.e., CS+ → no US), which then competes with the previously established excitatory fear association (Bouton, 2017). If the new “CS+ → no US” association is sufficiently strong, the expression of conditioned fear responses will be inhibited (i.e., “extinguished”).

Pattwell et al. (2012) examined age-related changes in fear extinction. Relative to both children and adults, adolescents showed attenuated extinction learning. These findings suggest that fear associations are less easily destabilized during adolescence. Thus, it has been argued that behavioral interventions for anxiety and trauma-related disorders could be less effective during this developmental period (Casey, 2015; Drysdale et al., 2014).

Two meta-analyses (Duits et al., 2015; Lissek et al., 2005) investigated altered fear extinction in anxiety disorders, obsessive-compulsive disorder, and PTSD. Compared with healthy individuals, patients showed slower and reduced extinction learning. Thus, an impaired ability to extinguish conditioned fear might be a risk factor contributing to the maintenance of pathological fear and anxiety. A prospective study in Dutch soldiers supports this hypothesis. Soldiers showing reduced fear extinction in a learning paradigm about 6 weeks before a 4-month deployment to Afghanistan reported a higher severity of PTSD-related symptoms after returning home (Lommen et al., 2013). In individuals with public speaking anxiety, impaired fear extinction predicted weaker exposure treatment outcomes (Ball et al., 2017). Intriguingly, there is evidence that extinction deficits may be attenuated by successful treatment (Duits et al., 2016).

Delayed or diminished extinction learning has also been discussed as a maintaining factor in *children* with anxiety disorders (Liberman et al., 2006). Nevertheless, according to a meta-analysis (Dvir et al., 2019), there is little empirical evidence that the differential conditioned response (CS+ versus CS−) is slower to extinguish in youth with anxiety disorders compared with healthy children. Yet, as outlined above (in the context of fear acquisition), children and adolescents with anxiety disorders maintain elevated fear responses to both threat (CS+) and safety (CS−) cues during extinction learning.

Exposure Therapy and Its Underlying Mechanisms

Similar to adults, in children, exposure interventions are empirically supported and highly effective in treating anxiety disorders (e.g., specific phobias, social anxiety disorder, separation anxiety disorder, generalized anxiety disorder), obsessive-compulsive disorder, and PTSD (Higa-McMillan et al., 2016;

Peris et al., 2020). Exposure therapy entails prolonged and repeated confrontation with the feared object or situation. By staying in the feared situation, a patient learns that the feared outcome does not occur.

“In vivo” exposure (i.e., actually facing the feared object or situation) can be distinguished from “in sensu” exposure (i.e., confrontation with the *imagined* feared object or situation). In the case of a child with dog phobia, an in vivo exposure would include going to places where dogs are playing or even interacting with a dog. Conversely, for in sensu exposure, the child could be asked to vividly imagine being near a dog or touching it. For exposures with younger children, puppets and toys can be utilized for “play-acting” feared situations. When bodily sensations (i.e., interoceptive signals) are threatening, interoceptive exposure can also be useful. In children with panic disorder, for example, feared sensations can be triggered by hyperventilation, exercising, or spinning (Bouchard et al., 2004).

Exposure therapy can be conducted in a massed (sessions are very close together in time) or spaced (longer time between sessions) format. Antony et al. (2006) recommend performing exposure exercises multiple times per week, in particular at the start of treatment. Similarly, a graduated approach can be distinguished from an intense form (Craske et al., 2014). This distinction determines whether exposure exercises start with a situation that is more likely to cause low/moderate or extreme intensities of fear. Exposure protocols usually involve the formulation of a fear hierarchy. In children and adolescents, fear hierarchies are often introduced as a stepladder (Mobach et al., 2020), with increasing steps in difficulty. In case of a dog phobia, for example, the first steps could be looking at photographs of a dog, while later steps could comprise standing close to a dog and petting the dog. After putting together such a stepladder, it needs to be decided which steps should be taken first during early exposure sessions. The most typical exposure strategies consist of a graduated (i.e., stepwise) procedure. This means that children first become exposed to mildly or moderately difficult situations, before moving on to more difficult ones (Bouchard et al., 2004). Depending on the circumstances, massed and intense approaches are also possible (Southam-Gerow, 2019). This implies that patients are immediately exposed to the most frightening situation. If a patient does not have enough time to undergo the more typical graduated approach, it can sometimes be helpful to start an exposure intervention with the most challenging tasks in the fear hierarchy. A possible situation would be a major class presentation for a child with social anxiety disorder. To ensure that a child will engage in confrontation with the threatening situation, the therapist must first prepare for it cognitively and explain the treatment rationale in a way that is understandable. For example, the therapist may explore with the child how likely (e.g., “has this ever happened in class before?”) the worst fears (e.g., “the whole class will laugh at me during my presentation”) are. Exposure therapy should be introduced as a way to “experimentally” test the child’s expectations, so that the child is motivated to make new experiences with this object or situation. To deliver psychoeducation in a more engaging way, hand puppets, cuddly toys, and cartoon stories can be helpful. The child might be encouraged to draw a picture of a threatening situation. To identify physiological symptoms of anxiety and how they wax and wane, the therapist and child might watch a scary movie together. Instead of a traditional Likert scale, an illustration of an “anxiety thermometer” can be used to visualize the child’s symptom severity (Lavell et al., 2020).

As illustrated above, patients are guided to gradually expose themselves to fear-provoking situations until their fear and distress begin to decline. In obsessive-compulsive disorders, the treatment strategy is complemented by response prevention. Under the guidance of the therapist, patients become repeatedly exposed to situations (e.g., touching a toilet) that initiate their compulsions. Importantly, patients are instructed to resist their urge to carry out compulsive behavior in order to have the chance to experience how the fear and the urge decrease. To support children during exposure, fantasy figures can be used. For example, children could be instructed to imagine their favorite hero or a comic character that accompanies them (virtually) and helps them stay in the feared situation. Through this exposure procedure, patients shall experience that their uncomfortable feelings will eventually start to fade over time, even if they do not engage in their compulsive behavior.

Abramowitz (2013) has pointed out that knowledge of underlying learning mechanisms helps clinicians to implement exposure therapy in a most successful way. Interestingly, one of the first reports of exposure therapy is a case study with a two-year-old boy named "Peter" in the 1920s (Jones, 1924a, b). "Peter" had a fear of rats, which generalized to other objects like rabbits. In this case study, "Peter" received food when he was confronted with a rabbit. The rationale was "*reciprocal inhibition*," i.e., the assumption that anxious behavior can be reduced by pairing a threatening object with a response that is physiologically and motivationally incompatible with anxiety and fear, because an individual cannot be relaxed or reward-seeking and anxious at the same time. Based on this idea, systematic desensitization therapy was developed (Wolpe, 1961). First, patients with anxiety disorders learn to relax with the idea that relaxation is incompatible with fear. A young girl with dog phobia, for example, could be trained in progressive muscle relaxation. In a similar vein, Kissel (1972) suggested utilizing therapeutic empathy and an office environment attractive for children (e.g., toys) as "fear inhibitors." Second, the therapist helps the patient to put together a fear hierarchy (e.g., watch a video of dogs, …, give a dog a cuddle). Third, when the patient is in a relaxed state, the patient is encouraged to imagine distress-provoking situations starting with the least fear-eliciting one. Compared with adults and adolescents, it is much more difficult for young children to engage in "in sensu" exposure, as they use thought and imagery considerably less proficiently (Kissel, 1972). To facilitate their imagination, children could be instructed to imagine a fear-provoking situation in which they are accompanied by superheroes from their favorite television series or movies (Lazarus & Abramovitz, 1962). Yet, research suggests that the relaxation component is unnecessary for successful fear reduction during systematic desensitization (Vinograd & Craske, 2020). Thus, reciprocal inhibition does not seem to be the central mechanism of exposure therapy. Nonetheless, it can help to overcome a child's motivational barriers to engage in the exposure.

The observation that subjective discomfort and physiological arousal gradually decrease during exposure has been interpreted as evidence for a *habituation* of the fear response (Benito & Walther, 2015; Tryon, 2005). Habituation can occur both within an exposure session (i.e., fear declines toward the end of exposure) and across sessions (i.e., the initially elicited fear response declines from session to session). According to the habituation model, in situations that activate fear (e.g., for a child with separation anxiety going to a sleep-over), the patient learns that fear and anxiety naturally decline ("habituate") by staying in the situation. Over several exposure sessions, the experienced peak level of distress will gradually diminish. Many patients with exaggerated levels of fear and anxiety have benefited from exposure interventions designed to promote habituation. However, habituation alone does not explain the efficacy of massed and intense exposure formats. Typically, habituation is smaller for high-intensity than low-intensity stimuli. Thus, when fear and anxiety are high, the effect of habituation will be modest.

Being confronted with stimuli high in the fear hierarchy can result in a substantial *expectation violation* (Craske et al., 2018). As explained earlier, fear conditioning is due to the formation of an excitatory association between the CS+ and the US, i.e., the CS+ eventually predicts the US. During extinction, a new inhibitory association (CS+ → no US) is established, i.e., it is learned that the CS+ is *no longer* a predictor of the US. This "CS+ → no US" association inhibits fear expression. For example, a girl with separation anxiety ("Susi") might have exaggerated fears in situations with no parent present, because she has acquired excitatory associations (i.e., fear expectations) due to previous frightening experiences when being alone or due to her parents having agoraphobic fears. During exposure, safety learning (i.e., fear extinction) would occur, and situations without her parents present acquire new meaning (e.g., "nothing bad will happen"; "it can be fun when no parent is there"). Whenever Susi is confronted with situations without her parents, the new "safety" memory trace competes with the previous “danger” memory trace. Repeated exposure experiences violate Susi’s expectations about the danger of not having her parents around (Panitz et al., 2021). The continued experience of expectation-violating situations strengthens inhibitory associations (Vinograd & Craske, 2020). When safety learning is sufficiently strong, the newly acquired inhibitory association inhibits excitatory associations of danger, ultimately leading to reduced subjective fear and anxiety (Milad & Quirk, 2012). Repeated exposure sessions modify Susi’s catastrophic beliefs, as she will learn that feared outcomes will not happen and that she can tolerate her distress.

Why do people benefit from exposure therapy? Should therapists design exposure situations that promote expectation violation (inhibitory learning) rather than habituation? Recent studies suggest that both mechanisms contribute to beneficial treatment effects (de Kleine et al., 2017; Elsner et al., 2022; Lange et al., 2020). Thus, therapists should aim at addressing both habituation and inhibitory learning (Jassi & Kindynis, 2020). Exposure interventions should allow the child to revise the maladaptive (disorder-specific) and individually relevant expectations (Becker et al., 2020; Craske et al., 2014). Note that the terms habituation and extinction learning are often (imprecisely) used interchangeably in the literature (McGuire & Storch, 2019). From a learning theory perspective, habituation refers to a nonassociative learning process, whereas extinction learning is inherently associative as it entails attenuated conditioned responses due to inhibitory learning.

Strategies to Enhance Inhibitory Learning During Exposure Therapy

As outlined, extinction, i.e., inhibitory learning, is a key mechanism of exposure therapy. Based on what is known about factors affecting the efficacy of fear extinction, several strategies can be derived to bolster the effects of exposure interventions (Craske et al., 2018; LeDoux, 2015; Lipp et al., 2020; McGuire & Storch, 2019; Mobach et al., 2020).

First, inhibitory learning can be augmented by increasing the degree of expectation violation during exposure. Specifically, exposure sessions should be designed in a way that allows the child to make experiences that maximally violate the child’s expectations. Thereby, the child experiences a situation that is less threatening than expected (e.g., for a patient with spider phobia: “the spider crawls actually away from me and does not bite me”). To direct the child’s focus toward the expectation violation, the therapist should explicitly ask the child before exposure to describe what specifically is feared and what the concerns are. After completing the exposure session, the child should be asked about whether these feared outcomes actually happened, and what was different than expected. To further enhance the correction of these expectations, dysfunctional beliefs should be questioned, by taking into account the exposure experience. Indeed, clinical data suggest that the treatment duration for childhood anxiety disorders can be shorter when exposure is implemented relatively early during treatment (Gryczkowski et al., 2013). If exposure is practiced early in treatment, an earlier and greater violation of threatening expectations can be achieved. Often, anxiety coping strategies are taught as an adjunct to the exposure sessions, in order to promote the patient’s self-efficacy.

Second, safety signals and behaviors should be removed during exposure. In social anxiety, safety behaviors might involve practicing beforehand what to say in a certain social situation. A distinction can be made between safety behaviors that are already part of the psychopathological problem and safety behaviors that may occur for the first time during exposure. For example, as part of her symptoms, a young girl with separation anxiety disorder may constantly use her cell phone to text her parents while at school. As exposure intervention, the therapist might suggest that the girl’s mother could leave the therapy room for half of the session and wait outside. In this situation, the girl might repeatedly ask the therapist how much time is left. Although these safety behaviors may reduce discomfort in the short term, they are detrimental to treatment success. Safety behavior can be thought of as an additional "conditioned inhibitor" that becomes associated with the (excitatory) fear-related stimulus or situation (the CS), which the exposure targets. Symptom relief during exposure (e.g., the decrease in discomfort during a social interaction) becomes dependent on the presence of the safety signal or behavior (e.g., practicing of what to say, asking the therapist for the remaining time) through classical conditioning. Thus, fear may return when safety signals and behaviors are eliminated. Exposure might not be possible, at least initially, without safety behavior. For example, a child with heightened anxiety in the dark could be too scared when entering a dark situation without a flashlight. Under these circumstances, the use of such safety behaviors/signals might be warranted in the beginning, as long as they still allow the expected outcome to be mitigated. Later, such safety behaviors/signals need to be faded out over time. Therapists or parents can become safety stimuli if they are always present during exposures. To counteract this effect, it is helpful, if possible, to also perform some exposure exercises without the therapist. The involvement of parents is varied, ranging from close supervision to arranging the setting of being within a reachable distance, depending on the age of the child.

Third, introducing reminder cues can promote the stability of inhibitory safety learning. After a successfully mastered confrontation session, a photo can be taken (e.g., in spider phobia: of the patient touching a spider; in separation anxiety disorder: of the patient in the classroom). Alternatively, a child could draw a picture or write a short story about what it was like. Classical conditioning leads to the establishment of a positive association between the photo/picture and successful extinction learning. Thus, the photo serves as a reminder cue for the previously experienced reduction of discomfort and successful mastery of the exposure. During future exposures, these cues can act as priming stimuli to facilitate the retrieval of inhibitory extinction associations (Blakey & Abramowitz, 2016). Nevertheless, an attempt should be made to reduce and eventually eliminate reminder cues toward the end of treatment in order to ensure that the therapeutic effects (i.e., extinction recall) do not depend on safety signals ("I can only handle a situation if I have my photo with me").

Facilitating the Generalization of Exposure Treatment Effects

During classical conditioning and extinction, information about the occurrence of the US does not only become associated with discrete cues such as the CS. The US contingency is also associated with the context of the learning experience (Maren et al., 2013). Context does not only refer to the setting (i.e., the place where conditioning/extinction occurs), but also entails temporal (the time), interoceptive (i.e., physiological states like thirst, hormonal status, level of stress hormones), emotional (e.g., angry, anxious, ashamed), and social (e.g., presence of peers, being with a therapist) cues. Hence, both conditioning and extinction learning are highly dependent on contextual features.

Exposure therapy should take contextual factors into account. Exposure interventions are usually conducted in therapy rooms, thus in a very different context than the one in which fear was acquired. Even if exposures are successful in the safe therapeutic situation, it is likely that extinction learning does not sufficiently generalize to everyday situations. Although excitatory fear associations generalize readily across similar stimuli and situations, the transfer of inhibitory extinction learning during exposure therapy is often limited and insufficient (Craske et al., 2018; Lipp et al., 2020). Thus, it is necessary to boost the generalization of inhibitory learning by implementing exposure sessions in multiple contexts (Craske et al., 2022; LeDoux, 2015; McGuire & Storch, 2019; Mobach et al., 2020). This includes, for example, different situations, different locations, different times of the day, and varying days of the week.

Exposure sessions should not be run only at the therapist's office, but also in the child's daily life. If necessary, exposure can be performed at the patient's home. For example, after some exposure sessions for separation anxiety, it might be possible that the child is able to be alone in a room with the therapist, while the parents are in the waiting room. Yet, it might still be difficult for the child to visit friends without the parents, or to take the school bus alone. In this example, it would be essential to conduct exposure sessions in different contexts (e.g., staying at a friend's home, taking a bus). In obsessive-compulsive disorder, exposure combined with response prevention such as compulsive washing or checking can initially be run at the therapist's office, but should be continued in the contexts in which these symptoms typically occur (e.g., the front door of the patient's house). In social anxiety disorder, exposure sessions need to incorporate situations of everyday life (e.g., asking a teacher at school, inviting a friend to a party, denying the request of another child). Most importantly, internal states also need to be considered as contexts. Thus, exposure sessions should be performed with the patient being in different internal states (e.g., negative versus neutral mood; stressed versus calm; fatigued versus energized). Taken together, exposure sessions should be varied in order to provide sufficient opportunities for the patients to correct their expectations taking into account contextual modulation.

Preventing the Return of Fear

Even successfully treated patients may relapse. As outlined earlier, extinction entails inhibitory learning, thus the originally acquired excitatory association is not erased from memory. Rather, the new inhibitory association competes with the previously acquired excitatory association. As a result, it depends on the strength of the newly acquired extinction memory trace whether the patient's fear might return, i.e., a relapse occurs (Bouton, 2002; LeDoux, 2015).

When exposed to the originally fear-provoking situation, successfully extinguished fear can return with the mere passing of time (i.e., "spontaneous recovery"). For example, a child successfully treated for separation anxiety might again experience a stronger fear response when going to school alone after the summer recess. From an evolutionary perspective, successful fear learning is more important for survival than extinction learning. Inhibitory associations (i.e., fear extinction) are less stable than excitatory conditioned responses (Mueller & Pizzagalli, 2016). Therefore, it is particularly important that patients are encouraged to continue confronting themselves with the feared object, even after therapy is completed. Similarly, reexposure to the US (i.e., the experience of the US without the CS) can also reverse extinction effects; this phenomenon is referred to as "reinstatement." Consider the young girl Cindy who successfully underwent exposure therapy for social anxiety disorder. If Cindy is laughed at by her friends sometime after the end of therapy, her social anxiety related to performance situations in school may reappear.

As explained above, extinction learning is highly context-dependent. If a child is confronted with a novel context after exposure, the expression of conditioned fear may return, i.e., a so-called "renewal" occurs. Internal states (e.g., being stressed versus calm) are among the most important contextual factors. In particular, highly stressful experiences, even if entirely unrelated to the original fear, can reactivate conditioned fear. In Cindy's example, this might be a very stressful exam period that could lead to a return of social anxiety symptoms. In children and adolescents, age and associated hormonal changes during puberty are also important contextual factors. Moving to another city, transferring to a different school, beginning the first job after completing school, or starting an (under-)graduate program are further examples of major contextual changes during development. To prevent fear from returning, it is essential for children and adolescents to confront themselves with (previously) feared situations again and again after therapy is completed, especially when major developmental changes occur.

Exposure Therapy with Children and Adolescents

Exposure interventions for children and adolescents compared with those for adults require additional considerations (Bennett & Albano, 2020; Jassi & Kindynis, 2020; Kingery et al., 2006; Vinograd & Craske, 2020). When working with children and adolescents, it is important to take into account the child's age, cognitive development, and the role of parents and family during planning and conducting exposure sessions. To facilitate inhibitory learning, it has been recommended that therapists ask patients to explicitly articulate their threat-related expectations at the beginning of the exposure sessions, in order to maximize the violation of dysfunctional expectations (Craske et al., 2018). Especially young children may have difficulties describing what they specifically are afraid of (Vinograd & Craske, 2020). In this case, exposure therapy may focus more on habituation and learning to tolerate and cope with fear and anxiety until it decreases. Through exposure, children learn that they are able to tolerate distress and that they can function when being confronted with the feared stimulus or situation (Vinograd & Craske, 2020). Using stories or examples from daily life is helpful to explain the rationale for exposures. Habituation can be illustrated by using swimming in a cold pool as an analogy (Jassi & Kindynis, 2020). The longer one stays in the cold pool, the more the body gets used to the low temperature (i.e., habituates). Alternatively, the therapist and the child can put a small stone in their shoes and notice how the unpleasant sensation will fade after some time (Bennett & Albano, 2020).

Because younger children have shorter attention spans and limited memory capacity (Kingery et al., 2006), it may be necessary to schedule shorter exposure sessions, to incorporate more in-session breaks, and to include more opportunities for rehearsal for successful extinction memory consolidation (Craske et al., 2022; Jassi & Kindynis, 2020). To increase the child's engagement, it is helpful to praise the child and reward successful exposure with a few minutes playing at the end of the session. Giving the anxiety disorder a name (e.g., the "Anxiety Monster"), using puppets, or talking about cartoons can make it easier to "tame the Anxiety Monster" (Jassi & Kindynis, 2020).

Treatment of young children usually involves their parents and families. Some children may not be able to completely understand psychoeducation that explains the rationale behind exposure therapy. In this case, it is even more important for treatment success that their parents are informed and aware of the underlying concepts and encourage their child to engage in exposure sessions (Jassi & Kindynis, 2020). If the child has difficulties with tolerating fear and anxiety, parents may be tempted to step in and reduce the child's fear. For example, parents may engage in well-intentioned over-accommodation of anxiety symptoms and overprotection of the anxious child (Bennett & Albano, 2020). Therapists should discuss this behavior with the parents and explain how their behavior may counteract habituation and expectation violation (Benito & Walther, 2015; Craske et al., 2018; Jassi & Kindynis, 2020). Similarly, if parents are solicitous about the child's level of anxiety and give in when their child tries to avoid or escape from a feared object, this parental behavior could also undermine exposure effects. In addition to parents, exposure exercises may also include the school environment (Kingery et al., 2006). A child with social anxiety disorder, for example, may have difficulty asking questions in the classroom. Similar to exposure interventions for adults, therapists should be aware of subtle safety behaviors. In adolescents, for example, social media use can constitute critical safety behavior as it enables them to avoid real-life social situations (Bennett & Albano, 2020). Also, a socially anxious adolescent might wear headphones in order to avoid being approached by someone.

Altogether, when conducting exposure therapy in children and adolescents, the patient's age and developmental stage need to be considered. Psychoeducational material needs to be adapted to the patient's level of cognitive development. Finally, the therapist should involve the patient's social environment (e.g., parents, family, and teachers).

Exposure Therapy Beyond the Treatment of Fear and Anxiety

Thus far, exposure interventions have mainly been discussed in the context of anxiety and fear-related problems. Yet, exposure therapy and its underlying mechanisms can be applied to other mental disorders. For example, exposure interventions are an important component of treatment programs for eating disorders (Becker et al., 2020). Anxiety and eating disorders are often comorbid and share certain symptom features (e.g., fear of being too fat; Melles et al., 2021). Mirror exposure is a good example of how confrontation principles have been made use of in the treatment of eating disorders. This intervention aims at reducing body image dissatisfaction by repeatedly viewing of oneself in a mirror. The exact mechanisms of action of mirror exposure are still to be elucidated (Griffen et al., 2018). The most frequently cited explanation is based on findings that patients with eating disorders, especially anorexia nervosa, tend to overestimate their body size (Vocks et al., 2007). It has been proposed that mirror exposure enables patients to correct this inaccuracy about their body dimensions, which may ultimately lead to a reduced fear of weight gain.

Yet, Griffen et al. (2018) suggested that, at least partially, classical conditioning might play a role in mirror exposure. According to this theory, the patient's own body image in the mirror may serve as a CS, which activates a conditioned response of fear and anxiety. Repeated exposure sessions may then reduce this response by inhibitory extinction learning and habituation. Although this explanation seems plausible, it has been questioned as to whether fear and anxiety are the core emotions that need to be considered in the treatment of eating disorders. Rather, patients may primarily experience disgust toward their own body (von Spreckelsen et al., 2018). In contrast to conditioned fear, disgust can be better changed by counterconditioning (Engelhard et al., 2014). Counterconditioning refers to the notion that conditioned responses can be modified by substituting the original US with a novel stimulus of the opposite or neutral valence. From this perspective (Griffen et al., 2018; Klimek et al., 2016), mirror exposure may improve body image dissatisfaction by pairing the body image (the CS) with a rather neutrally or even positively valenced US. During mirror exposure, patients are usually encouraged to describe their body nonjudgmentally or take the perspective of a neutral observer, i.e., a "neutral US" (Klimek et al., 2016). Nevertheless, further research is needed to clarify the precise underlying processes of mirror exposure. It seems clear, however, that learning processes underlying exposure therapy are qualitatively different in eating disorders than in anxiety disorders.

Appetitive Conditioning as a Fundamental Learning Process in Children and Adolescents

Aversive conditioning refers to the learning of predicting threats. Hence, the US is an unpleasant event, like a painful sting from a wasp, a dog bite, rejection by others, being left alone, or a loud noise in experimental settings. Being exposed to such stimuli is aversive and potentially harmful, thus it is highly adaptive learning to activate adequate "fight-or-flight" behavior in response to the CS (Roelofs, 2017). From an evolutionary perspective, it is not only important to learn about threat. It is also pivotal to learn about potential reward. Appetitive conditioning refers to the learning of CSs that are good predictors of reward, including outcomes for meeting basic needs (e.g., food, sexual stimulation). In combination with operant processes, appetitive cues trigger approach behavior. Consider a mother who often comes home with a shopping bag containing candy for her children. Whenever the children watch their mother coming home with a shopping bag, they will be excited and expect candy. In appetitive conditioning, the US is a pleasant and desirable event. This can be a primary reinforcer like delicious food (Andreatta & Pauli, 2015), a pleasant smell (Exner et al., 2021), drugs (LeCocq et al., 2021), or sex (Klucken et al., 2016), but also a secondary reinforcer like money (Kruse et al., 2020).

Appetitive conditioning is highly adaptive and can already be observed in newborns. Newborns need to rapidly locate the nipples of their mother; this is associated with certain cues (i.e., CSs; Hym et al., 2021; Jouhanneau et al., 2016) like maternal odor, temperature, and tactile stimulation (e.g., stroking the infant's head or a certain posture of the mother's arm). The mother's nipple that delivers milk (i.e., the US) triggers sucking in the infant (i.e., the unconditioned response). If a certain behavior of the mother (e.g., stroking the baby, attaching the baby to the breast, preparatory movements of the mother) is repeatedly associated with milk flow, the infant may show a conditioned sucking behavior that is elicited by this maternal behavior (the CS). Blass et al. (1984) impressively demonstrated successful appetitive conditioning in newborns just 2–48 h after birth. In their experimental group, the experimenter gently stroked the forehead of an infant. This tactile stimulation (i.e., the CS) was followed by an intraoral delivery of a sucrose solution (i.e., the US) through a pipette to imitate breastfeeding of the infant. Compared with a control group given *delayed* sucrose delivery after stroking, the children in the experimental group showed more head-orienting and sucking behavior during the stroking intervals, thus indicating successful acquisition of a conditioned response. Remarkably, this experimental study demonstrates contingency learning at a very young age, highlighting the crucial role of this learning mechanism for the development of early mother–infant bonds.

Though not necessarily conceptualized as such, appetitive conditioning also plays a subtle role in making the psychotherapeutic setting a positive context. If children tend to associate the therapeutic setting with positive valence, this helps to promote a good working alliance. Playing with toys, for example, is a vital component of psychotherapy with children, which facilitates positive learning experiences during therapy.

Appetitive Conditioning: Risk-Taking, Sensation-Seeking, and Substance Use

Relative to children and adults, adolescents show reduced impulse control to appetitive cues (Casey, 2015; Somerville et al., 2011). This observation could explain heightened risk-taking and sensation-seeking during adolescence, presumably due to enhanced appetitive conditioning during this developmental stage (Ernst et al., 2011). Adolescence is a transition period of social reorientation, which prepares the individual for becoming an adult. Adolescents spend less time with their parents, but more and more time with their peers. These behavioral changes are typically accompanied by elevated risk-taking and exploration. On the one hand, heightened reward responsivity during adolescence may explain elevated risk-taking and sensation-seeking, which peak during late adolescence (Ernst et al., 2011). On the other hand, heightened appetitive conditioning during adolescence seems to increase the vulnerability for certain mental disorders. Thus, the developmental trajectories of appetitive conditioning may help to explain why adolescence is a high-risk period for the onset of several mental disorders.

Appetitive conditioning presumably plays a crucial role in mental disorders characterized by acquired motivation, such as substance use disorders (Martin-Soelch et al., 2007). Specifically, the drug (i.e., the US), due to its psychotropic actions, automatically initiates intense pleasurable feelings including euphoria (the "high"). Substances are often consumed in certain situations (e.g., hanging out with friends, being at a party, dancing). Through repeated use, these situations become associated with the pleasurable effects of the drug, i.e., they serve as the CSs. Critically, unconditioned responses elicited by drug consumption and conditioned responses to the associated cues are qualitatively different (Berridge & Robinson, 2016; Koob & Le Moal, 2006). Especially in the beginning, substance use triggers a pleasant feeling (the unconditioned response, "liking"). With increasing drug consumption, incentive salience ("wanting") becomes assigned to the CS (e.g., being at a party). With repeated drug consumption, these cues as well as the context can elicit craving (i.e., intense "wanting").

Critically, conditioned craving responses are not necessarily hedonically pleasant. The psychological process of motivationally "wanting" recruits brain mechanisms that are distinct from hedonically "liking" the same reward. Due to sensitization of the mesolimbic dopamine system in the brain, persistent substance abuse leads to excessive "wanting" (Berridge & Robinson, 2016). In the case of highly addictive drugs, associated cues trigger strong craving (i.e., increased "wanting"), even though substance use itself is associated with diminishing feelings of pleasure (i.e., reduced "liking"). Smoking illustrates the pivotal role of appetitive conditioning in substance use disorders. Most smokers start smoking when they are teenagers. Nicotine is a US triggering pleasant feelings (the unconditioned response, "liking"). The setting when smoking (e.g., meeting with friends, at a party, during a school break), places (e.g., being in a pub, passing a tobacco store), or certain situations (e.g., at the school bus stop, before an exam) become associated with the rewarding effects of nicotine and serve as the CSs. Internal cues (e.g., feelings of nervousness, restlessness, or sadness) can also become CSs. If nicotine is not consumed, these stimuli can trigger craving symptoms ("wanting"). This increased urge to smoke is called cue-reactivity.

Appetitive conditioning processes early in life may contribute to the risk of later substance abuse. Prenatal alcohol exposure through maternal alcohol intake predicts later development of alcohol use disorders among affected children (Duko et al., 2022). Intriguingly, animal research suggests that this relation may at least partially be mediated by *in utero* appetitive learning (Gaztañaga et al., 2020). This is due to alcohol crossing the placenta, such that the fetus acquires an association between sensory properties of alcohol (the CSs) and its pharmacological effects (the appetitive US). In humans, the differential effects of the adverse influences of alcohol on neurodevelopment and appetitive conditioning are difficult to ascertain.

Cues associated with drug use can trigger conditioned emotional and physiological responses that are similar to the unconditioned response itself (e.g., euphoric, calming, stimulating, analgesic). In some cases, conditioned responses can also be opposite to the unconditioned drug response (e.g., dysphoric, depressed mood, increased pain sensitivity; O'Brien et al., 1990). Whether a drug-like or drug-opposite conditioned response occurs depends on the substance and the CS. Importantly, conditioned responses opposite to the drug effect explain conditioned tolerance and conditioned withdrawal symptoms in substance use disorders (Banasikowski & Beninger, 2015). Conditioned compensatory responses, which are often similar to the symptomatology of drug withdrawal syndrome, can be critical triggers for relapse. If drug-opposite conditioned responses occur just before drug intake, they can lead to an attenuation of the drug effect ("tolerance"). This effect partly explains why drug effects usually diminish with repeated use of the same dose (O'Brien et al., 1990). For this reason, classical conditioning has also been proposed as an explanation for heroin overdose deaths (Siegel, 2016). In some cases, individuals with a heroin addiction died after taking heroin at a dosage that they had learned to tolerate. Drugs are typically used in specific situations (e.g., at a certain time of the day, together with friends, "drug scene"). Thus, through classical conditioning, specific environmental cues become associated with the systemic effect of the drug. Upon repeated drug consumption, these cues elicit conditioned responses that counteract the drug effect and, therefore, mediate drug tolerance. If the drug is taken in a novel environment, these drug-compensatory responses are reduced and the acquired drug tolerance is attenuated (Koob & Le Moal, 2006).

Inspired by extinction-based treatment approaches for anxiety disorders, cue exposure therapy has been developed to treat substance use disorders. The rationale is to expose patients to drug-related cues (i.e., the CSs) without consuming the drug (i.e., the US), in order to extinguish cue-induced craving. In smoking, cue exposure therapy could involve confrontation with smoking-related cues (e.g., cigarettes, ashtrays, lighters, cigarette vending machines) or situations (e.g., being in a pub, waiting for the school bus, passing a tobacco store). However, research on this therapeutic approach yielded mixed findings and its efficacy seems to be rather poor (Mellentin et al., 2017; Vinci et al., 2021). A recent study on cue exposure therapy for smokers revealed that this technique may even increase the risk of relapse (Pericot-Valverde et al., 2019). Overall, cue exposure appears to be rather ineffective for substance use disorders, at least when this technique is applied in the way that it is commonly used for anxiety disorders (i.e., focusing on habituation and inhibitory learning). One reason for this could be that, in addition to classical conditioning, operant learning processes are particularly important in substance use disorders (Koob & Volkow, 2016; Wise & Koob, 2014). For example, reaching for a cigarette (habit learning) is operantly reinforced by subsequent smoking (Bouton, 2021). Therefore, when exposure interventions are applied to substance use disorders, it seems necessary to extend these techniques by including other abstinence strategies. For example, one promising possibility might be to expand cue exposure to incorporate urge-specific coping skills (Mellentin et al., 2017). Once craving-triggering cues have been identified, alternative behaviors to drug use (e.g., smoking) can be explored in therapy. For example, if an adolescent has always smoked during school breaks, the patient might try to avoid the smoker's corner and chat with classmates who do not smoke. If a patient has smoked when feeling nervous before an exam, relaxation techniques, drinking a glass of water, or exercising could be options to replace tobacco.

Appetitive Conditioning and Depression

Interestingly, *impaired* appetitive conditioning has been discussed as a mechanism in the etiology of depression (Martin-Soelch et al., 2007; Webb et al., 2017). Kumar et al. (2008) compared appetitive conditioning between patients with major depressive disorder and healthy controls. Participants learned to predict rewarding water delivery (the appetitive US), which was preceded by visual cues (the CSs). Intriguingly, patients showed reduced reward learning, as indicated by blunted brain activity in the ventral striatum. This brain region is typically activated during the anticipation of rewards (Daniel & Pollmann, 2014). Similarly, Arrondo et al. (2015) found reduced ventral striatal activity in depressed individuals during reward anticipation. These findings indicate that situations are less likely to acquire a positive connotation in patients with depression, presumably due to appetitive conditioning deficits. Anhedonia, i.e., hyposensitivity to rewards, is a core depressive symptom (Pizzagalli, 2014). However, it is yet to be determined whether anhedonia is a consequence or a causal factor of impaired appetitive conditioning. Given that lower US intensities lead to poorer learning (Rescorla & Wagner, 1972), attenuated reactivity to pleasurable stimuli (Pizzagalli, 2014) could affect perceived US intensity (i.e., less reward) in depressed individuals, and thereby interfere with conditioning. Clearly, blunted reward processing does not only affect classical conditioning, but also operant conditioning processes (Weinberg et al., 2022).

Beyond Exposure – Other Interventions Based on Classical Conditioning

As a clinical intervention, classical conditioning has been most influential in advancing exposure treatment techniques. Yet, classical conditioning is an important learning mechanism that also underlies other cognitive-behavioral interventions in adult, child, and adolescent psychopathology. To illustrate this, two examples will be given.

Many mental health problems during childhood and adolescence are accompanied by severe sleeping problems (Short et al., 2019). Classical conditioning mechanisms are critical for the development of effective therapeutic interventions for sleeping difficulties (Harris et al., 2012). Acute periods of stress often lead to transient sleep disturbances. However, with repeated episodes of insomnia, the bed, bedtime, and other contextual cues in the bedroom become CSs for emotional distress (the US), which is associated with persistent wakefulness, autonomic arousal, and difficulties with falling asleep. If patients repeatedly toss and turn in their bed for hours, going to bed will automatically elicit sleeplessness and worrying about not being able to sleep. Many patients report watching TV, surfing the internet, or even eating in their beds. These stimulating activities go along with elevated arousal, which is incompatible with sleep and further adds to associating being in bed with being awake and alert. In depression and anxiety disorders, excessive rumination and worrying in bed also contribute to elevated arousal; the bed is no longer a cue for sleeping. Based on this classical conditioning model of insomnia, so-called stimulus control therapy has been developed (Edinger et al., 2021), which can lead to rapid improvements in sleep and daytime functioning (Harris et al., 2012). The goal of stimulus control therapy is to extinguish bed–wakefulness associations and to restore functional bed–sleep contingencies (Edinger et al., 2021). Therefore, a consistent separation of lying in bed and wakefulness/distress is required. The bed situation should be reconditioned with pleasant emotions and relaxation. Individuals with sleeping difficulties are instructed to use their bed for sleep only, and to avoid stimulating activities in bed (e.g., reading, eating, or watching TV). If somebody cannot fall asleep within 20 min or experiences rumination in bed, it is recommended that they leave the bed and return only when becoming tired, to avoid the formation of dysfunctional associations. Conversely, waking up at the same time every morning helps to establish functional associations between sleeping and bedtime (Edinger et al., 2021).

Relaxation procedures represent a second example of applying classical conditioning. Relaxation techniques (e.g., progressive muscle relaxation, breathing exercises) are widely used in psychotherapy to reduce stress, anxiety, and depression symptoms (Gao et al., 2018). It has been discussed that the beneficial effects of relaxation could be partially mediated through classical conditioning mechanisms, and that cue-controlled (i.e., conditioned) relaxation could improve its efficacy (Hayes-Skelton et al., 2013). Relaxation techniques may be too time-consuming and complicated in specific anxiety-provoking situations; classical conditioning can simplify the induction of a relaxed state (Poser et al., 1965; Russell & Sipich, 1973). Relaxation instructions (the US) typically elicit a pleasant state of relaxation and well-being (the unconditioned response). After getting into a relaxed state, the patient may be instructed to repeat the word “relaxing” (a self-produced cue) with each exhalation. Through this procedure, the word “relaxing” becomes a CS and, eventually, induces a relaxed state (the conditioned response). This method enables the patient to generate a relaxed state easily and quickly in everyday life or in feared situations (e.g., before an exam at school or at a party). In addition, relaxation exercises can be practiced in a certain body posture (e.g., the so-called “cabman’s position” in autogenic training; Linden, 2021). Thereby, the body posture functions as a CS and facilitates the elicitation of a conditioned relaxation response.

Classical Versus Operant Conditioning

In addition to classical conditioning, operant learning processes are important for understanding and treating psychopathology in children, adolescents, and adults. Operant conditioning describes the process through which individuals learn to make (or not to make) certain behavioral responses, with the goal to obtain a desirable outcome or to avoid an unpleasant consequence. To explain avoidance behavior in pathological fear, Mowrer’s (1951) two-factor theory has already been described above. While classical conditioning is particularly important for the etiology of mental disorders, operant conditioning is pertinent for their maintenance. For example, in PTSD, hyperarousal and reexperiencing traumatic events can be explained by classical conditioning, whereas avoidance and escape symptoms are accounted for by operant mechanisms. The key difference between classical and operant conditioning is whether or not the outcome is contingent on a behavioral response. In classical conditioning, individuals receive an outcome (the US) regardless of whether they show a conditioned response or not. After repeated pairings of the CS and the US, the CS triggers a conditioned response. In contrast, in operant conditioning, the outcome (i.e., the reinforcement) occurs only when a particular behavior is shown. In addition, antecedent stimuli, i.e., discriminative stimuli, enhance the likelihood of a certain behavior in a given situation depending on which reinforcement is associated with it. The probability of a behavior being increased or decreased depends on whether an appetitive reinforcer ("reward") or an aversive consequence ("punishment") follows, or whether an (un-)desired outcome is removed ("negative reinforcement/punishment").

Classical and operant conditioning are often not clearly distinguishable, especially since both learning processes co-occur. This already becomes clear when looking more closely at the highly cited example of "Little Albert" (Watson & Rayner, 1920), which was introduced at the beginning of this chapter. Although this experiment is most frequently used to illustrate the basic concepts of classical fear conditioning, the child's learning in this example cannot be solely explained by "pure" classical conditioning mechanisms. Critically, the unpleasant noise (the US) was administered when "Albert's" hand *touched* the rat (the CS). Thus, this procedure also includes operant conditioning mechanisms.

In clinical practice, classical and operant conditioning procedures often go hand in hand and are difficult to distinguish. This interaction can be easily illustrated in behavioral treatment strategies for children with nighttime bed-wetting. Nocturnal enuresis describes the involuntary loss of urine at night at an age when a child could be expected to be dry. After organic causes have been excluded, so-called alarm interventions are an effective behavioral treatment strategy (Glazener et al., 2005; Peng et al., 2018). As part of this treatment, an alarm (e.g., a bell) is triggered by micturition, i.e., when a sensor in the sheets or nightclothes of the child is activated by urine.

Alarm interventions were originally designed based on a classical conditioning account (Doroshow, 2010; Ploog, 2012). Accordingly, the sensation of a full bladder (the CS) becomes associated with the alarm (the US), which automatically triggers an unconditioned response (waking up). After successful conditioning, the child learns to recognize sensations of the bladder being full during sleep and to wake up (conditioned response). Eventually, the child gets up in time to go to the bathroom without urinating in bed. It also has been proposed that voiding inhibition during sleep is conditioned (Caldwell et al., 2020). Specifically, being woken up by the alarm causes contraction of the urethral sphincter and the pelvic floor muscles, thus stopping urine flow (Butler, 2004). Thereby, the child learns to contract the urethral sphincter and the pelvic floor muscles (conditioned muscle response; Forsythe & Butler, 1989). Both classical conditioning accounts assume that the sensation of a full bladder becomes a cue (i.e., the CS) to either wake up or to inhibit urination. However, classical conditioning cannot fully explain the therapeutic effects of alarm interventions. In particular, it is unclear why removal of the alarm typically does not lead to extinction learning and associated relapse (Forsythe & Butler, 1989). Thus, it has been suggested that operant mechanisms also play a role.

From an operant perspective (Butler, 2004; Doroshow, 2010; Lovibond, 1963), the child learns to stay dry (i.e., to wake up or to hold back urine) by avoiding the annoying noise of the bell. In addition, avoiding bed-wetting is facilitated by preventing aversive consequences that typically follow a bed-wetting accident (e.g., parental criticism or accusations, changing the bed sheets, and the need to wash oneself). Regardless of the exact mechanism of action, alarm interventions are highly effective (Glazener et al., 2005; Peng et al., 2018).

In summary, the relative contribution of classical versus operant learning mechanisms is often difficult to disentangle in practice. Classical conditioning tends to be particularly important for the development of psychopathological symptoms, whereas operant learning seems to be of greater relevance for their maintenance. When designing new therapeutic interventions, care should be taken to address the implications that arise from both conditioning mechanisms. In this way, treatment efficacy can be maximized, while trying to reduce the risk of relapse.

Conclusions

Classical conditioning is one of the fundamental ways in which infants and children learn about the world around them. By discovering "what seems to come before what," the world becomes more predictable for children. In clinical psychology, classical conditioning has added substantially to our understanding of a wide variety of mental disorders in youth, which led to the development of effective interventions. The transition from childhood to adulthood is a high-risk period for the pathogenesis of mental health problems. The developmental trajectories of fear conditioning show that, with increasing age, children learn to differentiate between threat and safety. Some adolescents, however, continue overgeneralizing conditioned fear. This seems to be a critical risk factor in the etiology and maintenance of anxiety, fear, and trauma-related disorders. Exposure-based therapy, which is founded upon the principles of classical conditioning and extinction learning, is the treatment of choice for pathological fear and anxiety. Understanding exposure therapy from an inhibitory learning perspective allows for further optimizing its efficacy. Specifically, exposure should be conducted in multiple contexts (internal and external), safety behavior should be reduced, and the degree of expectation violation should be maximized. Several studies have confirmed the excellent effectiveness of exposure therapy. Nevertheless, exposure-based interventions are not necessarily used in routine care, even by therapists trained in cognitive-behavioral therapy (Pittig et al., 2019). It will be important to better understand what keeps clinicians from doing so. The dissemination of conditioning-based interventions needs to be improved, and practical or systemic barriers should be identified and removed. Conditioning procedures are most frequently referred to in the context of pathological fear and anxiety and their treatment. As outlined earlier, classical conditioning is a powerful learning mechanism, which has proven beneficial for treatments of a wider range of mental health problems during childhood and adolescence (e.g., eating disorders, substance use disorders, nocturnal enuresis, or sleeping difficulties).

Glossary

Appetitive Conditioning Classical conditioning with a pleasant unconditioned stimulus (US).

Aversive Conditioning Classical conditioning with an unpleasant unconditioned stimulus (US). Often referred to as "fear conditioning."

Classical Conditioning A learning mechanism through which external or internal stimuli become associated with motivationally relevant events, which can be either pleasant (appetitive conditioning) or unpleasant (aversive conditioning).

Conditioned Response A learned response that is elicited by the conditioned stimulus after successful classical conditioning. A conditioned response is associated with affective, physiological, and behavioral changes. The conditioned response is often similar to the unconditioned response, but can also be qualitatively different, as it is closely related to the motivational state induced by the expectation of the unconditioned stimulus (US).

Conditioned Stimulus (CS) An external or internal stimulus that becomes associated with the unconditioned stimulus (US) during classical conditioning. After successful conditioning, the CS predicts the pleasant (appetitive conditioning) or unpleasant (aversive conditioning) US and elicits a so-called conditioned response. Experimental conditioning paradigms typically entail two different CS types. A CS+ is repeatedly paired with the US, while a CS− remains unpaired. The difference between responses to the CS+ and the CS− is referred to as *differential* conditioned response.

Exposure Therapy A behavioral intervention that is mainly based on extinction learning. Exposure therapy is best researched and most established for the treatment of anxiety and trauma-related disorders. Patients are guided to confront themselves with the feared object or situation. By staying in the feared situation, the patient learns that the anticipated negative outcome does not occur (or is less threatening than expected). Besides pathological fear and anxiety, exposure-based strategies can be applied to a variety of mental health problems (e.g., mirror exposure for eating disorders or cue exposure for substance use disorders).

Extinction The decline of conditioned responses when the conditioned stimulus (CS) is repeatedly presented without the unconditioned stimulus (US). An individual learns that the US is no longer predicted by the CS. Extinction is due to inhibitory learning.

Generalization Responses that have been acquired to a particular conditioned stimulus (CS) transfer to stimuli that are perceptually, conceptually, or symbolically similar, but have never been paired with the unconditioned stimulus (US). Children and adolescents show elevated fear generalization, which usually declines with increasing age. In adults, overgeneralization of conditioned fear (i.e., heightened generalization to a wider range of stimuli similar to the CS) has been linked to the etiology and maintenance of anxiety disorders.

Unconditioned Response An innate response, which occurs naturally in response to the unconditioned stimulus (US) and does not require prior learning.

Unconditioned Stimulus (US) A motivationally salient stimulus that is either pleasant (appetitive conditioning) or unpleasant (aversive conditioning).

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Mindfulness

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Mindfulness is defined as paying attention to the present moment nonjudgmentally (Kabat-Zinn, 2013; Segal et al., 2013). Mindfulness practice originates from Eastern traditions, and its recent popularity in Western psychology is largely due to the development and widespread application of two standardized mindfulness-based programs for adults (MBPs): mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT) (Kabat-Zinn, 2013; Segal et al., 2013).

MBPs that integrate mindfulness practices with psychoeducation on stress reduction, often for managing specific health issues, can strengthen competence in coping. Most MBPs consist of group-based learning, and participants are trained in a range of formal mindfulness practices, including body scan, mindful stretching, mindfulness of breath, sounds, and thoughts, and informal mindfulness practices for daily activities such as walking and eating (Kabat-Zinn, 2013; Segal et al., 2013). A growing body of robust evidence from randomized controlled trials (RCTs) demonstrates that MBPs are effective in improving a range of clinical and nonclinical psychological outcomes in adults, including anxiety, stress, quality of life, chronic pain, attention-deficit/hyperactivity disorder (ADHD), autistic spectrum disorder (ASD), and other psychological symptoms in patients with chronic conditions (Galante et al., 2021; Gu et al., 2015).

What Is Mindfulness?

In addition to the above-mentioned concise definition of mindfulness provided by Kabat-Zinn (2013), mindfulness has been operationally defined in psychological science as “the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment [and] adopting a particular orientation toward one’s experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance” (Bishop et al., 2004, p. 232). Although the concept of mindfulness has long been a part of many religious and spiritual traditions, the current Western interest in this concept can be traced to Buddhist meditation. However, many mindfulness practices used in psychosocial interventions are secular, requiring no compliance to Buddhist doctrine.

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Mindfulness practice is often presented as beginning with focused attention on the breath, followed by more critical open monitoring of present-moment experiences and awareness of the whole body (Lutz et al., 2008). In the practice mindfulness of the body, focused attention requires concentrating one's attention on a chosen object, typically on the breath, and refocusing on the breath when the mind wanders away, thereby enhancing volitional attentional focus. Open monitoring requires nonreactive focused attention on the contents of one's moment-by-moment experiences of whatever feelings and thoughts arise. Increased awareness leads to an understanding of the nature of thoughts, feelings, emotions, and perceptions as they arise and dissolve of their own accord (Kabat-Zinn, 2013; Segal et al., 2013).

Mindfulness meditation leads to enhanced attention and awareness of internal and external environmental cues. In essence, by being present and aware of what is happening in each moment, we can learn to discriminate between our preconceptions and the actual experience of the moment. This enables us to change our relationship with the experience of our feelings, thoughts, emotions, and perceptions. Instead of trying to change them, we simply accept them for what they are. Individuals who practice mindfulness regularly are more likely to notice when they adopt the mode of avoidance when encountered with threats or situations requiring them to take self-preserving action such as physical avoidance or defensive attack (i.e., the fight/flight reaction). Mindfulness practice can enable the person to pause and approach their experience, regardless of whether it is pleasant or unpleasant, with a sense of openness and willingness to experience it as it is and to respond consciously to internal and external events (Crane, 2017). This can greatly change one's lifestyle, leading to improved health and wellness.

Assessment Scales for Child Mindfulness

Due to the complex nature and qualities of the mindfulness construct, measuring mindfulness is challenging in children and adolescents. Fewer instruments are available to measure mindfulness in these younger populations than in adults. Some issues that need to be considered when assessing mindfulness in children include age-appropriateness of the items, perceived comprehensibility (e.g., abstract and concrete), limitations regarding self-reflection, and tailoring factor structure and sophistication to respondents' developmental stage (Potts et al., 2021). The most commonly used mindfulness scale in adults is the Five-Facet Mindfulness Questionnaire (FFMQ, Baer et al., 2006). It has multiple subscales that assess how aware the respondent is at the moment based on five aspects: describing, observing, acting with awareness, nonreactivity, and nonjudgment. However, responses to some of these subscales require more advanced metacognitive skills. Thus, most of the current child mindfulness scales are unidimensional (Potts et al., 2021).

The Child and Adolescent Mindfulness Measure (CAMM; Greco et al., 2011) is the first mindfulness scale developed specifically for use in children and adolescents aged 10–17 years. The CAMM assesses trait mindfulness, which is defined as acting with awareness instead of responding instinctively, and accepting without judgment (Greco et al., 2011, p. 2). Many items of the CAMM are based on the Kentucky Inventory of Mindfulness Scale, an adult mindfulness measure (Baer et al., 2004), and it was originally developed to assess three factors: the first factor reflected observation, the second factor reflected lack of awareness of the ongoing activity and judgmental responses to thoughts and feelings, and the third factor reflected non-accepting and avoidant stances toward unpleasant thoughts and feelings. However, the CAMM did not gain adequate support in confirmatory factor analysis, although it demonstrated good reliability in single-factor analysis (Kuby et al., 2015).

The CAMM has 20-item and 10-item versions, and both are supported by empirical evidence. The scale has been translated into many languages including Dutch (de Bruin et al., 2014), Spanish

(Guerra et al., 2019), French (Dion et al., 2018), Chilean Spanish (Garcia-Rubio et al., 2019), Italian (Chiesi et al., 2017), Greek (Theofanous et al., 2020), and Chinese (Lo, 2021).

The Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003) is a 15-item unidimensional measure that assesses trait mindfulness, defined as the tendency to pay attention to and be aware of life experiences. After modifications, the MAAS has been formally adapted for use in children aged 9–13 years (MAAS-C; Lawlor et al., 2014) and adolescents aged 14–18 years (MAAS-A; Brown et al., 2011). The MAAS-A has demonstrated strong internal consistency in different populations including secondary students, psychiatric patients, and incarcerated adolescents. Unlike the CAMM, the MAAS-A and MAAS-C emphasize the "presence" quality of mindfulness. The MAAS has been translated into many languages and has been adapted to adolescents in different countries and cultures with some modifications; for example, some researchers have developed shorter versions of the MAAS for the younger population, such as a 5-item version for Norwegian adolescents (Smith et al., 2017).

The Comprehensive Inventory of Mindfulness Experiences – Adolescents (CHIME-A; Johnson et al., 2017) is a 25-item trait mindfulness measure developed for use in adolescents aged 12–14 years. The CHIME-A is adapted from the CHIME, which was developed for mindfulness assessment in adult populations (Bergomi et al., 2015). The CHIME-A assesses mindfulness in eight domains: awareness of internal experiences, awareness of external experiences, acting with awareness, accepting and nonjudgmental orientation, decentering and nonreactivity, openness to experiences, relativity of thoughts, and insightful understanding. Recently, a study in Belgium used the CHIME-A to investigate mindfulness in adolescents with chronic conditions (Kock et al., 2021). While this measure may be particularly helpful for measuring specific components of mindfulness, use of its total score is not recommended due to the unsatisfactory internal consistency. Further studies on the psychometric properties and external validity of this measure are warranted.

Although the assessment scales currently available for child and adolescent mindfulness are few, each has its strengths and shows good psychometric properties. Further studies are needed to inform the development of improved mindfulness scales for younger populations (Pallozzi et al., 2017). Future research should focus on clarifying the factor structure and content being assessed by these mindfulness scales. This is challenging in children, given that single-factor solutions often function better, but the content of these single factors varies, and the scales are lacking items relevant to the definitions of mindfulness in adults. It is also worth investigating whether the factor structure of a mindfulness scale should vary by the developmental stage of the respondents. There is a lack of scales for measuring state mindfulness in the younger population, which suggests another research direction for future studies. Overall, assessing mindfulness using adapted scales in children and adolescents is imperative to advance our understanding of mindfulness and promote the application of MBPs in this population.

Mindfulness-Based Programs and Practices for Children

Mindfulness-Based Stress Reduction and Mindfulness-Based Cognitive Therapy for Children

Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 2013) is the first benchmark evidence-based secular program that provides brief but intensive mindfulness training for people with a wide range of medical, psychological, and psychiatric conditions. Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2013), which incorporates elements of MBSR and cognitive therapy, was initially developed as an intervention to prevent relapse of major depression but has subsequently been used in people with a wide range of clinical issues and problems. Some MBPs for children have been claimed to be adapted from the MBSR or MBCT program for adults, although their formats are different from the adult versions.

Biegel et al. (2009) conducted an RCT of MBSR in adolescent psychiatric outpatients aged 14–18 years, most of whom had mood or anxiety disorders. This study intervention closely followed the format of MBSR, comprising a 2-h class per week for 8 weeks, home practice for 20–35 min, and no day retreat. Relative to control participants who received the usual treatment, those receiving MBSR self-reported reduced symptoms of anxiety, depression, and somatic distress, and improved self-esteem and sleep quality. However, the author paid relatively little attention to ensuring the developmental appropriateness of this adult MBSR-based intervention in adolescents, apart from reducing the practice intensity.

Huppert and Johnson (2010) studied the effects of a brief mindfulness program on 155 male students aged 14–15 years. The program was claimed to be a modified version of MBSR. It involved four 40-min classes and three 8-min audio files for use as home practice guidance. Video clips were produced to highlight the values of mindful awareness. Students after such mindfulness program did not report significant between-group differences, probably due to the limited intensity of the program and the lack of individual practice outside classroom. This protocol has been relabelled as ".breathe," (read as "stop and breathe") a brief mindfulness-based program, under the umbrella of the Mindfulness in Schools Project. Some recently developed MBPs for children and adolescents are claimed to have been developed based on MSBR or MBCT and are labeled with different names.

Two studies evaluated an MBSR intervention comprising a 50-min session per week for 12 weeks in low-income urban youth. The study population included 41 school-going boys in one study (Sibinga et al., 2013) and 33 HIV-infected adolescents in a hospital in another (Sibinga et al., 2011). The MBSR program was adapted to the target population by modifications such as giving reminder phone calls to the participants before the sessions, providing snacks, and using simplified and clear language to present the materials. However, the authors emphasized that the intervention retained the core content of adult MBSR. In the first study, the boys in the MBSR group reported significant improvements in anxiety, ruminations, and negative coping, but no improvements in other outcome measures such as emotional awareness, anger expression, conflict, and perceived stress were found. In the second study, the MBSR group reported reductions in hostility, general discomfort, and emotional discomfort after the program. Both studies did not include control groups for comparison and included small sample sizes. While the programs concern about the suitability of child MBPs following the structure of adult MBPs and developed shorter sessions and practices, there may be an issue of intervention fidelity of MBSR.

Semple and Lee (2007) developed a manualized MBCT program for children (MBCT-C) aged 9–12 years. It consists of 12 weekly 90-min sessions delivered in groups of up to eight children. The first three sessions of the MBCT-C focus on introducing the basic concepts of mindfulness to the participants, followed by six sessions dedicated to providing experiential learning of mindfulness. The last three sessions of the MBCT-C focus on cultivating self-compassion and applying mindfulness skills to manage intrusive thoughts and emotions. An open trial showed the feasibility of the MBCT-C in reducing negative emotional symptoms in adolescents aged 9–12 years (Lee et al., 2008). Semple et al. (2010) further conducted a waitlist-controlled trial involving 25 schoolchildren. The study produced mixed results but showed improvements in the anxiety symptoms and behavior problems of children with clinical anxiety.

The MBCT-C has been adapted to other child populations in two studies in Iran. Esmaeilian et al. (2018) conducted an RCT of a modified version of the MBCT-C in 83 10–13-year-old children of divorced parents. At the end of intervention, the children from the mindfulness group showed significantly fewer symptoms of depression, trait anxiety, state anxiety, trait anger, and state anger in comparison with the control group. Abedini et al. (2021) randomly assigned 40 11–13-year-old children with cancer to the MBCT-C or treatment-as-usual control group. The MBCT-C group showed significant reductions in internalizing and externalizing problems, and these effects were maintained at the 2-month follow-up. Another recent study applied the MBCT-C to 24 youth at risk of bipolar disorder (Cotton et al., 2020). There were significantly greater improvements in overall clinical severity after MBCT-C compared to the waitlist period, but not in clinician- and child-rated anxiety, emotion regulation, or mindfulness. The main limitation of most studies on the MBCT-C is their relatively small sample sizes.

In another study, Bögels et al. (2008) developed an MBCT-based MBP for adolescents with externalizing disorders such as ADHD, ASD, oppositional-defiant disorder, and conduct disorder, and for their parents. The 8-session MBCT program (1.5 h per session) was adapted to provide mindfulness training for the adolescents and their parents in parallel groups. The program included all mindfulness practices from MBCT, and a worksheet and CD were provided for practice. In the last session, the adolescents were required to develop an action plan to continue their mindfulness practice in the 8 weeks following the termination of formal training. The pilot study included 14 adolescents with mixed clinical diagnoses. Compared with the waitlist group, the adolescents in the MBCT group self-reported improvements in internalizing and externalizing problems, attention problems, self-control, and attunement to others (Bögels et al., 2008). A follow-up study further reported the positive effects of the MBCT program in ADHD children and their parents (van der Oord et al., 2012). Based on these initial attempts, Bögels developed a treatment approach called MYmind for children with ADHD and ASD and their parents (a following section discusses the application of this program in clinical populations).

.b and Paws b

The Mindfulness in Schools Project in the UK has developed a series of child MBPs, starting from “.b” (read as “dot-be”) for secondary school students. In the original design of the MBP, one session is scheduled weekly to be taken place during normal lesson time. The content includes the basic practices of mindfulness of breath, body, and thoughts, mindful eating, mindful walking, and coping with stress. It is supported by home practice, a guidance manual, an indicative script for teachers, and a student booklet. The course designers have also created PowerPoint files with interactive, experiential, and lively resources, such as video clips, and challenging activities to facilitate classroom teaching and make the content attractive to teenagers.

A total of four curricula have been subsequently developed for different age groups, “dots” for children aged 3–6 years in preschool settings, “Paws b” for children aged 7–11 years, “.breath” for children aged 9–14 years, and “.b” for adolescents aged 11–18 years in secondary schools. Each program has a different structure adapted to the developmental stage of the target population. “Dots” consists of 30 sessions that can be delivered in discrete 10–20-min sessions and can be repeated throughout an entire week or even weeks. “Paws b” can be delivered as twelve 30–60-min lessons or can be grouped into six sessions. “.breathe” is a brief course of four sessions and consists of fewer mindfulness practices than “.b” or “Paws b,” which include more extensive training.

Large-scale studies have been conducted to investigate the feasibility and effectiveness of the “.b” program. The first cohort-controlled study recruited 522 secondary school students aged 12–16 years to participate in “.b” or in the usual school curriculum as the control group. Students who participated in the program reported fewer depressive symptoms at posttest and significant improvements in stress and well-being at follow-up (Kuyken et al., 2013). In an RCT, Johnson et al. (2016) assessed the effects of “.b” on 132 students in comparison with those of the usual treatment on 176 students. They did not find significant between-group differences in anxiety, depression, body concerns, or well-being at posttest and the 11-week follow-up.

A large-scale cluster RCT was conducted in Finland to evaluate the effects of ".b" on 3519 adolescents aged 12–15 years. The students were randomized into a 9-week ".b" program, a relaxation program, or teaching as usual (the control group) (Volanen et al., 2020). The ".b" program showed no beneficial effects on most outcomes compared with the control treatment, but it had a positive effect on resilience at post-intervention in comparison with the relaxation group. Compared with the control treatment, the ".b" program reduced depressive symptoms in girls at the 26-week follow-up but not in boys. This lack of significant difference in the depressive symptoms in boys may be because their depression scores were already low at baseline.

Furthermore, Sanger and Dorjee (2016) attempted to uncover the impacts of ".b" using neuroscientific methodology. They found that students after the ".b" program showed more negative N2 amplitudes in response to color-deviant and standard nontarget stimuli in a visual oddball paradigm. These improvements were thought to be associated with self-reported negative-thought controllability and reductions in students' hypercritical self-beliefs (Sanger & Dorjee, 2016).

Vickery and Dorjee (2016) conducted a non-RCT to investigate the acceptability and emotional well-being outcomes of the "Paws b" program in 71 children aged 7–9 years. Compared with the control participants, the students after the program showed significant decreases in self-reported negative affect at follow-up and improvement in teacher-rated metacognition. However, these findings are limited by the small sample size and lack of randomization. Other limitations are that the same teachers who delivered the program also rated the students' metacognition, and that the improvements in metacognition were not supported by the parents' ratings.

Overall, ".b" is one of the most studied school-based MBPs. It is not surprising that a classroom-delivered program can only yield modest effects; therefore, further studies are warranted to explore optimal ways to adapt and deliver MBPs in the school context, particularly so that students are motivated to perform home practice and maintain the benefits even after the termination of formal training (Volanen et al., 2020).

MindUP

MindUp is mindfulness-based social and emotional learning program that consists of fifteen 45-min lessons, one lesson taught per week. It has been developed for children from pre-kindergarten to 8th grade, with three versions adapted to different age groups: pre-kindergarten to grade 2, grades 3–5, and grades 6–8. Each lesson incorporates mindfulness practices with classroom activities to learn about the brain, understand how thoughts and feelings affect actions, and learn strategies to become caring people. The Core Practices (for 3 min, three times a day) consist of focusing on one's breathing and attentively listening to a resonant sound. Children learn how training their focused awareness offers a self-regulatory strategy to calm themselves when they are overwhelmed with emotions. The MindUP program includes one lesson dedicated to teaching children about the brain, particularly the amygdala and the prefrontal cortex and their roles in emotions and cognition. This helps them to understand the links between the brain's neurology, positive psychology, and mindfulness practices and motivates them to perform those practices to improve their attention and calmness.

Studies have demonstrated the effects of the MindUP program in promoting mindfulness and positive development in children and young adolescents. The first study adopted a waitlist-controlled design involving 246 early adolescents from the 4th to 7th grades (Schonert-Reichl & Lawlor, 2010). In the study, the adolescents in the mindfulness group showed significant increases in optimism and teacher-rated attention and classroom social competent behaviors, compared with those in the control group. The second study randomly assigned 99 adolescents from the 4th and 5th grades to the MindUP program or the regular social responsibility school program (Schonert-Reichl et al., 2015) and performed multiple outcome assessments, including objective cognitive tasks; salivary cortisol assessment; social–emotional competence assessment via self, peer, and teacher ratings; and assessment of end-of-year math grades. At posttest, compared with the control group children, the mindfulness group children had significantly shorter response times on average in the cognitive control tasks, indicating improvements in inhibition, working memory, and selective attention. They also had higher cortisol secretion in the morning and a stable diurnal pattern, both implying a healthier stress physiology. Furthermore, the mindfulness group children also showed significant improvements in optimism, emotional control, empathy, perspective-taking, prosocial behaviors, and mindful attention and decreases in depressive symptoms; a significant increase in self-reported school self-concept (i.e., perceived academic abilities and interest and enjoyment thereof); and a 15% gain on average in teacher-reported math grades.

The positive outcomes of the MindUP program reported in the above studies are promising (Schonert-Reichl et al., 2015; Thierry et al., 2016, 2018). However, many outcome measures evaluated in the program correspond to the social–emotional learning components, and it remains uncertain whether the mindfulness component of this program provides additional benefits for children relative to the other social–emotional learning programs. The MindUP program has been translated into different languages in countries including China, Finland, and Qatar, and quasi-experimental studies have reported the effects of the program in 223 Portuguese children (de Carvalho et al., 2017) and 200 Northern Ugandan children, as well as the process of adaptation to the local culture (Matsuba et al., 2020).

Learning to Breathe

The Learning to Breathe (L2B) curriculum teaches adolescents to be mindful of their present moment through lessons on awareness, reducing self-judgment, and being mindful in everyday life (Broderick, 2013). It can be implemented in 6-, 12-, or 16-week versions in a group setting. Each 45-min lesson includes core practices common to most MBPs, such as body scan, mindfulness of thoughts and emotions, and mindful movement, in addition to loving-kindness practice where students are asked to bring someone to mind, including themselves, and wish them well. Students are provided with workbooks and CDs for mindfulness practice at home.

After a pilot study reporting positive effects of the L2B program in 23 marginalized youth (Eva & Thayer, 2017), the impact of the program was investigated in a sample of 251 high-school students who were randomly assigned to a teacher-delivered L2B program or the usual health curriculum (the control group) (Frank et al., 2021). The L2B program group students did not show significant improvements in any self-reported measure in mindfulness, emotion regulation, mental health symptoms, or social connectedness but unexpectedly reported higher levels of rumination and difficulties in goal-directed behavior (a subscale of emotion regulation) compared with the control group students. In behavior assessments of executive functioning, the mindfulness group reported better reaction times in cognitive interference and working memory tasks than the control group. The study further investigated the effects of adequate L2B practice, i.e., practicing at least once per month, according to student's self-reported in one-third of the whole sample, and found a moderating effect of practice with greater improvements in emotion regulation, emotional awareness, emotional clarity, impulse control, mind wandering, and social connectedness.

In view of the unexpected findings, a few implementation issues were highlighted (Frank et al., 2021). First, despite providing school teachers with extensive support while delivering MBPs, including supervision, live observations, and weekly feedback calls, none of the teachers achieved a high level of implementation fidelity. This suggests that it is unrealistic to expect teachers to become competent mindfulness instructors after a short training. Second, effects of the MBPs on clinical symptoms could not be detected as the majority of the students in the study samples were relatively healthy (Greenberg & Abenavoli, 2017). Lastly, despite efforts to integrate mindfulness practice into the regular school day, only one-third of the adolescents reported practicing mindfulness at least once a month. Thus, students may need more support and guidance to incorporate the practice into their daily lives.

Mindful School

The Mindful School program consists of eighteen 20-min lessons, delivered at the rate of three a week for a total of 6 weeks. To maintain consistency in implementation, the teachers are provided with a manual based on which to deliver each lesson. In this program, children practice focusing their attention on breathing, walking, eating, and seeing. The program includes lessons on "heartfulness," which helps students explore themes on kindness toward and caring about themselves and others. Following each lesson, children are asked to write or draw in their journals about what they learnt from the new mindful awareness practice that day. Children are also encouraged to practice what they learned and teach their family members at home and to share about these experiences at the beginning of each session.

An earlier study of the program effect was conducted in 409 children from ethnic minorities and disadvantaged backgrounds (Black & Fernando, 2014). Teachers were asked to deliver 2-min practices to their students on the days when the Mindful School instructors were absent. At post-intervention, the teachers reported improved classroom behaviors including attention, self-control, and caring for others, and the effects were maintained at 7 weeks post-intervention. Unfortunately, no control group was included in the study design. Viglas and Perlman (2018) studied the effects of the program on the self-regulation, prosocial behavior, and hyperactivity of 127 preschool children aged 4–6 years using an RCT design. Compared with the control group, the mindfulness group showed greater improvements in self-regulation, prosocial behavior, and hyperactivity with moderate effect sizes. Similar to many other studies of school-based MBPs, the study by Viglas and Perlman (2018) involved children from low-income households; therefore, the generalizability of the findings to children from other socioeconomic backgrounds is uncertain.

MYmind

MYmind is a standardized mindfulness-based program for children and adolescents and their parents (Bögels, 2015). This program lasts 8 weeks with 1.5-h sessions for children and their parents conducted in parallel groups of 5–6 children and 6–12 parents and includes a booster session 8 weeks after the last session. The MYmind program incorporates a brief version of the Mindful Parenting program created by the same authors (Bögels & Restifo, 2014), and both programs for parents and children emphasize on practices to focus and sustain attention, to be aware of being distracted and regain attention on the original focus, and to enhance bodily awareness. The practices include short meditations, yoga, playful exercises, and games. Parents and children receive session handouts describing the session theme, instructions for practice, homework completion diaries, and recordings of mindfulness exercises to practice at home for 15 min each day.

The targets of the MYmind program are children with ADHD and adolescents with ASD. To encourage participation and retention, tokens are given as rewards to children for completing homework and participating in exercises during the sessions. With accumulation of tokens, rewards such as a small gift or additional play time will be given to the children. Other strategies to increase intervention compliance, such as creating a highly structured program, establishing ground rules, allowing breaks at regular intervals, and including a helper in addition to the instructor, are also adopted. Empirical studies of this program are included in a later section focusing on clinical populations.

Soles of the Feet

Soles of the Feet (SoF) is a brief mindfulness practice that enables an individual to move the focus of attention from an emotionally arousing thought, event, or situation (e.g., anger, aggression, worry, anxiety, and fear) to an emotionally neutral part of the body, such as the soles of the feet (Singh et al., 2011c). The practice allows children and individuals to tap into the interoceptive awareness of emotional and physical changes that may manifest in their body and to pay attention to the source of the emotional changes and encourages them to insert a pause between the eliciting stimulus and their typically instinctive reaction to this stimulus. The pause enables the individual to discern the individual components of the situation and then produce a mindful response that is socially acceptable. Training on task analysis is delivered either on an individual basis or in a group (Felver & Singh, 2020). The SoF practice has been widely used as a self-management intervention in various populations and settings, including child residential homes, schools, community settings, eldercare settings, clinics, and hospitals. Empirical studies of this program in children with clinical problems are presented in a later section.

Age and Sex Effects on the Outcomes of Child Mindfulness Programs

Until 2009, fewer than 10 studies had been published on mindfulness programs for children and adolescents annually. However, the number has grown rapidly in recent years, with 164 papers being published by 2019 (Saunders & Kobers, 2020). Thus, evidence on the effectiveness of MBPs in children has been accumulating. In this section, we discuss the effects of age and sex on the outcomes of the mindfulness programs, discuss the key findings in systematic reviews and meta-analyses of clinical populations, and present some recent representative studies that provide a picture of the current state of research in this area.

Can Mindfulness Programs Benefit Preschool Children?

A recent systematic review focused on studies on the application of mindfulness in preschool-aged children (Sun et al., 2021). Although most studies reported some positive improvements in selected domains of child development, the methodological quality of many of the included studies was concerning and many studies had moderate-to-serious overall risk of bias. As mentioned in the earlier section, Viglas and Perlman (2018) studied the effects of the Mindful School program on 127 preschool children aged 4–6 years and reported significant improvements in their self-regulation, prosocial, and hyperactivity. However, this study sample included only children from low-income households, which prevents the generalization of the findings to children from other socioeconomic backgrounds.

A recent RCT evaluated the effects of the Kindness Curriculum on 68 preschool students from families from a higher-income district. The program integrates mindfulness practices with gratitude and compassion to cultivate prosocial behavior (Flook et al., 2015). It is a 12-week program that includes two 20–30-min lessons each week. At the end of the program, the students in the mindfulness group in the RCT showed greater improvements in prosocial behavior and teacher-reported social competence, and also received higher academic grades at the end of the school year, than the students in the control group. The teacher-rated improvements in both the mindfulness and control groups showed large effect sizes. However, the between-group difference in terms of prosocial behavior and emotion regulation was small (d = .29 and .25 respectively).

The feasibility of the OpenMind program, which integrates mindfulness practices with social–emotional learning, was studied in an RCT in 262 children aged 3–5 years (Jackman et al., 2019). Children were assigned to the mindfulness program or a social–emotional learning intervention. Compared with the active control group, the students from the mindfulness group showed greater improvements in self-regulation, as reflected by their performance in the Head, Toes, Knees, and Shoulders task. However, the students from the mindfulness group showed deterioration in cognitive flexibility and no significant differences in inhibitory self-control, metacognition, or overall executive functioning when compared with the active control group (Jackman et al., 2019).

To date, three studies have focused on the MindUP program on preschool children, as reported in the earlier section (Crooks et al., 2020; Thierry et al., 2016, 2018). Thierry et al. (2016) studied the effects of the MindUP program on 47 students (mean age = 4.56 years, SD = 0.33 years) in comparison with those of the usual treatment in the control group. Although the parent-reported scores of children in the mindfulness group did not reveal significant changes, the teacher-reported scores revealed significant improvements in working memory and planning/organizing with large effect sizes (d = 1.02 and 1.17 respectively). The mindfulness group also had higher vocabulary and reading scores than the control group. Thierry et al. (2018) then replicated the study in a larger preschool sample of African American and Latino students (n = 157) of similar age and a matched control group. At the end of the school year, the students in the mindfulness group showed greater improvements in executive functions than those in the control group with small-to-moderate effect sizes (ds = .31 to .56). Crooks et al. (2020) recruited 261 preschool children and evaluated the impact of the program, with a comparison group of 323 children, in districts that were characterized as high social risk and disadvantaged. Students who received the program demonstrated improvements in adaptive skills, reduction in behavioral problems, and executive functioning, relative to the control group counterparts.

Thus, more studies with a rigorous design are warranted to conclude the benefits of this program in preschool children. Nevertheless, the findings of the two studies suggest that mindfulness is a promising approach in children, but they should be interpreted with cautions due to two limitations. First, the sample sizes of these studies were small, probably because more resources are required when conducting intervention studies targeting preschool children as they often include their parents/guardians as well. One study (Thierry et al., 2016) reported teachers' ratings but not parents' ratings. Second, the younger the program participants, the more modifications are required in the intervention components to adapt to the younger population, and it becomes a delicate problem to judge whether a program is mindfulness-based or a multiple-intervention program.

Can Children and Adolescents Benefit Equally from Mindfulness Programs?

A few large-scale clinical trials are described in this section to elucidate the current state of research on this specific question. Gómez-Odriozola and Calvete (2021) conducted a waitlist RCT of the L2B curriculum in 300 students aged 13–21 years who were randomly assigned to the program (Broderick, 2013). Older adolescents in the control group showed significant increases in depression and somatic symptoms implied the L2B program may have a preventing effect. Moreover, interpersonal difficulties decreased among older adolescents who completed the program. In contrast, younger adolescents in the program group showed increases in depression and somatic symptoms, whereas no significant changes in those factors were observed in the control group. These findings suggest the need for age-appropriate adaptation of mindfulness programs and satisfaction survey results suggested that students expect a program more enjoyable and stimulating (Gómez-Odriozola & Calvete, 2021). Besides, the relevance of mindfulness practice in younger adolescents without serious health or mental health issues should be rigorously evaluated for better program efficacy.

A recent meta-analysis investigated the effects of age on the outcomes of school-based mindfulness programs and found similar evidence (Carsley et al., 2018). Studies conducted in late adolescents ($n = 7$; Hedges' $g = .28$) revealed larger program effects on mental health and well-being outcomes than those conducted in children in middle childhood ($n = 6$; $g = .20$). Program effects on early adolescents were not significant ($n = 6$; $g = .11$). Late adolescents showed significant but small effects at follow-up in both the within-group ($n = 4$; $g = .33$) and between-group analyses ($n = 3$; $g = .22$). However, a meta-analysis (Odgers et al., 2020) of studies on anxiety found significantly larger effect sizes in studies on children ($n = 6$, $d = .41$) than in studies on adolescents ($n = 13$, $d = .21$).

Sex Effects on the Outcomes of School-Based Mindfulness Programs

Most previous findings suggest that adult women benefit more than adult men from mindfulness programs (Katz & Toner, 2013). Of the six studies that have investigated the potential moderating effect of sex on the outcomes of school-based mindfulness programs, two reported greater benefits in female students than in male students (Johnson et al., 2016; Kang et al., 2018), one indicated greater benefits in male students than in female students (Salmoirago-Blotcher et al., 2018), and two reported no significant differences between the sexes (Johnson et al., 2017; van der Gucht et al., 2016).

Sheinman et al. (2018) investigated the perception of mindfulness practice among 646 students aged 9–12 years in Israeli public schools that had implemented a mindfulness curriculum. They reported that girls had a higher tendency than boys to apply mindfulness strategies in coping with stress, regardless of their age. Although most studies show that girls benefit more than boys from child MBPs, further studies are warranted to explore the moderating effect of sex in different age ranges and with different clinical problems.

Application of Mindfulness Programs in Clinical Populations

Attention-Deficit/Hyperactivity Disorder (ADHD)

Mindfulness practices offer a training for children to maintain focused attention and to bring their attention back when it wanders. With such practices, children with ADHD can learn to focus and sustain their attention and respond mindfully to thoughts, feelings, and situations rather than to react impulsively. In the practice of Buddhist meditation, there is a metaphor called the monkey mind, describing the mind with scattered attention that jumps from one thing to another; this is a particularly challenging aspect to control for children with inattention, hyperactivity, and impulsivity problems. Some children with ADHD also have difficulties with or a reduced capacity for emotion regulation probably due to their thin anterior cingulate cortex (part of the frontal lobe) (Bledsoe et al., 2013).

Mindfulness training may help to tame the monkey mind and improve emotion regulation with kindness, compassion, and acceptance, and by practicing mindfulness regularly, children with ADHD can learn to take a pause and act mindfully, thus reducing their impulsive behavior as well as other ADHD symptoms such as hyperactivity and inattention.

Several systematic reviews and meta-analyses of studies on the application of mindfulness in children with ADHD have been published in the past few years (Cairncross & Miller, 2016; Chimiklis et al., 2018; Evans et al., 2018; Mak et al., 2018; Tercelli & Ferreira, 2019; Vekety et al., 2021; Xue et al., 2019). Cairncross and Miller (2016) meta-analyzed 10 studies on child MBPs, six of which reported the effectiveness of MBPs on inattention in children with ADHD, with an average moderate effect size of $d = .66$, and five reported the effectiveness of MBPs on hyperactivity/impulsivity, with an average small-to-moderate effect size of $d = .47$. Most of the studies included in the meta-analysis by Evans et al. (2018) reported significant effects of MBPs on ADHD symptoms but also had a high risk of bias. In contrast, two of the included studies that incorporated yoga and marital arts in the MBPs showed no effect or even negative effects on ADHD symptoms. Mak et al. (2018) reviewed 13 studies reporting the effects of child MBPs on neuropsychological measures of attention and executive functioning. Five of these studies showed medium-to-large effect sizes, while the other eight studies showed no effects. A review of 10 studies by Tercelli and Ferreira (2019) revealed positive effects of child MBPs on attention deficits but found less conclusive evidence of the effects of the programs on hyperactivity. They emphasized that the included studies had several methodological limitations and concluded that the current evidence on the impact of MBPs on ADHD is inconclusive.

Chimiklis et al. (2018) reviewed 11 studies on the effects of yoga and mindfulness interventions on youth with ADHD and reported that these interventions significantly reduced hyperactivity and inattention in this cohort and improved executive functioning. However, evidence of MBPs with ADHD are not comparable to pharmacological approach and behavioral training. Vekety et al.'s (2021) review of 21 studies revealed that the MBPs significantly decreased children's inattentive and hyperactive symptoms with small effect sizes ($g = .38$). However, these positive outcomes were significant only in teachers' ratings, while nonsignificant in parents' ratings and the children's self-reported ratings. Finally, Xue et al.'s (2019) review of 11 studies found that the mindfulness interventions had significant positive effects on inattention ($g = .83$) and hyperactivity/impulsivity ($g = .68$) relative to the control interventions. The results of subgroup analyses showed significant positive outcomes in both self- and observer-reported ratings of ADHD symptoms in the intervention groups. However, self-reported ratings of ADHD core symptoms had a greater impact on heterogeneity across the studies than did observer-reported ratings. Overall, although the inclusion criteria of and results reported by the included studies varied, most of them suggested that mindfulness is a potential complementary therapy for children with ADHD.

We further discussed some recent studies that had not been included in recent meta-analyses. After a few small open trials, three large-scale RCTs were conducted on the outcomes of the MYmind program in the Netherlands. One of these was a large multiple-baseline study of the effectiveness of the MYmind program in 187 children and their parents (de Bruin et al., 2021). The study reported no changes in children's ADHD symptoms in the waitlist group while significant reductions in the symptoms in the MYmind group at posttest, 2 months later, and 1 year later relative to the pretest levels. Improvements were also reported in the parents' ratings of the children's internalizing and externalizing symptoms in the MYmind group, in addition to significant improvements in the children's executive functioning at the 1-year follow-up.

In another RCT, 103 children and adolescents aged 8–16 years with ADHD were randomized to the standard care plus mindfulness program or the standard care alone (Siebelink et al., 2021). The mindfulness plus standard care group showed a small nonsignificant posttreatment improvement in the self-control deficits, but more children showed reliable posttreatment improvements following mindfulness training versus standard care only group (32% versus 11%). The parents' and teachers' ratings of the children's ADHD symptoms showed significant positive trends at posttest. However, only parents' ratings of hyperactivity and impulsivity remained significant at the 6-month follow-up. Between-group differences in other secondary outcomes were mostly nonsignificant at posttest and follow-ups.

Another RCT compared the effects of an 8-week mindfulness program with those of an 8-week methylphenidate treatment (Meppelink et al., 2016) in a randomized sample of 91 children aged 8–18 years with ADHD. After randomization into the trial, 8-week mindfulness or methylphenidate treatment is administered. Due to ethical concerns, between the first and second follow-ups, the children and their families were free to choose another treatment, stop treatment, or transfer to the other intervention group. The two interventions performed better in different outcome measures, and details of the results will be reported in an upcoming publication. Apart from studies in the Netherlands, pilot studies of MYMind program have also been conducted in Hong Kong Chinese children with ADHD (Zhang et al., 2017), and a large-scale RCT is currently ongoing with an active control group being administered cognitive behavior therapy (Chan et al., 2018).

Another RCT adopted a similar design to investigate the effects of an 8-week parallel program that integrated the Mindfulness Matters child mindfulness program (Snel, 2014) with a brief MBP for parents (Lo et al., 2017). The study recruited 100 children aged 5–7 years with ADHD and their parents (Lo et al., 2020). The families were randomized to the mindfulness group or a waitlist control group. According to the parents' ratings, the children from the MBP group showed greater improvements in inattention (d = .60) and hyperactivity (d = .59) than those from the waitlist group. The parents' ratings of child behavior, attention, and conflict monitoring also showed small effect sizes. Changes in ADHD symptoms were found to mediate improvements in overall child behavior (Lo et al., 2020).

All meta-analyses have pointed out that many of the published studies on child MBPs have major methodological limitations. In fact, some well-controlled studies did not find significant between-group differences, suggesting that the effects of mindfulness should not be overstated. Further studies with a rigorous study design are warranted to investigate whether the effects of mindfulness programs can be sustained after the intervention.

Autistic Spectrum Disorder (ASD) and Intellectual Disability (ID)

Although mindfulness may not be suitable for all children with ASD and ID, MBPs may benefit those with high-functioning autism, especially indirectly through offering mindfulness training to their parents and caregivers. Hartley et al. (2019) reviewed 10 studies investigating the effects of mindfulness on children and adults with ASD. However, only three of these study focused on children and adolescents, and moderate effects were noted across all of these studies.

De Bruin et al. (2015) assessed the effects of the MYmind program on 23 adolescents aged 11–23 years with ASD through an open trial design. The adolescents self-reported increased quality of life and decreased rumination at post-intervention. Although no changes were reported in the core symptoms of ASD or worry, improvement was noted in social responsiveness. Ridderinkhof et al. (2018) delivered the same program to 45 adolescents aged 8–19 and their parents. The children self-reported improvements in externalizing problems and attention problems at posttest and follow-up, while the parents reported improvements in their children's social communication, internalizing problems, and externalizing problems at posttest and follow-up. Salem-Guirgis et al. (2019) evaluated the effects of the MYMind program on 23 youth aged 12–23 with ASD and their parents in Canada, using a within-subject repeated-measures design. The parents reported a small but significant decrease in their children's behavioral symptoms, but this change was not maintained at the 10-week follow-up. A small significant increase in adaptive skills was reported at posttest and follow-up. The parents also reported improvements in the overall symptoms of autism and social motivation at posttest and follow-up. These three studies provided initial evidence of the effectiveness of mindfulness programs on adolescents with ASD. Another feasibility study of the program was conducted in Hong Kong, using a waitlist control design (Ho et al., 2021). Both parent's ratings of social competence and behavior problems showed significant improvements after the program, but similar changes were found in waitlist control group. The program had high satisfaction and attendance, but no between-group difference was found at posttreatment. However, all studies had a relatively small sample size and lacked a control group. Thus, further studies are required with larger samples sizes and control interventions for comparison to obtain more robust evidence.

Hwang et al. (2015) conducted an outcome study of a mindfulness program in six dyads of children aged 8–15 years with ASD and their mothers in Australia. The mothers participated in a program similar to MBSR consisting of a weekly 2.5-h session for 8 weeks, but there was a 4-week break between the last two sessions, allowing the mothers to practice independently as a transition from the end of intervention to home practice. After the end of 8 weeks, the mothers delivered mindfulness training to their children with the support of the trainer through home visits and online meetings. The results revealed improvements in the children's overall behaviors and anxiety.

As introduced in the earlier section, the Soles of the Feet (SoF) program adopts a one-to-one approach to training children with ASD or ID and their parents. In a study with a multiple-baseline design, 1 month after receiving SoF training, the mothers taught their three adolescents with ASD to practice the SoF approach to self-manage their physical aggression at home and during community outings (Singh et al., 2011b). Following baseline observations of the adolescents' aggressive behaviors, the mothers taught them the SoF practice in a 15-min session daily for 5 days and prompted them to follow the SoF practice when they anticipated the children's anger or aggression. The adolescents were provided with audiotapes for self-practice outside of the training sessions and were required to practice twice a day and whenever an incident occurred that could elicit aggressive behavior. The results showed that the three adolescents reached the training outcome of no aggressive behaviors for three consecutive weeks during week 17, 22, and 24, and all three of them maintained the lack of aggressive behaviors during the 4-year follow-up. In another study using a similar research design and methodology, three adolescents with autism were taught by their mothers to use the SoF procedure to self-manage their aggression (Singh et al., 2011a). Compared with the adolescents in the previous study, these adolescents with autism took longer to achieve the training outcome of no aggression for four consecutive weeks and displayed a few aggressive behaviors during the 3-year follow-up.

In another such study, Ahemaitijiang et al. (2020) taught mothers of three Chinese adolescents with ASD a foundational meditation practice before teaching them the SoF practice. The results showed clear benefits of the SoF practice, and the adolescents' frequency of physical aggression and destructive behavior decreased to zero and was maintained at this level during the 12-month follow-up. This study thus demonstrated the applicability of the SoF practice in mainland Chinese culture.

Studies on mindfulness training of individuals with ID are scarce and are mostly based on adult samples. In a small waitlist RCT, 34 individuals aged 17–31 years with mild ID were randomly assigned to either the SoF group or a waitlist control group (Singh et al., 2013a). The results showed that verbal and physical aggression were significantly reduced only in the SoF group, and that the waitlist group showed similar reductions when they were provided training in SoF. This suggests that mindfulness training is effective for late adolescents, but evidence on its effectiveness in younger children is still lacking.

The benefits of integrating mindfulness in health promotion programs for children with ID were evaluated in a pilot study of 32 overweight or obese adolescents (Myers et al., 2018). This program included a 10-week training to the parents via online platform and the content including mindfulness practice and health education including physical exercise, healthy eating and nutrition, mindful eating, mindful responses to thoughts of hunger, and a mindfulness practice to control the urge to eat. Parents delivered the training to their children afterwards. The 30 participants who successfully completed the whole program lost an average of 38.27 lb (17.36 kg) by the end of intervention and maintained their target weight for four consecutive years.

Another such study evaluated the effectiveness of an MBP in a sample of 14 school students aged 9–12 years with severe learning difficulties and borderline IQ (Malboeuf-Hurtubise et al., 2018). The program consisted of eight 1-h sessions and was adapted to the developmental level of the students. Unexpectedly, the students reported a significant reduction in need satisfaction after the program. This suggests issues in the implementation and study of mindfulness training among children with ID, including potential harmful effects, inadequate language adaptation for special-needs children, and selection of meaningful outcome measure in match with the target population.

In summary, studies on the efficacy of MBPs in children with ASD and ID are limited in the literature. A meta-analysis concluded that children with ASD demonstrate fewer short-term benefits from mindfulness practice relative to adult cohorts. However, they may benefit from indirect effects of the mindful parenting that their parents are usually trained for in a parallel intervention (Hartley et al., 2019). It is therefore recommended that parents also receive training in mindful parenting during their children's mindfulness training. Currently, there is no evidence supporting the application of mindfulness training to children with ASD or ID alone; thus, practitioners should be aware of the potential risks of delivering mindfulness to this special-needs population. Notably, mindfulness training can be provided for parents and caregivers alone if such a training is deemed infeasible for their children with ASD or ID. Studies on mindfulness training for the parents of children with ASD or ID are discussed in a following section.

Anxiety and Depression

Anxiety and depressive disorders are common mental disorders, and the effects of MBSR/MBCT on these disorders are well studied in adult populations. There is also increasing interest in the application of MBPs to treat child anxiety and depression in view of their potential benefits in emotion regulation for children experiencing emotional challenges. In addition to several early attempts in developing MBCT for children (Semple et al., 2010) and a clinical trial of an MBP for adolescent outpatients (Biegel et al., 2009), which has been reviewed in an earlier section, evidence of the efficacy of MBPs in school-going population and clinical samples is accumulating. Three recent systematic reviews and meta-analyses have reported the effects of MBPs on anxiety and depression in children (Borquist-Conlon et al., 2019; Chi et al., 2018; Odgers et al., 2020). Borquist-Conlon et al.'s (2019) review of five studies revealed a moderate and significant effect of mindfulness on anxiety disorders in children ($g = .62$). Furthermore, Odgers et al.'s (2020) review of 20 studies identified a small positive effect of MBPs on anxiety at posttreatment ($d = .26$), but RCTs conducted in Western countries demonstrated no significant effects of MBPs compared with control interventions ($d = .05$). In fact, the posttreatment effect on adolescents ($d = .21$) was smaller than children ($d = .21$) and the effect was further reduced when compared to passive control intervention ($d = .33$) and active control intervention ($d = .12$), respectively. The effect size in clinical samples was weak ($d = .13$). Two authors provided contrasting conclusions on the effects of mindfulness on child anxiety. As the number of rigorous RCTs is limited, further studies are warranted for a clearer picture of the effectiveness of MBPs on anxiety in children.

Chi et al.'s (2018) review of 18 studies identified a moderate effect of an MBP in reducing the depressive symptoms at posttreatment ($g = .45$), but effects at follow-up were not significant ($g = .24$). Notably, although the review included studies on adolescents and young adults, the moderating effect of participants' age was not significant and therefore, the conclusion is likely applicable to adolescents.

Lastly, it should be emphasized that many studies in this research area assessed anxiety and depression symptoms in general child and adolescent populations, and not on those with psychiatric diagnoses. Thus, robust RCTs with well-defined control groups and studies focusing on clinical populations in this age range are warranted.

Aggression and Disruptive Behaviors

Several studies have provided evidence of the effects of MBPs on reducing aggression in children and adolescents. Tao et al.'s (2021) meta-analysis of 18 studies identified that mindfulness had a moderate effect size on aggression. In subgroup analyses, clinical samples ($g = .59$) were found to benefit more from MBPs than nonclinical samples ($g = .45$). However, it should be emphasized that very few studies on the effects of MBPs on aggression had an RCT design and that many studies applied a single-subject design that has a limitation of small sample size. Furthermore, different procedures were adopted to deliver the interventions across studies, which makes a direct comparison of effects more challenging.

Other Chronic Conditions

A small pilot study investigated the effects of an MBP on 20 adolescents aged 13–17 years with chronic pain (Waelde et al., 2017). The results indicated no significant changes in pain or depression, but functional disability and the frequency of pain-related functioning complaints improved, with small effect sizes. However, this study had a small sample size and lacked a control group for comparison.

Another study tested the effects of MBSR on 72 HIV-infected youth aged 14–22 years using an RCT design (Webb et al., 2018). The MBSR group reported higher levels of mindfulness, problem-solving coping, life satisfaction, and lower aggression than the control group at the 3-month follow-up. The participants from the mindfulness group were also more likely to have reductions in HIV viral load at the 3-month follow-up than those in the control group, suggesting better HIV disease control, possibly due to higher levels of medication adherence.

Impact of Mindfulness Training for Parents and Teachers on Children

Many studies have evaluated MBPs for parents and teachers, especially those of children with developmental disabilities. However, many of these studies focused on the effects on the adults (parents and teachers) themselves and not on their children. This section discusses studies that have investigated the transferability of program effects on children.

Parents

Mindful parenting, a concept first proposed by Jon Kabat-Zinn and Myla Kabat-Zinn (2014), is defined as the ability to intentionally and nonjudgmentally pay attention to children and parenting in the present moment. It is a continuous process through which parents can develop greater awareness of their child's unique nature, feelings, and needs and a stronger ability to be present and listen with full attention; this further helps them to recognize and accept things as they are in each moment, whether pleasant or unpleasant, recognize their own reactive impulses, and learn to respond more appropriately and imaginatively with greater clarity and kindness (Kabat-Zinn & Kabat-Zinn, 2021). An increasing number of studies have found that mindful parenting can benefit both parents and children. A recent study found that mindful parenting can be assessed in four dimensions: compassion for the child, nonjudgmental acceptance of parenting, emotional awareness in parenting, and listening with full attention (Lo et al., 2018). Mindful parenting is associated with better child well-being, including the physical, emotional, mental, social, and behavioral aspects, and reduced psychopathological symptoms, including internalizing and externalizing problems (Parent et al., 2016; Turpyn & Chaplin, 2016).

A recent meta-analysis suggested that MBPs for parents significantly reduce parenting stress and psychological symptoms and have a positive influence on children's development, psychological functioning, and overall quality of life (Burgdorf et al., 2019). Bögels and Emerson (2018) emphasized that most mindfulness-based interventions are directed toward the individuals themselves; however, there is growing evidence supporting that individual mindfulness improves relational functioning. This explains how mindfulness in parents can improve child outcomes, possibly via stress regulation within family relations. This suggests that mindfulness-based interventions should target not only the individual with a health condition, but also the whole family system, including other family members and their interrelationships.

Unlike MBSR and MBCT for general adult populations, there is no standardized program for parents or families. As an early initiative, Bögels and Restifo (2014) developed a Mindful Parenting program that largely retains the content and structure of the MBCT program. All mindfulness practices (body scan, mindful eating, 3-min breathing space, and mindful sitting) and yoga exercises from MBCT are included and adapted to the parenting context, such as automatic pilot parenting, parental doing and being mode, parental self-compassion, and beginner's mind in parenting. Specific in-session and homework practices are added to promote mindful parenting. One example of an informal home practice is to observe one's child with a beginner's mind, after experiencing the use of nonjudgmental awareness in the raisin exercise in the first session. Parents are encouraged to become aware of automatic patterns in their interactions with their child and to use breathing space to delay automatic reactions to their children. After all core mindfulness practices are introduced, the theme of conflict in parent–child relationship is included in class 6, and mindful limit-setting in parenting is addressed in class 7. Consistent with MBCT, parents are asked to maintain formal and informal practices at home, six times per week for approximately 1 h each time.

In the MYmind program that is specifically developed for children with ADHD and ASD and their parents, there is an interesting mindfulness practice called "distraction exercise" that can be especially useful in the parenting context. In this exercise, the children take turns being the "meditators" versus the "distractors," and the meditators sit in a small circle with the trainer leading a meditation practice focusing on the breath, while the distractors walk around the room and make various distracting noises. The meditators experience how hard it is to keep meditating with all these distractors around them. This exercise can help parents monitor improvements in their children's ability to sustain focused attention on the breath after a few weeks of practice and develop a nonjudgmental acceptance toward children.

Another study investigated the acceptability and effects of the 8-week Mindful Parenting program in mental health care using a waitlist-controlled design (Bögels et al., 2013). Eighty-six parents were referred to the program because of their children's and/or their own psychopathological symptoms. Post-intervention improvements were observed in the children's internalizing and externalizing problems and were generally maintained at follow-up. A follow-up study compared the effects of the program as a preventive intervention for 98 parents who experienced parental stress or problems (nonclinical sample) with those of a curative intervention for 87 parents in mental health care for their own or their children's psychiatric problems (clinical sample). At baseline, the parents from the nonclinical sample showed greater well-being and fewer behavior problems but similar levels of parental stress levels, parental overreactivity, mindful parenting, and partner relationship when compared with the parents in the clinical sample. The results further revealed improvements in child well-being and behavior problems with small effect sizes and improvements in child functioning were associated with improved mindful parenting, suggesting the transferability of MBP for parent effect on children.

In a recent study, this Mindful Parenting program was delivered to Chinese parents of children with a clinical disorder (Liu et al., 2021). One hundred and thirteen parents of children with ADHD were randomly assigned to the 8-week program or treatment-as-usual. The children of parents from the mindfulness group showed significant improvements in hyperactivity, conduct, and learning problems, although the children had not participated in the MBP. Notably, the children from the treatment-as-usual group also experienced improvements, albeit to a lesser extent, indicating no significant between-group differences.

Some practitioners and researchers have explored alternative program structures as many parents who are working full-time or preoccupied with household chores may find participating in an 8-week intensive program challenging. A few brief mindfulness programs have been developed for this purpose and are also consistent with the low-intensity public health intervention approach, which is more cost-effective for the health and social care system (Dykens et al., 2014; Neece, 2014). Lo et al. (2017) developed a brief MBP consisting of one 1.5-h session per week for 6 weeks. The program includes all mindfulness practices, including body scan, mindful stretching, mindful sitting, loving-kindness exercise, and informal practice (mindful eating and mindful walking), followed by brief practice enquiry and psychoeducation for stress management in parents. In the study, parents were encouraged to perform 10 min of home practice daily using audio files. In a feasibility study, 180 eligible parents of children with developmental disability were recruited and were allocated to the intervention group or treatment-as-usual. The results indicated significant improvement in stress from dysfunctional parent–child interactions but not in children's behavioral problems.

Inspired by these outcomes, Lo et al. (2020) developed a family-based mindfulness intervention that integrated the brief MBP for parents with an 8-session MBP for children (Snel, 2014). The first clinical trial was conducted in children with ADHD symptomology and their parents, the outcomes of which are reported in the previous section (Lo et al., 2020). The second trial was conducted in 102 children aged 5–7 years and their parents from economically disadvantaged families, using a waitlist randomized controlled trial (Lo et al., 2019). The children from the mindfulness group showed more significant improvements in attention and self-regulation than those from the control group. In addition, saliva samples to measure cortisol levels were collected from some randomly selected dyads to investigate whether their improvements were related to the mindfulness program. The children from the mindfulness group showed increased morning cortisol levels and decreased diurnal cortisol slopes, suggesting that this brief family-based MBP benefited the children's neuroendocrine functioning (Ho et al., 2020).

Finally, it should be emphasized that most of the MBPs for children with ADHD or ASD also targeted their parents. This suggests that the involvement of parents in mindfulness programs is crucial to transfer the benefits of the program to children, especially young children and those with special needs.

Teachers

Many studies have investigated the effects of MBPs on teachers' well-being, including psychological stress, burnout, and teaching practices (Hwang et al., 2017). However, most of the studies on MBPs for teachers have measured the effects on teacher variables, while few have evaluated the impact on students. In a small study, Singh et al. (2013b) evaluated the benefits of an 8-week MBP in three teachers and the effects on 18 preschool children with mild ID. When compared with baseline, the students showed significant reduction in socially unacceptable behaviors, enhancement of compliance with teacher requests, and improvement in social interactions with peers after the teachers' mindfulness training.

In a large cluster RCT involving 185 teachers across 20 Australian schools, Hwang et al. (2019a, b) evaluated the effects of an 8-week MBP on teachers' well-being and quality of teaching. Outcome measures included teachers' rating of their relationship with students, students' rating of their sense of relatedness to teachers, and teachers' verbal interactions with their students by independent observers. The results indicated no significant change in teachers' ratings of teacher–student relationships, but there was a significant increase in students' ratings of their sense of connectedness to teachers (Hwang et al., 2019a). Classroom observations based on a subsample of 60 teachers showed significant positive changes in person-centered teaching practices, as demonstrated by reduced teacher talk, increased indirectivity in teaching, and increased student talk immediately after the program and at the 6-week follow-up.

Another RCT evaluated the effects of an MBP on teachers in Portugal (de Carvalho et al., 2021). A follow-up study was then conducted using a subsample of 41 teachers from the intervention group and 18 teachers from the waitlist control group. Based on the subsample, 1503 students and 1494 parents from the intervention group and 947 students and 913 parents from the waitlist group were recruited to participate in the study. Compared with the control group, significant improvements were found in independent observers' ratings of the teacher's competence in engagement of students in classroom after MBP. There were also improvements in students' perceptions of the quality of their teachers' involvement in classroom relationships, student's self-reported affect, and parent-perceived social competencies, compared with the students from control group counterparts.

In sum, although the related literature is limited, evidence supports the benefits of MBPs to teachers, including positive changes in the teaching quality, teacher–student interactions, and students' social–emotional well-being. As suggested by a mindfulness educator, it would be more helpful for teachers to be mindful and to teach mindfully, before they equip themselves with additional knowledge and skills to teach mindfulness to students (Hawkins, 2017).

Conclusions

Evidence on child mindfulness-based programs has been accumulating rapidly in the last two decades. Practitioners and researchers are investigating strategies for effective program adaption and implementation to the different target populations. Due to the early developmental stage of children and the multicomponent structure of child mindfulness programs, research on children mindfulness programs can be challenging. Thus, caution should be exercised when considering MBPs as an intervention for this population. Mindfulness is an experiential and embodied practice that requires the person delivering the program to not only follow a regular disciplined personal meditation practice but also have extensive knowledge about developmental psychology and various physical or mental health conditions that may affect children's capacity to practice mindfulness. Proper program implementation and professional training are important to ensure that children benefit from such an innovative approach.

Several published studies on MBPs have adopted rigorous randomized controlled designs, large sample sizes, assessment of multiple outcome measures, and replications in other sociocultural contexts. However, some studies showing positive outcomes were conducted in clinical populations, had smaller sample sizes, and had integrated other components such as positive psychology and social–emotional learning components in the MBP. Children reporting more clinical symptoms may exhibit greater benefits of mindfulness than their healthy counterparts. Further, studies have shown that early adolescents report fewer benefits than individuals of other age ranges, indicating that the mindfulness protocols should be adequately adapted to the target population. As there are increasing attempts to apply mindfulness programs as health promotion programs in schools, practical issues such as intervention fidelity, implementation quality, dosage, and contextual and structural factors to improve program effectiveness warrant more attention in future studies. Finally, it is challenging to measure changes or improvements due to an MBP, especially when the program has multiple components, and it cannot be ascertained whether the observed changes are attributable to the mindfulness practices. It is likely that some children may not find mindfulness appealing; thus, practitioners and researchers should find a balance between motivating the students to practice and respecting their choice and freedom. Some children may also benefit indirectly from mindfulness training delivered to their parents and teachers.

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23

Family Therapy

Alan Carr

Introduction

Family therapy is an approach to clinical practice that involves conceptualizing individual psychological problems and their treatment within a family context (Fiese et al., 2019; Wampler, 2020). It is one of a number of interventions for child and adolescent problems in which parents play a key role (Carr, 2019). Other family-based interventions include parent-child psychotherapy and parent training. These are considered elsewhere in this volume.

Family therapy emerged simultaneously in the 1950s in the USA and the UK within a variety of different professional, therapeutic, and research traditions (Carr, 2012, 2015). The central insight that intellectually united the pioneers of the family therapy movement was that psychological difficulties are essentially interpersonal, not intrapsychic. Therefore, their resolution requires an approach to intervention which directly addresses relationships between people. This insight contravened the prevailing view that all psychological problems are manifestations of essentially individual disorders and so require individually focused psychodynamic, behavioral, client-centered, or biomedical interventions.

Family therapy was developed partly in response to the ineffectiveness, in some cases, of individually oriented treatment approaches, and partly in response to research findings which indicated that family factors contribute to the etiology of psychological disorders. To inform their approach to clinical work with families, the pioneers of family therapy drew on insights from general systems theory and cybernetics. Ludwig von Bertalanffy (1968), in general systems theory, proposed that in any biological or social system the whole is more than the sum of its parts. Therefore, any element of a system can best be understood with reference to the system as a whole. Applied to families, this principle suggested that one family member's problematic behavior, beliefs, or feelings, can most usefully be understood with reference to the behavior, beliefs, or feelings of other family members.

Norbert Wiener (1961), in his cybernetic theory, proposed that mechanical systems use feedback to remain stable (i.e., to maintain homeostasis) or to adapt to new circumstances so as to achieve goals (i.e., to achieve morphogenesis). The implication of this principle for family systems is that families use feedback to balance the tendency to maintain stability with the need to adapt to the changing

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demands of the family life cycle. In line with this principle, family therapy pioneers suggested that in some instances problematic behavior, beliefs, or feelings of one family member may serve the useful function of helping the whole family maintain stability when it lacks the resources for adaptive change. For example, a child's behavior problems may motivate parents experiencing marital distress to postpone separation, so as to jointly manage their child's problematic behavior.

In the early years of the family therapy movement, there was no single shared unified, integrated overarching framework. Rather, a range of models of family therapy were developed by a number of skilled clinicians, drawing on insights from systems theory and cybernetics combined with observations made while conducting family therapy in clinical practice. These models may be classified into three groups in terms of their primary emphasis (Carr, 2012). Some models focused predominantly on problem-maintaining relational patterns and methods of disrupting these rigid repetitive cycles of family interaction. For example, structural and strategic family therapy (Haley, 1976; Jackson & Landers, 2020; Minuchin, 1974). Others addressed family members' belief systems, scripts, and narratives about the causes of and solutions to psychological problems and the most appropriate way for family members to manage distress and conduct their relationships which underpinned problem-maintaining relational patterns. For example, social constructionist and narrative approaches to family therapy (Anderson, 1997; Chenail et al., 2020; White & Epston, 1990). A third focus of therapeutic concern in some early family therapy models was understanding and addressing the broader historical and social context out of which problem-related belief systems, scripts, and narratives and rigid problem-maintaining relational patterns had emerged. For example, transgenerational and psychoanalytic family therapy approaches (Boszormenyi-Nagy & Spark, 1973; Bowen, 1985; Hargrave & Houltberg, 2020; Slipp, 1988). Early models of family therapy laid the foundation for contemporary integrative, research-informed, or evidence-based models of family therapy practice, which are the main focus of this chapter. Contemporary models are integrative in that they synthesize ideas and practices from a range of earlier family therapy models. They are also evidence-based, and/or research-informed, unlike early models which relied predominantly on clinical observation and case studies. Pioneers of family therapy trained the next generation of family therapists who developed contemporary models through a process of live demonstration and live supervision using video recording and one-way mirrors (Liddle et al., 1988). This approach to training and supervision was a major innovation in the wider field of psychotherapy.

The effectiveness of family therapy for child and adolescent clinical problems is supported by a growing evidence base. In a meta-analysis of 56 studies, Riedinger et al. (2017) found that family therapy was an effective intervention for a range of child and adolescent problems including externalizing behavior problems such as disruptive behavior and substance use disorders, internalizing behavior problems such as depression and anxiety, and eating disorders. Family therapy showed small-to-medium effects in comparison with waiting list control groups and alternative interventions after treatment and at follow-up. At follow-up, longer interventions produced larger effect sizes. These results are consistent with those of extensive narrative and systematic reviews (Carr, 2019; Retzlaff et al., 2013; von Sydow et al., 2013). There is preliminary evidence to support the provision of family therapy online using video-conferencing technology (McLean et al., 2021).

A number of factors common to many different models of family therapy for different types of disorders across the lifespan may underpin its effectiveness (D'Aniello & Fife, 2020). These include convening regular family sessions; establishing therapeutic alliances with, and between family members; reframing child-focused problems in relational terms; disrupting dysfunctional problem-maintaining, relational patterns; mobilizing family members to collaborate in resolving the presenting problem; and empowering families to use lessons learned in family therapy to prevent relapse. Of these common factors that contribute to the effectiveness of family therapy, establishing a therapeutic alliance with, and between, family members has a particularly strong evidence base. For example, in a meta-analysis of studies of 40 samples involving over 4000 families, Friedlander et al. (2018) found moderate correlations between therapeutic alliances with, and between, family members on the one hand, and therapy outcome on the other.

While common factors contribute to the effectiveness of family therapy, these operate through model-specific factors. For example, the common factor of disrupting family-maintaining relational patterns is operationalized in different ways in functional family therapy (FFT) for conduct problems (Sexton, 2019) and attachment-based family therapy (ABFT) for depression (Diamond et al., 2016). This is partly because different types of relational patterns maintain depression and conduct problems. Most contemporary evidence-based or research-informed models of family therapy have been developed to address specific clinical problems. In the remainder of this chapter, some examples of such models will be presented with reference to supporting evidence.

Delinquency and Disruptive Behavior Disorders

FFT (Sexton, 2019) and Multisystemic Therapy (MST, Henggeler & Schaeffer, 2019) are two family therapy models that were developed initially to treat juvenile delinquency and adolescent disruptive behavior disorders. FFT was the first clearly articulated integrative evidence-based model in the field of family therapy, having emerged in the 1970s. MST was developed in the 1980s and currently has the largest evidence base of any family therapy model.

Functional Family Therapy

FFT was developed initially by James Alexander at the University of Utah and more recently by Tom Sexton at the University of Indiana (Alexander et al., 2013; Robins et al., 2016; Sexton, 2011, 2019). It was designed to prevent recidivism in young offenders. FFT is disseminated by FFT-LLC (http://www.fftllc.com) and FFT associates (http://www.functionalfamilytherapy.com).

FFT is based on an ecological multifactorial model which highlights the role of risk and protective factors in the etiology of delinquency and prosocial behavior (Alexander et al., 2013; Sexton, 2019). Recursive relational interaction patterns within the family are assumed to maintain adolescent prosocial and antisocial behavior. Family members' vulnerability to engaging in these interaction patterns are assumed to be influenced by experiential-developmental and biological-constitutional factors. Factors within the wider social network (including the extended family, school, peer group, and community) also are assumed to influence the development and maintenance of adolescent prosocial and antisocial behavior.

The FFT theoretical model is informed by five core principles (Sexton, 2019). First, all family members' behavior, including adolescent antisocial behavior, occurs as part of a relational system with multiple, mutually interactive components including adolescents, parents, siblings, extended family members, and the community. Adolescent problem behavior is more likely to occur in families and social systems where the influence of risk factors is greater than that of protective factors, whereas a preponderance of protective factors supports the development of prosocial behavior. Second, relational patterns are a central feature of family relationships. Relational patterns are behavioral sequences among family members that, over time, become routine ways of interacting. Families develop relational patterns in an attempt to adapt to life events. Some such events are normal, for example, family life-cycle transitions such as the birth of the first child. Others are abnormal, for example, trauma. Clinical problems are maintained by relational patterns that incorporate a family's ineffective attempts to adapt to life events. For example, parents may unsuccessfully attempt to reduce adolescent aggression with corporal punishment, which inadvertently maintains the young person's aggression. Third, family members' attributions and narratives about relational patterns in which problem behaviors occur contribute to the development and maintenance of clinical problems. For example, parents may attribute a child's aggressive behavior to the child's wish to annoy them or inappropriately get their attention. They may also attribute the child's failure to respond to corporal punishment with less aggressive behavior as an indication that the child needs more severe physical punishment in order to become less aggressive. This narrative about "a bad attention-seeking or willful child needing more severe corporal punishment in order to learn how to be less aggressive" may contribute to the maintenance of the relational pattern that maintains the child's aggressive behavior. This narrative keeps the family "stuck." Fourth, young people's clinical problems are essentially family problems, because they are embedded in relational patterns. For example, a young person's aggressive behavior may be embedded in a family relational pattern, such as receiving corporal punishment from a parent for behaving aggressively. This relational pattern may be subserved by a family narrative that physical punishment is the appropriate solution for the child's problematic aggression. These sorts of family relational patterns tend to become very stable once established and maintain the young person's clinical problem. FFT adopts a family-based approach to intervention to disrupt these problem-maintaining relational patterns and subserving attributions and narratives. Fifth, homeostatic problem-maintaining relational patterns remain stable because they fulfill relationship functions for family members. In FFT, it is assumed that families vary in the level of (1) emotional connection and (2) relational hierarchy that they require for family stability. The relational patterns that family members engage in have the function of helping them maintain the level of emotional connection and relational hierarchy that they feel comfortable with. Some families feel comfortable with a high level of connection (high emotional closeness and intensity). Others will feel comfortable with a low level of connection (high emotional independence and low emotional intensity). A third type of family feels comfortable when their relational patterns help them to "midpoint" by achieving both emotional closeness and emotional independence. With regard to relational hierarchy, some families feel comfortable with a set of relationships in which power is shared equally. In this context, power may be economic, physical, or role-related. Other families may feel comfortable with relationships in which one or more family members have greater power than other family members. In FFT, there is no attempt to change a family's preference for high or low levels of connection or hierarchy. Rather, therapists assess the function of problem-maintaining relational patters in helping a family achieve certain levels of connection and hierarchy. They then help families maintain their preferred levels of connection and hierarchy, by facilitating the use of other relational patterns that do not involve maintaining the young person's antisocial behavior. For example, in a family where corporal punishment is used to address adolescent aggression, and this relational pattern meets the family's need for a low level of emotional connection and a high level of relational hierarchy, contingency contracting may be offered as an alternative way of fulfilling these relational functions. However, in a family with similar problems, but where the relational pattern meets the family's need for a high level of emotional connection and a moderate level of relational hierarchy, fulfilling these relational functions could be met by facilitating regular periods of parent-adolescent quality time in addition to contingency contracting.

The FFT clinical intervention model which guides treatment incorporates concepts and practices from attribution theory (Jaspers et al., 1983) and a variety of earlier models of family systems therapy. These include behavioral family therapy (Merrill et al., 2019), the Mental Research Institute brief therapy (Fisch et al., 1982), Milan systemic family therapy (Selvini-Palazzoli et al., 1978), and social constructionist family therapy (Anderson, 1997). The FFT clinical intervention model is based on five principles (Sexton, 2019). First, successful intervention involves developing a strong alliance with each family member and between members of the family. Helping family members develop shared goals is central to strengthening the alliances between family members. Second, therapeutic change occurs in phases. These include the initial engagement and motivation phase; the behavior change phase in which new skills are developed; and the concluding generalization phase in which families apply competencies developed in the middle phase of treatment to challenging new situations. (The phases of FFT will be elaborated below.) Third, treatment goals are achievable; fit with clients' priorities, values, and culture; and modify risk and protective factors relevant to the presenting problems and relational patterns that maintain them. These goals may appear to be small, for example, reducing blaming within the family, or increasing positive parental monitoring of adolescents behavior. However, such goals can have a significant, cumulative, long-term impact on family functioning and presenting problems, by, for example, reducing the frequency and intensity of episodes of family violence. Fourth, in FFT therapists and clients form a collaborative expert team. Therapists are experts on therapeutic change. Clients are experts on their own lives, including their culture, values, style, and unique characteristics, history, and goals. Fifth, families are helped to achieve their goals by using web-based session-by-session measures of progress to inform clinical decision making. Where session-by-session measures indicate that little progress is being made, reasons for this are explored and interventions to address obstacles to progress are implemented.

The FFT clinical intervention model consists of three phases: engagement and motivation, behavior change, and generalization (Sexton, 2019). In the engagement and motivation phase, there is a focus on building alliances with, and between, family members. Therapists use empathy, positive regard, and other interpersonal skills to form strong alliances with family members, so that each family member experiences the therapist as understanding and supporting them. Therapists facilitate alliances between family members and reduce intrafamilial negative attributions and blame through relational reframing. Problematic behaviors and interaction patterns are reframed to reflect noble, yet misguided intentions. For example, anger and criticism may be reframed as expressions of emotional hurt, love, and concern. Over the course of therapy, relational reframing is repeatedly used in FFT to help families construct and "own" positive relational themes such as parents being invested in supporting their adolescent's wish to achieve greater independence and young people looking for ways to express a need for autonomy. Therapists also facilitate alliances between family members by helping them negotiate shared goals.

In the behavior change phase, therapists help families develop specific behavioral competencies such as communication and problem-solving skills, conflict management, contingency contracting, and parenting skills to disrupt maladaptive relational patterns which maintain problem behavior. These skills are not taught as a step-by-step curriculum. Rather, families are coached in using these skills to address day-to-day problems that they mention in therapy sessions. Therapists match the competences and protective factors that they help families develop to family needs. They also help them develop ways of using skills that meet the levels of relational connection and hierarchy that they feel comfortable with.

In the generalization phase, the skills acquired in the behavior change phase are generalized to contexts beyond those involved in the family's initial presenting problems and to anticipated future challenges. Families are supported to apply problem-solving, communication, and conflict management skills learned for addressing adolescent antisocial behavior, to managing other conflictual relationships, for example, with members of the extended family. Relapse prevention, and managing "slips" so they do not snowball into full-blown relapses, is central to the generalization phase of therapy. Future challenges are anticipated and planned for, and other relevant community supports are accessed if necessary. Protective factors and skills developed in the second phase are consolidated. The aim of the generalization phase is for families to stabilize gains made in the second phase and develop a sense of mastery about their capacity to manage novel challenges. In each phase of FFT, therapists alternately assess and intervene to reduce risk factors and build on family strengths and protective factors, with the overall aim of increasing adolescent prosocial behavior and reducing antisocial behavior.

In FFT, a secure web-based information system – FFT-Care4 – is used to aid clinical decision making and session planning. Each week therapists receive web-based feedback from family members, based on their responses to short measures of symptoms, session impact, and progress. Feedback is presented on a "dashboard" which gives the status of the young person's symptoms, session progress, and family functioning; clinical alerts, for example, running away; and detailed reports showing change in symptoms, therapy impact, and progress of each family member.

FFT is usually provided by teams of 3–8 therapists. Therapists carry caseloads of 12–15 families. Whole family sessions are conducted on a weekly basis. Treatment spans 8–30 sessions over 3–6 months. Sessions are convened in clinic, home, and community locations. To ensure treatment fidelity, therapists are trained and supervised by FFT training organizations. Adherence to the FFT model is assessed regularly in telephone supervision sessions.

FFT is a well-validated, evidence-based, widely disseminated, and strengths-oriented secondary prevention program for adolescent delinquency (Alexander et al., 2013; Hartnett et al., 2017; Robbins et al., 2016; Robbins, & Turner, 2019; Sexton, 2019). It is widely disseminated, supported by over 30 outcome evaluations, and a dozen economic evaluations. There are more than 340 FFT dissemination sites in 12 countries serving more than 50,000 families annually, and independent economic analyses indicated that communities served by these FFT sites save over a billion US dollars annually from avoided incarcerations and four billion US dollars in avoided victim-related costs (Robbins & Turner, 2019).

In a meta-analysis of 14 published and unpublished FFT trials involving over 1600 cases, Hartnett et al. (2017) found that FFT led to significant reductions in antisocial behavior compared with untreated controls and well-defined alternative treatments such as cognitive behavior therapy, other models of family therapy, and individual and group therapy for adolescents. In a systematic review of 27 FFT-published and unpublished clinical trials involving over 2800 cases, Alexander et al. (2013) concluded that FFT is effective in reducing recidivism by up to 70% in adolescent offenders from a variety of ethnic groups over follow-up periods of up to 5 years, compared with those receiving routine or alternative services. It also leads to a reduction in antisocial behavior in siblings of offenders. Other positive outcomes included reduced adolescent substance use and improved adolescent and family adjustment. In a review of large-scale effectiveness studies, Sexton (2016) found that FFT was significantly less expensive per case than juvenile detention or residential treatment and also led to crime and victim cost savings. He also concluded that, in a large-scale effectiveness study, the drop-out rate from functional family therapy was about 10% compared to drop-out rates of 50–70% in routine community treatment of adolescent offenders. A final conclusion was that better outcomes occurred where therapists implemented the FFT model with a high degree of fidelity. Against this backdrop of positive outcome results, it is worth noting that there has been controversy about the methodological quality of reviews of the evidence base for FFT (Robbins & Turner, 2019; Weisman & Montgomery, 2019a, b). My opinion on this controversy is that while there is supportive evidence for the effectiveness of FFT in reducing adolescent antisocial behavior, more well-designed large-scale studies would enhance support for this model.

Multisystemic Therapy

MST was developed at the Medical University of South Carolina by Scott Henggeler and his team initially as a treatment for juvenile delinquency (Henggeler et al., 2009). MST has subsequently been adapted to help families of adolescents with a range of problems including substance use, sexual offending, severe mental health problems, self-harm, nonadherence to regimes for managing chronic medical conditions including diabetes, asthma, HIV, and obesity, and families at risk of child abuse (Henggeler & Schaeffer, 2019). MST is disseminated by MST services (http://mstservices.com).

Following Bronfenbrenner's (1979) social ecological theory, in MST it is assumed children's psychological problems are affected by a range of risk and protective factors in multiple nested social systems (like Russian dolls). These nested systems include the child, family, peer group, school, medical, social and juvenile justice systems, and neighborhood. In MST, relevant risk and protective factors are assessed in real-world settings (the home, school, and neighborhood) using information from multiple sources (child, parents, teachers, and involved professionals). Interventions involving the child, family, and members of the child's social system are implemented to enhance protective factors and reduce risk factors.

For example, in cases of delinquency the most common factors that maintain adolescents' antisocial behavior are ineffective parenting, deviant peer group membership, and underachievement in school. MST interventions help parents develop effective parenting practices; young people develop skills to avoid deviant peer group membership and engage with prosocial peers; and schools improve the fit between young people's educational needs and the way that they are instructed. Parents are supported to overcome barriers to effective parenting such as substance use and low motivation. The effects of interventions are monitored regularly. Where interventions are ineffective, they are modified until success is achieved. Families are supported to sustain effective interventions to prevent relapse.

In MST, intensive family therapy is combined with individual skills training for adolescents and intervention in the wider school and interagency network. Interventions must fit with the child's social ecology and stage of development and be based on empirically validated pragmatic therapeutic practices. Structural (Minuchin, 1974), strategic (Haley, 1976), and behavioral (Merrill et al., 2019) family therapy interventions are used to enhance family functioning. Systemic consultations are used to enhance co-operative interagency working where professionals from multiple agencies are involved. Individually focused components of treatment programs commonly include cognitive behavior therapy (CBT) to improve self-regulation of anxiety, depression, and impulsivity (Friedberg & McClure, 2015). CBT and social skills training are conducted to enhance adolescents' ability to resist deviant peer group influences and engage with prosocial peers. When required, remedial tuition and study skills training are used to promote academic attainment. Contingency management is incorporated into MST for substance use (Henggeler et al., 2012). Safety planning is incorporated into MST for families at risk for child maltreatment (Swenson & Schaeffer, 2012) and families of adolescents with problem sexual behavior (Borduin et al., 2009) or significant mental health problems such as psychosis and suicidality (Henggeler et al., 2002). For chronic health conditions including diabetes (Ellis et al., 2012), asthma (Naar-King et al., 2014), HIV infection (Letourneau et al., 2013), and obesity (Naar-King et al., 2009), MST incorporates interventions to target barriers to medical treatment adherence.

Clinical practice in MST is individualized to meet the specific needs of particular families. It is guided by nine treatment principles (Henggeler & Schaeffer, 2019). First, therapists assess how presenting problems (and successes) "fit" or make sense within the context of the family and the wider social system. They help adolescents, families, and involved professionals understand how adolescents' problems are maintained by recursive sequences of interaction within the youngster's family and social network. Second, there is a focus on the role of strengths in facilitating positive change and recovery. That is, individual and family strengths are used to develop and implement action plans. Third, interventions are designed to increase responsible behavior of family members. Fourth, interventions help family members identify actions that may be taken to solve clearly defined problems. MST focuses on the present rather than facilitating insight into the past. Fifth, interventions aim to change sequences of behavior of members of the family and social system that maintain presenting problems. New skills are developed to disrupt problem-maintaining patterns. Sixth, interventions are designed to be appropriate to the developmental needs of the young person. Seventh, interventions are designed to require regular daily or weekly effort leading to rapid change. This provides opportunities for frequent corrective feedback and more success experiences. Adolescents, parents, carers, and young people are supported to follow through on action plans. Eighth, in MST clinicians continuously evaluate intervention effectiveness and accept responsibility for promoting recovery. They do not label families as unmotivated or blame them for not recovering. Ninth, interventions empower family members, especially parents and caregivers, to sustain changes after leaving treatment. Families are encouraged to use newly learned skills and insights to handle new problem situations. These nine MST principles are implemented by following a recursive process of assessment, formulation, intervention development, intervention implementation, and reevaluation to help families achieve treatment goals.

MST is delivered by teams of two to four master's level therapists and a half-time doctoral or advanced master's level supervisor (Henggeler & Schaeffer, 2019). Teams are trained by the MST training organization. MST therapists receive ongoing supervision. Supervisors and therapists have periodic contact with an MST consultant. Treatment fidelity is maintained through the use of treatment and supervision manuals and regular assessment of treatment adherence. Parents or caregivers regularly complete a therapist adherence measure; therapists complete a supervisor adherence measure; and therapists and supervisors complete an MST consultants adherence measure. A web-based platform supports adherence data collection and processing. Multisystemic therapy involves regular, frequent home-based family and individual therapy sessions with additional sessions in school or community settings over 3–6 months. MST is intensive and may involve up to 100 h of direct contact with young people, their families, and members of their wider social system. Therapists carry low caseloads of 4–6 families and provide 24-h, 7-day availability for crisis management.

MST has the largest evidence base of any family therapy model and is one of the most widely disseminated (Henggeler & Schaffer, 2019). Over 50 MST outcome, implementation, and benchmarking studies have been conducted, most by independent investigators. These have yielded more than 100 peer-reviewed articles (http://mstservices.com/files/outcomestudies.pdf). There are more than 500 MST dissemination sites in 16 nations serving more than 20,000 families annually.

In a meta-analysis of 22 international studies involving over 4000 families, van der Stouwe et al. (2014) found that compared with treatment as usual, MST led to small but significant reductions in delinquency, substance use, psychopathology, out-of-home placement, family disorganization, and engagement with antisocial peers. MST was most effective for young Caucasian adolescents under the age of 15, with severe problems and in which treatment led to improvement in parenting skills. The positive effects found in this large meta-analysis by van der Stouwe et al. (2014) were smaller than those found in previous meta-analyses of fewer studies (Curtis et al., 2004, Littell, 2005). These meta-analytic findings are consistent with those from narrative reviews by Henggeler's group which showed that MST had positive effects in multiple domains including delinquency and drug misuse up to 20 years after treatment and led to significant cost saving in placement, juvenile justice, and crime victim costs (Henggeler & Schaeffer, 2016, 2017, 2019). However, Multisystemic Therapy is not more effective than treatment-as-usual in all contexts. In a large UK independent randomized controlled trial involving 684 cases, Fonagy et al. (2020) found that Multisystemic Therapy was no more effective than treatment-as-usual in reducing out-of-home placements of delinquent youth at 18 months or 5 years follow-up.

Randomized controlled trials (RCT) of adaptations of MST have shown that compared with routine services, it is an effective intervention for a number of other problems besides juvenile delinquency. These include the prevention of child maltreatment (Swenson et al., 2010), adolescent substance misuse (Henggeler et al., 2002), adolescent sexual offending (Letourneau et al., 2013), adolescent mental health problems including psychosis and suicidality (Henggeler et al., 1999, 2003; Huey Jr. et al. 2004), and nonadherence to medical regimes for chronic health conditions including diabetes (Ellis et al., 2012), asthma (Naar-King et al., 2014), HIV infection (Letourneau et al., 2013), and obesity (Naar-King et al., 2009).

Substance Use Disorders

Brief Strategic Family Therapy (BSFT; Szapocznik & Hervis, 2020) and Multidimensional Family Therapy (MDFT; Liddle, 2016) are two evidence-based family therapy models that were developed in the 1980s to treat adolescent substance use disorders.

Brief Strategic Family Therapy

BSFT was developed at the Centre for Family Studies at the University of Miami by Josè Szapocznik and his team (Anderson et al., 2019; Szapocznik & Hervis, 2020). It is disseminated by the Family Therapy Training Institute of Miami (https://brief-strategic-family-therapy.com/what-we-do/). BSFT aims to resolve adolescent drug misuse by improving family interactions that are directly related to substance use. This is achieved within the context of conjoint family therapy sessions by coaching family members to modify such interactions when they occur and to engage in more functional interactions. BSFT incorporates principles and clinical practices from structural and strategic family therapy (Haley, 1976; Jackson & Landers, 2020; Minuchin, 1974). The first principle is that families are usefully understood as systems in which the actions of one member affect all members. The second principle is that families engage in repetitive interaction patterns that are linked to adolescent drug use. Therapeutic interventions alter moment-to-moment family interactions to achieve therapeutic change. The third principle is that treatment is problem-focused and planned. Practical interventions are used to promote adaptive interactional patterns and alter maladaptive interactional patterns directly linked to adolescent problem behaviors.

The main techniques used in BSFT are engaging or joining with families, identifying or tracking maladaptive interactions and family strengths, reframing the meaning of family interaction patterns, and restructuring maladaptive family interactions. Validation, which involves showing empathy and respect, is the main technique used to join with each family member. Enactment is one of the main techniques used to track adaptive and maladaptive interaction patterns. During enactments, therapists encourage family members to talk to each other, rather than to the therapist. When the therapist observes repetitive patterns that emerge, they highlight aspects of them. For example, “Is it usually the case that then Mum and Dad talk, Anne interrupts or Jamie distracts them?” When tracking and diagnosing maladaptive interactional patterns, structural family therapy concepts are used, for example, unclear family hierarchies characterized by problematic cross-generational alliances between one parent and one child against another parent; enmeshed or overinvolved relationships; and disengaged relationships. Reframing is used to reduce conflict caused by expression of negative affect. For example, “I hate your drug use and your dirty friends!” may be reframed as “You are concerned for your son. You worry for his future. You are sacred his friends are leading him away from a good future. Tell your son how much you care about his future and how worried you are.” Reframing in this way reduces negative affect and maladaptive conflictual interaction patterns. It opens the possibility for developing more adaptive interactional patterns. Restructuring is used to change maladaptive interaction patterns. Where family members typically withdraw from negotiations before a compromise is reached, with restructuring they are encouraged to continue until a compromise is agreed. Where adolescents have more power than either parent alone, and so each parent finds they cannot effectively set limits, restructuring may be used to help parents form a strong parenting team and jointly set effective limits.

Where there are difficulties engaging with whole families, in BSFT an intervention referred to as strategic engagement is used (Coatsworth et al., 2001; Santisteban et al., 1996; Szapocznik et al., 1988). Therapists work with motivated family members to engage less motivated family members in treatment, or directly contact other family members and invite them to a meeting to address issues that are of concern to them. This latter approach is particularly effective in two scenarios. In the first, one parent (usually the mother) attends therapy and indicates that the other parent (usually the father) would have little to contribute to treatment. In such cases, strategic engagement involves phoning the father, forming an alliance with him in the phone conversation, and respectfully inviting him for a meeting to discuss his concerns about his teenager. In the second scenario, the parents attend therapy, but the adolescent does not. In such cases, strategic engagement involves phoning the adolescent, forming an alliance with them in the phone conversation and respectfully inviting them for a meeting to discuss their concerns about conflict at home, or whatever is their main concern.

BSFT was developed initially for use with minority Hispanic families. It has been disseminated to agencies that provide services to ethnically diverse communities. BSFT typically involves 16 weekly 60–75-min sessions. While it was developed for the treatment of adolescent drug use, it may also be used to address delinquency and conduct problems. BFST is supported by at least six evaluation studies. In thorough reviews of BSFT research, conducted largely in the US, Horigian et al. (2016) and Anderson et al. (2019) concluded that BSFT was effective at engaging and retaining adolescents and their families in treatment, reducing drug misuse, and improving family relationships. Therapist adherence to the BSFT clinical practice model was associated with better outcomes. Better adherence occurred in agencies that supported implementation of BSFT. A systemic model for introducing BSFT into agencies has been developed.

Multidimensional Family Therapy

MDFT was developed by Howard Liddle and his team at the Centre for Treatment Research on Adolescent Drug Abuse at the University of Miami (Liddle, 2002, 2016). It is primarily a treatment for adolescent drug misuse, although it has a positive impact on delinquency, mental health problems, and family functioning. It is disseminated by the MDFT Program (http://www.mdft.org/MDFT-Program/What-is-MDFT).

MDFT is based on systems theory (von Bertalanffy, 1968), family and developmental psychology (Fiese, 2019), and structural and strategic family therapy (Haley, 1976; Jackson & Landers, 2020; Minuchin, 1974). Ten principles guide clinical practice in MDFT (Liddle, 2002). First, adolescent drug misuse and its effective treatment are multidimensional. Drug use is influenced by personal and contextual risk and protective factors. Risk factors may be characteristics of the young person such as emotion regulation difficulties, aspects of their family such as conflict and lack of parenting teamwork, and features of the wider social system, such as membership of a drug using peer group, lack of coordination among involved health and social care agencies, and living in a socioeconomically deprived community. Protective factors may be personal strengths such as academic or athletic ability, family factors such as supportive adolescent-parent relationships, or features of the wider system, such as supportive school placements. In MDFT, the therapist assesses and modifies the balance of risk and protective factors. This involves engagement with the adolescent, parents, other relevant family members, and involved extrafamilial agencies. Second, problem situations or crises provide important assessment information and are also opportunities for clinical intervention. In MDFT, therapists capitalize on disruption of family routines that occurs during crises, for example, adolescents being arrested or overdosing, which may be platforms for therapeutic changes within the family. Third, therapeutic change is multidetermined and multifaceted. It is determined by multiple factors within the young person, their family, their wider social system, and the therapy process. It involves changes, not only in the young person, but also in their relationships with members of their social network including the family, school, peer group, and involved agencies. Therefore in MDFT, therapists facilitate therapeutic change through multiple pathways toward multiple interrelated goals. Fourth, motivation is malleable. For adolescents, their parents, and members of their wider social systems, receptiveness to engage in therapeutic change waxes and wanes. In MDFT, therapists accept resistance as a normal part of therapy, because adolescents and families find making lasting lifestyle changes challenging. Fifth, outcome-focused working relationships are central to effective treatment. In MDFT, therapists develop these relationships by enquiring about individual and family developmental tasks and articulating relational and life themes that are significant for family members. Sixth, interventions are individualized so as to alter the balance of specific risk and protective factors unique to each case and facilitate the achievement of particular therapy goals, specific to that case. Seventh, case formulations are used flexibly to plan treatment. Formulations and plans are not fixed and may be modified in light of families' responses to interventions. Eighth, treatment is conceptualized by the therapist as consisting of phases, but in practice phases are linked together so clients experience the therapeutic process as continuous. Ninth, therapists are responsible for engaging and motivating clients; assessing families and creating a therapeutic focus; developing, implementing, and evaluating the impact of interventions; and revising ineffective interventions. Tenth, therapists adopt an optimistic outcome-oriented attitude and are advocates for both adolescents and parents.

MDFT is organized into four modules and three stages (Liddle, 2002). MDFT stages refer to practices that occur as families progress through treatment. They include (1) engaging families in treatment and developing a case formulation; (2) prompting families to take action to address substance use and working with family themes central to recovery; and (3) consolidating treatment gains and disengagement. MDFT modules are sets of practices for working with four subsystems of the adolescent's overall social system. These are: (1) the adolescent, (2) the parents and other family members, (3) interactions within the family, and (4) the extrafamilial system, for example, the school, courts, and health and social service agencies. In MDFT, therapists convene periodic whole family therapy sessions and these constitute the family interactions module. Structural and strategic family therapy techniques are used in these sessions. These include joining, relational reframing, enactment, using distress to strengthen motivation, building family strengths, and cultivating optimism. In MDFT, therapists arrange for adolescents to have weekly urinalysis drug screening tests and results of these tests are discussed with the young person and parents in family sessions. Modules with the adolescent and with the parents and other relevant family members prepare them to participate constructively in whole family sessions. In the adolescent module, therapists conduct individual sessions with the young person to engage them in MDFT, identify their goals associated with the developmental transition from childhood to adulthood, and develop self-regulation, communication, and problem-solving skills to help them work toward these goals. Reducing excessive drug use may be identified as an obstacle to achieving valued goals such as performing well at school, work and in sports, and dating. In the module for parents and other relevant family members, therapists work with parents (and those who support parents) to empower them to facilitate the teenager's recovery and to overcome personal obstacles such as depression or interpersonal obstacles such as inefficient parental teamwork that impede progress. The module for parents enhances their feelings of love and commitment toward their teenager and strengthens their capacity to consistently set age-appropriate limits for remaining drug free, attending school, and engaging in prosocial activities. In the extrafamilial module, the focus is on engaging with the school, juvenile justice, health, and social agencies to develop a coordinated approach to supporting the young person achieve normal developmental goals and reduce substance use. However, the extrafamilial module may also involve case management strategies that support parents and teenagers. For example, helping parents deal with complex bureaucratic procedures for obtaining health, social welfare, and public housing benefits; or organizing transportation for the adolescent to attend job training or self-help programs.

MDFT is delivered and supervised by mental health professionals with at least a master's level qualification. Therapists and dissemination site supervisors are initially trained by MDFT program faculty. Subsequently therapists receive ongoing supervision. Treatment fidelity is maintained through the use of treatment and supervision manuals and regular assessment of treatment adherence. MDFT is conducted over 16–25 one- to two-hour sessions spanning 4–6 months. Treatment sessions may include adolescents, parents, whole families, and involved professionals. Sessions may be held in the clinic, home, school, court, or other relevant agencies. Treatment is intensive. Multiple contacts may occur in a week. Frequent telephone contacts with the adolescent, family members, and members of the extrafamilial system are used to establish and maintain strong working alliances and consolidate work done in face-to-face sessions.

In a meta-analysis of 19 studies (including one very large multi-country European study), van der Pol et al. (2017) found that compared with alternative treatments, MDFT led to small but significant reductions in substance misuse, antisocial behavior, psychopathology, and family disorganization. The effects were greatest for families of adolescents with severe substance use and conduct problems. These meta-analytic results are consistent with those from other meta-analyses and narrative reviews (Filges et al., 2018; Liddle, 2016), notably that of Liddle (2016) who concluded that MDFT has positive short and long-term effects in multiple domains including drug misuse and delinquency and leads to significant cost savings.

Attachment-Based Family Therapy for Depression

ABFT was developed at the University of Philadelphia and Drexel University, Philadelphia, by Guy Diamond and his team, beginning in the late 1990s (Diamond et al., 2014, 2016). ABFT was developed as a treatment for adolescent depression and suicidality. It is disseminated by the Centre for Family Intervention Science at Drexel University (https://drexel.edu/familyintervention/abft-training-program/overview/).

ABFT is based on attachment theory (Bowlby, 1982). In ABFT, it is assumed (without ignoring biological factors) that adolescent depression and suicidality may be caused, maintained, or exacerbated by parent-adolescent interactions that promote attachment insecurity (Diamond et al., 2014). These interactions include conflict, detachment, separation, abandonment, loss, harsh criticism, neglect, and abuse. The negative effect of these family processes on adolescent mood is compounded when parents do not adequately comfort and support their teenagers. This is addressed in ABFT by facilitating supportive parent-adolescent interactions. This corrective attachment experience increases adolescents' attachment security and reduces their depression and suicidality. It helps adolescents experience their parents a safe haven that protects them from challenging life stresses, and a secure base from which to develop autonomy as they move toward adulthood.

ABFT integrates ideas and practices from a number of schools family therapy. From MDFT (Liddle, 2002), it takes the idea that targets for change in family therapy, for example, attachment insecurity, should be research informed. From emotionally focused couple therapy, it takes the idea that emotional processing is central to therapeutic change (Greenberg, 2015). The idea that the reestablishment of trust is essential for family problem-solving is taken from transgenerational family therapy (Boszormenyi-Nagy & Krasner, 2013). From structural family therapy (Minuchin, 1974), ABFT takes the practice of enactment as particularly impactful procedure for facilitating the development of positive relational patterns.

In ABFT there are five therapeutic tasks which facilitate repairing parent-adolescent attachment ruptures (Diamond et al., 2014). The first task is relational reframing and occurs in the first session. The family is helped to understand that the young person's depression and suicidality is most usefully conceptualized as a relationship problem involving the parents and the adolescent. When the young person needs comfort and support from their parents, they are unable to effectively elicit it. Also, the parents have difficulty recognizing and responding to the adolescents' unmet attachment needs. The therapist helps family members to access their longing for greater closeness and agree to rebuild trust during therapy so that greater closeness will be possible. Building an alliance with the adolescent is the second task and spans two to four sessions. In individual sessions with the adolescent, the therapist helps them to identify and articulate their experiences of their parents' failure to meet their attachment needs and commit to discussing their unmet attachment needs with their parents in conjoint family sessions. Building an alliance with the parents is the third task and spans two to four sessions. Parents are encouraged to consider how their family-of-origin experiences have affected their parenting style, and the difficulty they have in identifying and meeting their adolescent's attachment needs. This leads to them developing greater empathy for their adolescent's experiences. Repairing attachment is the fourth task and the task which is central to the effectiveness of ABFT in alleviating adolescent depression. This task may span one to four sessions. When adolescents and parents are ready, in conjoint family sessions, the therapist facilitates a series of discussions between them about the adolescents concerns. In enactments, adolescents articulate their unfulfilled attachment needs. Therapists help them to express feelings of sadness, hurt, and loss to their parents. These primary emotions are often masked by secondary emotion, especially anger. Therapists encourage expression of primary, but not secondary emotions. In response, parents are guided by therapists to empathize with their adolescent, as they become more willing to consider their own contributions to family conflict. Although the adolescent-parent attachment insecurity may not be fully resolved during enactments, this respectful and emotional dialogue between adolescents and parents is usually a "corrective attachment experience" that increases the adolescent's trust in that their parents will meet their attachment needs in future. The fifth ABFT task is promoting autonomy and may span one to ten sessions. As the parent-adolescent relationship becomes closer and more supportive, adolescents are encouraged to engage in prosocial activities at school, work, sports, and hobbies that will give them a sense of increasing autonomy. They may also be encouraged to discuss other factors contributing to their depression such as divorce or bullying and identity formation topics such as race, sexual identity, and religion. Parents are helped to serve as the secure base and safe haven from which their teenager can receive comfort, advice, support, and encouragement as they explore these new opportunities and issues.

In a narrative review, Diamond et al. (2016) concluded that a series of five Non-unit numbers (from "one" to "ten") should be spelled out in the text outcome studies and a number of process studies supported the efficacy and effectiveness of ABFT for adolescent depression in suicidality. Most participants in these studies were of low socioeconomic status and African American ethnicity. Compared with waitlist-control groups and treatment as usual, ABFT led to significant reductions in depression and/or suicidal ideation, with gains maintained at 6 months follow-up.

Cognitive Behavioral Family Therapy for Anxiety

Cognitive behavioral family therapy (CBFT) is an umbrella term for clinical practice models in which the principles of CBT are used to inform family-based treatment of clinical problems (Dattilio, 2009; Lan & Sher, 2019). A large number of CBFT clinical practice models have been developed to treat a very wide range of clinical problems across the lifespan. There are CBFT approaches for most externalizing and internalizing behavior child and adolescent problems. In this section the focus will be on CBFT for disorders where anxiety is a central feature. These include separation anxiety, selective mutism, phobias, social anxiety disorder, generalized anxiety disorder, obsessive compulsive disorder, and posttraumatic stress disorder. All are characterized by excessive fear of particular internal experiences or external situations and avoidance of these anxiety-provoking stimuli. In CBFT, it is assumed that the child's behavioral avoidance of external anxiety-provoking stimuli; suppression of anxiety-provoking memories, thoughts, and feelings; and threat-amplifying negative automatic thoughts, assumptions, beliefs, and cognitive distortions maintain anxiety. However, this behavioral and experiential avoidance and threat-amplifying cognition are maintained by parents' or other caregivers' inadvertent reinforcement of the child's avoidance and threat-related cognition (Norman et al., 2015). A central treatment strategy of CBFT for childhood anxiety disorders is to encourage parents and other caregivers to stop inadvertently reinforcing avoidance and threat-amplifying cognition; and instead to reinforce the child for approaching feared stimuli and engaging in threat-reducing cognition and coping (Wood & McLeod, 2008; Rapee et al., 2008). In a large study of synthesized individual case data from 18 separate trials, Manassis et al. (2014) found that CBFT in which parents were helped to use contingency management to reinforce children's "brave behavior" for coping with exposure to anxiety-provoking stimuli was particularly effective in helping young people maintain treatment gains a year after treatment had ended. This type of CBFT was significantly more effective in the long-term, than CBT where parents had limited involvement, or where they had extensive involvement which did not require them to use contingency management to reinforce children's "brave behavior."

In CBFT for child and adolescent anxiety disorders, a range of formats are used. However, the following features are common to most programs. Children and parents attend preliminary assessment sessions and periodic conjoint treatment sessions, as well as parallel sessions for children and parents. Children attend individual or group sessions with other children who have anxiety disorders to learn CBT anxiety management and coping skills; develop hierarchies of anxiety-provoking stimuli; and engage in exposure to these while using anxiety management and coping skills to tolerate distress during exposure tasks. Concurrently, parents attend individual or group psychoeducation sessions about CBT for child and adolescent anxiety and their role in promoting their child's recovery. Conjoint family sessions are held in which therapists help parents and children practice and plan to use contingency management to reinforce children's "brave behavior" when exposed to increasingly anxiety-provoking stimuli.

In CBFT, the classes of stimuli to which children are exposed depend on their particular anxiety disorder. The use of CBFT to effectively treat a range of anxiety disorders is supported by a growing body of evidence. For separation anxiety with school refusal, school reentry and attendance are reinforced (Maynard et al., 2018). For selective mutism, speaking in the presence of adults in school is the treatment target (Zakszeski & DuPaul, 2017). For generalized anxiety, parents may reinforce exposure to multiple targets and also engaging in planned periods of worry, where children fear they have lost control of the worrying process (Kolomeyer & Renk, 2016). For OCD, parents reinforce children for engaging in exposure and response prevention activities (McGrath & Abbott, 2019). That is, exposure to cues that elicit obsessional anxiety and prevention of compulsive rituals which reduce anxiety. For PTSD, parents reinforce young people for engaging in exposure to trauma-related cues, while not suppressing traumatic memories (Lenz & Hollenbaugh, 2015). Trauma-focused CBFT also involves helping young people process traumatic memories and, in cases of child abuse, developing safety skills and more supportive relationships with the non-abusing parent (Cohen et al., 2017).

Family-Based Therapy for Eating Disorders

Family-based treatment (FBT) is a contemporary family therapy model for treatment of adolescent anorexia nervosa, bulimia nervosa, and other eating disorders (Le Grange and Lock 2007; Lock & Le Grange, 2005, 2013; Loeb et al., 2015). The manuals for the model, developed and written by James Lock at Stanford University and Daniel Le Grange at Chicago University in the 1990s and 2000s, are based on the Maudsley model (Eisler et al., 2016), developed in the UK in the 1980s, which was inspired by the structural family therapy model (Minuchin et al., 1978) developed at the Philadelphia Child Guidance Clinic in the 1970s. FBT is disseminated by the Training Institute for Child and Adolescent Eating Disorders (http://train2treat4ed.com).

FBT is an intensive outpatient family therapy program for adolescents under 16 with anorexia or bulimia that has not persisted for more than 3 years. In FBT, the family of the adolescent with an eating disorder is viewed primarily as a treatment resource for promoting recovery. In FBT, parents are helped to restore their child's weight or eating pattern to normal, hand control over eating back to their teenager, and encourage normal adolescent development. FBT has three clearly defined phases spanning 15–20 sessions over 12 months (Le Grange & Lock, 2007; Lock & Le Grange, 2013).

The aim of the first phase is to establish a strong positive working alliance with all family members and to maximize the parents' motivation to cooperate with refeeding the young person if they have anorexia, or normalizing their eating pattern if they have bulimia. This is done by raising parents' anxiety about the medical risks associated with the child's condition, e.g., cardiac dysfunction, and the efficacy of FBT in helping adolescents recover from eating disorders. The therapist externalizes the eating disorder, framing it as a condition that the whole family (including the patient, siblings, and parents) will have to work together to overcome, and commits to supporting the parents in their joint attempt to restore their adolescent's weight. In cases of anorexia nervosa, the therapist invites the family to have a meal during a therapy session in the first phase of FBT. This allows the therapist to observe the family's typical interaction patterns around eating and provides the therapist with an opportunity to support the parents as they encourage their adolescent to eat a little more than they were prepared to. The therapist helps the parents adopt a noncritical attitude and express sympathy and understanding concerning the adolescent's ambivalence about recovering from their eating disorder, while at the same time insisting that starvation is not an option. The therapist models this noncritical attitude toward the adolescent by expressing support and empathy for their predicament of entanglement with the eating disorder that they are trying to overcome. The first phase of FBT typically spans about 10 weekly sessions. During weight restoration, the adolescent stays at home from school, and parents create a rotational system so that one of them is at home supervising the young person throughout the weight gain program and preventing vomiting, laxative use, overexercising, and binging in the case of bulimia.

There is a transition to the second phase of treatment when the adolescent accepts the parental request for increased food intake and achieves a target weight of 90% of the expected weight for their age, height, and gender or, in the case of bulimia, demonstrates an ability to avoid dieting, binging, and purging. This is accompanied by an improvement in family mood associated with relief at parents having taken charge of the eating disorder. In the second treatment phase, parents are encouraged to help their teenager to take more control over eating so that by the end of the second phase adolescents are fully responsible for their own eating and weight. In early sessions of this phase, there is discussion about how parents can support the adolescent to develop autonomous control of their eating. There is also discussion of adolescent eating in multiple contexts including the home, at school, with peers, and when dating romantic partners. The second phase typically spans 6 sessions spaced at 2–3 weekly intervals. Eating disorders constitute an interruption of normal adolescent development. In the first phase of FBT, normal adolescent physical development is resumed with the normalization of eating, weight, and other bodily functions such as menstruation. During the second phase, normal adolescent social development is resumed. The family is invited to support the adolescent in returning to school, socializing with friends, and dating.

Transition to the third phase of FBT occurs when the adolescent reaches 95–100% of normal body weight, efforts at self-starvation or dieting, binging, and purging have abated, and the adolescent has achieved autonomous control of their eating and weight. The aim of this phase is to help the adolescent develop a healthy identity and facilitate disengagement from treatment. The therapist helps the family review progress; make relapse prevention plans; and support normal adolescent development. The third phase typically spans 4 sessions spaced 4–6 weeks apart.

Schlegl et al. conducted a systematic review of FBT for anorexia and bulimia nervosa in adolescence. In five RCTs involving 560 cases of anorexia nervosa, remission rates were 21–42% at posttreatment and 29–49% at 12-month follow-up. In two RCTs involving 210 cases of bulimia nervosa, remission rates were 39% at posttreatment and 49% at 1 year follow-up. Richards et al. (2018) reviewed a number of augmentative versions of FBT that have been developed to meet the needs of cases judged to require more or less intensive treatment, more accessible treatment, or a format appropriate for families in which a high level of criticism was directed toward the adolescent, as this is associated with poorer outcome. In these versions of FBT, the duration of sessions and the overall program were modified (e.g., fewer more intensive day-long sessions, larger or smaller number of contact hours); additional components were added (e.g., individual or group psychotherapy, CBT, or dialectical behavior therapy for adolescents, or training sessions for parents); a format other than outpatient treatment was used (e.g., teletherapy, multifamily therapy, or partial inpatient therapy with additional multidisciplinary health care); or parents and adolescents were invited to separate sessions. In a review of 30 studies of augmentative FBT approaches for anorexia and other restrictive eating disorders, Richards et al. (2018) found that all reported significant posttreatment improvements in weight and eating disorder symptoms. In nine comparative studies, augmentative FBT approaches were at least as effective as standard FBT for anorexia and other anorexia-like restrictive eating disorders.

Psychoeducational Family Therapy for Psychosis

Psychoeducational family therapy (PFT) for psychotic disorders refers to a collection of practice models in which families of people with psychosis are engaged in multimodal treatment programs that include both antipsychotic medication and family therapy to facilitate the recovery of the person with psychosis (Day & Petrakis, 2017; McFarlane, 2016). The development of PFT was informed by research which showed that high levels of negative expressed emotions including criticism, hostility, and over-involvement among family members of people with psychosis contributed to relapse (Amaresha & Venkatasubramanian, 2012; Butzlaff & Hooley, 1998). High levels of negative expressed emotion are typically elicited by psychotic symptoms such as delusions, hallucinations, disorganization, and impaired motivation, which family members find aversive. They may attribute these symptoms to the psychotic person being “lazy,” “crazy,” “dangerous,” or “disabled.” One of the aims of PFT, therefore, is to help family members reduce their expression of negative emotions, and in doing so prevent or delay relapse.

In PFT, the expression of negative emotions is reduced by helping families understand psychosis as a condition that arises when vulnerable individuals are exposed to life events, ongoing relationships, or situations that they appraise as stressful, threatening, or overly demanding. PFT also helps family members understand how to facilitate recovery by supporting the person with psychosis. This support involves communicating simply, clearly, and respectfully with the person with psychosis in a low-key way that takes account of the cognitive constraints and emotional vulnerability associated with psychosis. It involves taking a systematic approach to problem-solving to address challenges that arise in the day-to-day life of the person with psychosis. Support may be offered by family members prompting the person with psychosis to adhere to their medication regime, to use effective coping strategies for managing stress and symptoms, and to follow relapse prevention plans in risky situations. Family members may also offer support by helping the person with psychosis establish a meaningful social and occupational role in life that takes account of their wishes, strengths, and vulnerabilities.

PFT may be offered in multiple formats. Single families may be treated in a series of conjoint family therapy sessions (Falloon et al., 1984; Kuipers et al., 2002). Groups of four to seven families may be treated in multifamily therapy attended by all family members (McFarlane, 2002). Alternatively, young people with psychosis and their parents may be treated in parallel groups. PFT integrates ideas and practices from many schools of family therapy, notably CBFT (Dattilio, 2009) and structural family therapy (Minuchin, 1974). PFT typically spans 9–12 months. It is usually offered in a phased format with initial sessions occurring more frequently than later sessions and crisis intervention as required. Early sessions focus on engagement of families in treatment and establishing a collaborative partnership with family members. Families are offered psychoeducation based on stress-vulnerability or bio-psycho-social models of psychosis. This provides a rationale for the central role of family support for the young person's recovery. It also provides a rationale for family skills training which occurs in the middle phase of treatment. Families are helped to refine their communication, problem-solving, coping, and medication management skills. Skills training commonly involves modeling, rehearsal, feedback, and discussion. In PFT, an emphasis is placed on blame-reduction and the importance of families building social networks to support the parents and the young person with psychosis. In the final phase of PFT, the recovery process is reviewed and relapse prevention or crisis management plans are developed. Throughout PFT, there is an opportunity to address issues such as loss and stigma associated with psychosis.

Reviews and meta-analyses of over a dozen controlled trials of PFT for psychosis in adolescence or young people at risk of psychosis lead to the following conclusions (Bird et al., 2010; Claxton et al., 2017; Day & Petrakis, 2017; Ma et al., 2018; McFarlane et al. 2012, 2016; Onwumere et al., 2011). Combining antipsychotic medication with PFT leads to significantly better outcomes than routine treatment with antipsychotic medication. For young people, better outcomes include a reduction in psychotic symptoms and relapse rates. For family members, better outcomes include improvement in carer well-being, reduction in carer burden, and reduction in patient-directed negative expressed emotion, particularly criticism and hostility. The reduction in patient-directed criticism and conflict may lead to young people experiencing less stress or more support, and this may facilitate recovery. Compared with single family therapy, multifamily psychoeducational therapy may be particularly effective, possibly because it provides families with a forum within which to experience mutual support, shared learning, and a reduced sense of isolation and stigmatization. PFT is more cost effective than treatment as usual, because it led to reduced use of medical care services. Models of PFT have been developed for other disorders, notably bipolar disorder (Miklowitz, 2008; Miklowitz & Chung, 2016).

Closing Comments

Evidence-based family therapy is recommended in many best practice guidelines for the treatment of child and adolescent disorders covered in this chapter (Kreyenbuhl et al., 2010; Hilbert et al., 2017; NICE, 2007, 2013a, b, c). Family therapy is an effective clinical intervention for a wide range of common child and adolescent difficulties and disorders not covered in this chapter (Carr, 2019). These include, for example, somatization disorders (Hulgaard et al., 2019), child maltreatment (Kolko & Swenson, 2002; Rynyon & Deblinger, 2013), adjustment to chronic medical conditions (Pratt et al., 2020), and addressing problems associated with autism spectrum disorders/conditions (Patrini 2021). The central strength of family therapy is that it provides a conceptual and clinical framework for drawing on the family as a resource in treating children's problems.

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Parent Training

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Parent training, or behavioral parent training (BPT), has an extensive history as a psychological intervention for parents of children with behavioral difficulties (Dangel & Polster, 1984; Eyberg & Robinson, 1982; Patterson, 1977; Webster-Stratton, 1981). Over the years, the research for BPT for multiple diagnoses and related disruptive behaviors has grown significantly. Studies have demonstrated not only the efficacy of parent training for school-age children (e.g., Evans et al., 2014), but also benefits of parent training as an accessible early intervention for young children with attention-deficit/hyperactivity disorder (ADHD; Chronis et al., 2006; Evans et al., 2018; Wolraich et al., 2019; Risley et al., 2020), oppositional and conduct behaviors (Schoenfield & Eyberg, 2005; Webster-Stratton & Hammond, 1997), internalizing disorders (Carpenter et al., 2014), and as an adjunct to other early intensive behavioral interventions for children with autism spectrum disorder (ASD; Machalicek et al., 2014) and developmental disabilities (Matson et al., 2009). Parent training interventions are implemented in multiple formats including individual (i.e., Parent-Child Interaction Therapy or Pivotal Response Treatment), concurrent parents/child groups (i.e., The Incredible Years Parent Training), or parent-only groups (i.e., Parent Management Training – Oregon Model). Within the context of growing healthcare costs and emphasis on evidence-based intervention, parent training is an evidence-based practice that has been demonstrated to be cost-effective both in group settings, particularly when implemented in a brief number of sessions (Tynan et al., 1999) and in individual settings (Goldfine et al., 2008). Furthermore, the advent of telehealth interventions and increased use of alternative methods of treatment delivery has significantly increased access to care for families, with many of these interventions including parent training (McGoron & Ondersma, 2015).

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This chapter focuses on research examining the efficacy of BPT when treating multiple diagnoses and related difficulties, using the term “parent” to address any caregiver in the parenting role for children. Evidence-based and widely used parent training programs are described in detail for neurodevelopmental disorders such as ADHD and ASD, as well as for other childhood disruptive behavior disorders. Following this, parent training programs used in special populations (families in the foster care/child welfare system, incarcerated parents) are reviewed. Finally, cultural considerations for BPT are discussed, including the need to increase both access and utilization of these healthcare services in frequently underserved families.

Behavioral Parent Training for Child Behavior Problems

Child psychopathology is highly prevalent, with recent estimates indicating that 16.5% of children under the age of 17 in the United States have at least one mental health disorder (Whitney & Peterson, 2019). Childhood mental health disorders comprise a wide spectrum of cognitive, emotional, and behavioral difficulties, for which multiple interventions have been designed. For children with behavioral difficulties, behavioral parent training (BPT) is one of the most widely studied and utilized interventions. BPT programs have been established as a primary intervention to address problematic behaviors and associated impairments with disruptive behavior disorders and neurodevelopmental disorders including ADHD and ASD.

Behavioral Parent Training for Attention-Deficit/Hyperactivity Disorder (ADHD)

ADHD is characterized by chronic and pervasive difficulties related to poor attention regulation and/or excessive activity levels and poor impulse control that interfere with an individual’s daily functioning (American Psychiatric Association [APA], 2013). BPT targets problematic behaviors associated with ADHD such as noncompliance, aggression, and misbehavior by providing parents with specific behavioral modification strategies. Strategies typically provided in BPT teach the parents the importance of directed attention (praising positive behaviors and ignoring negative or unwanted behaviors), using effective commands to increase compliance, the effective use of time-outs, and establishing reward and response-cost systems (Chronis et al., 2004). Notably, the extensive empirical support for BPT has established it as an effective treatment for ADHD. In their 1998 review, Pelham et al. identified 17 studies examining BPT that had met stringent criteria for testing empirical support. As per the results of their review, BPT firmly met criteria as a probably efficacious treatment (Pelham et al., 1998). An update to this review by Pelham and Fabiano (2008) identified an additional 22 studies that primarily used a group-based BPT intervention ranging from 8 to 16 sessions. Across the 22 studies, results demonstrated that BPT clearly met criteria as a well-established treatment for preschool- and school-aged children with ADHD. These findings have since been reaffirmed by two additional follow-up reviews (Evans et al., 2014, 2018). Due to BPT’s clear status as a well-established treatment, the American Academy of Pediatrics strongly recommends BPT as a first-line treatment that can be used in combination with medication management for elementary and middle school-aged children with ADHD (Wolraich et al., 2019). Furthermore, Evans et al. (2018) found that BPT met criteria as a possibly efficacious treatment for adolescents with ADHD.

In addition to reducing problematic behaviors associated with ADHD, BPT has resulted in a number of parent-related improvements. For example, Gerdes et al. (2012) observed a significant reduction in maternal use of inconsistent discipline and corporal punishment, increased father involvement in parenting, and improvements in multiple aspects of maternal parenting stress. Loren et al. (2015)

found that an eight-session outpatient BPT program reduced the negative impact of child behavior on the family and significantly improved parent-rated child impairment, parent-child interactions, and parents' confidence in managing their child's behavior. Furthermore, other studies have demonstrated significant reductions in parenting stress and improvements in parental well-being (Ciesielski et al., 2020; Sonuga-Barke et al., 2001).

An important aspect of a well-established treatment is that it can be effective across different populations. In their research with single mothers, a population considered high risk for not seeking or dropping out of BPT prematurely, Chacko and colleagues (2017) identified a number of factors common for these parents not attending group-based BPT despite clinical need, those who leave the group BPT prior to completion, and single mothers who completed group BPT. Primary factors for parents who never attended BPT included parental perspectives that their child's behavior problems were internal, global, and stable, and who had lower ratings on measures of parenting efficacy. Parents who dropped out of the treatment were most likely to do so if they believed the BPT was not relevant to them or their situation. Other factors that have been identified for families who do not seek or complete treatment include parental depression and stress (Chronis et al., 2004). Two of the most recent reviews of the ADHD treatment literature focused on examining adapted or enhanced BPT programs for individuals who have historically not participated in BPT (i.e., single mothers, fathers, parents with depression) (Evans et al., 2014, 2018).

One example of a BPT program adapted for use with a special population is the Strategies to Enhance Positive Parenting (STEPP) program, a BPT program for single mothers (Chacko et al., 2009). The overarching goals of the STEPP program are to build social support and increase parent engagement as well as opportunities to observe and practice learned skills within sessions. Although a randomized clinical trial did not identify any significant differences between the STEPP program and traditional BPT across multiple clinical outcomes (e.g., ADHD symptoms, maternal depression), the STEPP program had significantly higher session attendance, homework completion, and maternal satisfaction with the intervention (Chacko et al., 2009). Furthermore, the STEPP program had a dramatically reduced dropout rate (10% vs. 65% for traditional BPT) and significantly greater improvements in important factors empirically related to treatment engagement (e.g., amount and quality of social support between mothers within their intervention group) (Chacko et al., 2012).

Another population for which there is an identified need to increase engagement in BPT is fathers. Fabiano (2007) found that out of 32 identified studies in his review of BPT for ADHD, only 4 explicitly reported the effectiveness of BPT for fathers. Furthermore, Fabiano (2007) identified a number of potential engagement barriers for fathers including the discordance between the classroom format of BPT and high likelihood of parental ADHD, clinical correspondence addressed only to the mother, scheduling difficulties, and potential differences in caregiving roles between mothers and fathers. Thus, the development of BPT programs modified specifically to promote paternal engagement is particularly important. One such modified BPT program is the Coaching Our Acting-Out Children: Heightening Essential Skills (COACHES) program (Fabiano et al., 2001). In the COACHES program, fathers spend the first hour reviewing effective parenting strategies in a group setting while their children practice soccer skills. During the second hour, fathers then practice the learned parenting strategies within the context of a soccer game with their children (Fabiano et al., 2001). Compared to a waitlist control group, fathers enrolled in the COACHES program demonstrated significantly reduced ratings of problem behavior intensity as well as reduced levels of negative talk. Moreover, the COACHES program also resulted in significantly increased levels of parental praise (Fabiano et al., 2012). Additionally, when compared to traditional BPT, fathers participating in the COACHES program demonstrated significantly more engagement in the treatment process (Fabiano et al., 2009), suggesting that fathers were more receptive to the adapted structure.

Behavioral Parent Training for Disruptive Behavior Disorders

Disruptive behavior disorders, such as oppositional defiant disorder (ODD) and conduct disorder (CD), are characterized by persistent patterns of disobedient, defiant, and aggressive behaviors (APA, 2013). As these types of behaviors are by their nature disruptive to others, there is significant need for interventions that address these behaviors, the most effective of which include BPT interventions. One such intervention is the Incredible Years Parent Training (IYPT) program, a group-based performance-training method based on cognitive social learning, self-efficacy, and relationship building theories (Webster-Stratton, 1981, 1982). IYPT and its counterparts for teachers and children were designed to change poor parenting practices and early-onset conduct and disruptive behavior problems (Webster-Stratton et al., 2012). Parents enrolled in the program view brief video vignettes of modeled parenting skills such as play skills, praise and rewards, limit setting, and managing misbehavior. After watching the videos, trained group leaders work collaboratively with parents through focused discussions, self-reflection, problem-solving, collaborative learning, and role-playing (Menting et al., 2013; Webster-Stratton et al., 2012). Parent programs are offered for four separate age groups: Infant (from 6 weeks to 1 year), toddler (from 1 to 2.5 years), preschool (from 3 to 5 years), and school-aged (from 6 to 12 years). Program goals are adapted for each specific age group and include promoting parent competencies and positive parenting, using child-directed play interactions to teach children social-emotional, verbal, academic, and persistence skills, reducing negative discipline and increasing positive discipline practices, increasing family support networks, and increasing parents' involvement in school-related activities (Webster-Stratton et al., 2012). Numerous studies, both in the United States and internationally, have demonstrated the effectiveness of IYPT in reducing disruptive behavior problems, increasing prosocial behaviors, and maintaining benefits over time in a diverse range of families (e.g., Larsson et al., 2009; Menting et al., 2013; Seabra-Santos et al., 2016; Webster-Stratton et al., 2012). Additionally, the Office of Juvenile Justice and Delinquency Prevention identified IYPT as one of 11 "blueprint" programs that prevent violence and treat youth exhibiting problem behaviors (Mihalic et al., 2004), although a meta-analysis by Menting et al. (2013) indicated that IYPT appears to be more effective as a treatment intervention than a prevention.

Another widely studied intervention for parents of children with disruptive behaviors is the Parent Management Training – Oregon Model (PMT-O®), a family of evidence-based parenting programs (Forgatch & DeGarmo, 1999). Developed for single mothers, the foundation of PMT-O® is based on the social interaction learning (SIL) model (Forgatch & Patterson, 2010; Patterson, 2005). According to the SIL model, children's behavior is directly affected and shaped through reinforcing contingencies provided during repeated interactions with important people in their social environment (i.e., parents) (Forgatch & Kjobli, 2016). The interventions of PMT-O® focus on parents as the agent of change with the goal of breaking, damaging, and maladaptive interaction patterns between parents and children that often escalate and reinforce misconduct. To achieve this goal, PMT-O® aims to enhance five core parenting practices: skill encouragement, limit setting, monitoring/supervision, interpersonal problem-solving, and positive involvement (Forgatch & Kjobli, 2016; Ogden & Hagen, 2008). PMT-O® has substantial empirical support as a well-established intervention for children with disruptive behavior (Eyberg et al., 2008) and has been adapted and disseminated for a wide range of cultures and contexts in the United States and internationally (for reviews, see Dishion et al., 2016; Forgatch & Kjobli, 2016; Forgatch & Patterson, 2010).

A third parent training program is the Triple P – Positive Parenting Program, a multilevel, preventively oriented parenting and family support program (Sanders, 1999). Like PMT-O®, Triple P is based on SIL theory. Its overarching aim is to prevent severe behavioral, emotional, and developmental problems in children and adolescents through the enhancement of knowledge, skills, and confidence of parents and the creation of a family-friendly environment that supports parents in raising their children (Sanders, 2008, 2012). In order to best address the specific needs of families, Triple P has been designed as a multilevel intervention that utilizes both universal and targeted interventions tailored to different behavioral needs and child developmental stages. Triple P provides interventions for parents of children from birth to age 16 across five levels of increasing strength (Sanders, 1999, 2012). The first level, Universal Triple P, consists of universal parenting information campaigns related to positive parenting that are targeted toward all parents. The second level, Selected Triple P, offers brief parenting advice for parents who are interested in general parenting information through brief, individual consultations or through large group seminars. Level 3, Primary Care Triple P, provides information and active skills training related to common child behavioral problems and parenting challenges. The next level, Standard Triple P, provides education, active skills training, and support for parents of children who are struggling with behavioral problems, but who may or may not meet diagnostic criteria for a behavioral disorder. Importantly, parents also learn how to apply learned parenting skills both at home and in public. Lastly, Level 5, Enhanced Triple P, is an optional enhancement of Standard Triple P families with additional risk factors that might need to be addressed through additional intervention. Multiple systematic reviews and meta-analyses have highlighted the effectiveness of Triple P across its different levels, though effect sizes vary considerably (de Graaf et al., 2008; Fletcher et al., 2011; Nowak & Heinrichs, 2008; Sanders et al., 2014). Of note, one meta-analysis by Fletcher et al. (2011) found that the positive effect of Triple P was smaller in fathers than in mothers, emphasizing a need to identify effective strategies to increase fathers' engagement.

Finally, one of the most commonly used interventions, Parent-Child Interaction Therapy (PCIT), has been demonstrated to be a highly effective model of parent training. Multiple studies have found PCIT to significantly increase positive parent-child interactions and improve behavior difficulties in children as well as child compliance with parent directions (Cooley et al., 2014; Schoenfield & Eyberg, 2005; Thomas et al., 2017). PCIT is grounded in social learning and attachment theories and is an evidence-based, manualized treatment comprised of two treatment phases: Child-Directed Interaction (CDI) and Parent-Directed Interaction (PDI). Intervention during CDI is intended to improve the quality of the parent-child relationship, increase parental attention to the child's positive behaviors, and provide reinforcement for positive child behavior. Parents are also taught active ignoring skills and to engage in child-led play, including decreasing commands, questions, and other intrusive comments during play. Through the course of CDI, parents are taught to use PRIDE skills (praise, reflection, imitation, description, and enthusiasm). Following completion of CDI, parents transition to PDI during which they learn to direct child behavior, give commands effectively, and follow through with consequences, including time-out (Funderburk & Eyberg, 2011). Unlike other parent training interventions which are typically completed with a therapist, parent(s), or parent-child dyads in either individual, family, or group sessions, PCIT is an intensive in vivo intervention. Following an initial session with the parents alone to provide an overview of the intervention, PCIT sessions are then all completed with parents and their child together, with the treating therapist offering direct, live coaching to the parents throughout the session. When parents complete PCIT in an outpatient clinic setting, the therapist observes parent-child interactions through a one-way mirror and provides direct coaching via a "bug in the ear" or earpiece system (Funderburk & Eyberg, 2011).

There is significant empirical evidence for the efficacy of PCIT in improving disruptive behavior difficulties in young children (Thomas et al., 2017) with studies demonstrating long-term positive outcomes (Hood & Eyberg, 2003). Of note, multiple adaptations of PCIT for various child behavior problems and diagnoses have also been shown to be successful (Niec, 2018). For example, research has demonstrated efficacy with a PCIT group intervention for children with ASD and externalizing behavior difficulties (Ros & Graziano, 2019) and using telehealth through Internet-Delivered PCIT (I-PCIT; Comer et al., 2017). Furthermore, although cognitive-behavioral therapy is a well-established evidence-based treatment for school-age children and adolescents with anxiety (Silverman et al., 2008; Walkup et al., 2008), preschool-aged children also present with anxiety disorder diagnoses (Egger & Angold, 2006) and require treatment appropriate to their developmental level, which typically requires a parent training component and parent involvement in treatment. Puliafico et al., (2012) developed an adaptation of PCIT for young children with anxiety, the PCIT CALM Program: Parent-Child Interaction Therapy Coaching Approach behavior and Leading by Modeling. Similar to PCIT, in PCIT CALM parents begin using CDI, throughout the course of which the therapist also provides psychoeducation about anxiety and ways in which parents may maintain child anxiety. Rather than the PDI, for the second portion of training parents engage in exposure treatment with their child using DADS (Describing the exposure situation, Approaching the situation themselves, giving Direct commands for the child to approach the situation, and Selective attention to approach behaviors). Similar to PCIT, the intervention is delivered using the earpiece technology and live coaching.

Behavioral Parent Training for Autism Spectrum Disorder (ASD)

Another neurodevelopmental disorder for which BPT programs have been developed is autism spectrum disorder (ASD), which is characterized by persistent impairment in social interaction and communication, as well as restricted and repetitive behaviors, interests, or activities (APA, 2013). The American Academy of Pediatrics' most recent guidance on the management of ASD notes that it is critically important to include parents in the intervention process, and that parent training has utility for promoting compliance with behavioral goals (Hyman et al., 2020). Indeed, a growing body of evidence suggests that incorporating parent training into ASD interventions improves treatment outcomes. A recent systematic review and meta-analysis by Black and Therrien (2018) examining the inclusion of parent training in interventions for school-aged children with ASD identified 15 studies with parent training primarily aimed at improving social and emotional adjustment, social skills, problematic behaviors, or adaptive skills. Across studies that isolated the effects of parent training, adding parent training interventions was found to exert a small, but notably additive, positive effect on the outcomes for children. A second review and meta-analysis by Deb et al. (2020) identified 17 papers from 15 randomized clinical trials (RCTs) examining interventions for parents of children aged 1–18 years with ASD. Parent training interventions were found to result in improvements across a number of domains of ASD symptoms and associated behaviors, including language and communication, interaction and play, behavior management, and parents' understanding of ASD. However, not all papers reported significant results, and the results that were significant indicated small to moderate positive effects (Deb et al., 2020). Lastly, Postorino et al. (2017) conducted a systematic review and meta-analysis of studies examining the effects of parent training for disruptive behaviors in children with ASD, identifying eight RCTs, all with a conceptual and practical foundation in behavior management training. A medium effect of parent training for reducing disruptive behaviors was found (Postorino et al., 2017). Importantly, this medium effect was substantially larger than the small effect of parent training observed in a separate meta-analysis of parent training RCTs targeting the core features of ASD (Nevill et al., 2018), suggesting that parent training may be more beneficial for managing secondary impairments associated with ASD, rather than the core symptoms.

Several parent training programs exist for addressing the core symptoms and related difficulties of ASD. One such intervention is *Pivotal Response Treatment* (PRT), which aims to improve social communication skills in children with ASD (Koegel et al., 2006). Based on applied behavioral analysis, the "gold standard" for ASD treatment, PRT teaches children targeted pivotal skills that, when acquired, lead to additional improvements in other, often untargeted, domains of functioning (Lei & Ventola, 2017; Verschuur et al., 2014). Areas of functioning in which research has identified these pivotal skills to be particularly important include motivation, self-initiation, responding to multiple cues, and self-management (Verschuur et al., 2014). Using a more naturalistic approach in which interventions are provided within the child's natural environment, PRT strategies include following the child's lead and offering choices, gaining the child's attention, interspersing maintenance and acquisition tasks, and providing reinforcement for both attempts and successful completions of target behavioral skills (Verschuur et al., 2014).

Another parent training program is the DIRFloortime® Model, a comprehensive, interdisciplinary framework designed to build healthy foundations for social, emotional, and intellectual abilities (Greenspan, 1992; Greenspan & Wieder, 1998, 1999). The central component of the model is Floortime®, a specific intervention in which the parent serves as a play partner for 20-minute sessions. During the play time, the parent follows the child's lead as they engage with their natural interests, then joins the child in "their world" in order to foster emotional connections with the child. Next, the parent then pulls the child into a "shared world" in which the parent works with the child on specific skills in order to help the child master foundational social, language, and emotional abilities (Hess, 2013). These specific skills, such as problem-solving strategies, speech therapy, occupational therapy, or mental health care, are tailored to the child's specific needs using the DIR® framework. This framework stresses that the child's behavior should be viewed from three perspectives: (1) within the context of a developmental framework, (2) within the context of individual differences in underlying neurological processing, and (3) within the context of relationships and affective differences (Greenspan & Wieder, 1999; Hess, 2013).

Although PRT has been identified as an evidence-based practice (Wong et al., 2015), research examining the efficacy of PRT and DIRFloortime® has been inconclusive. Multiple reviews of group and single-case design studies have found PRT to result in improvements in both targeted and untargeted behaviors (Bozkus-Genc & Yucesoy-Ozkan, 2016;Forbes et al., 2020; Verschuur et al., 2014). However, reviews have also identified serious flaws in the literature base (Forbes et al., 2020; Verschuur et al., 2014). For example, Verschuur et al. (2014) identified 39 studies examining PRT in their systematic review but noted that the majority of the studies (56.4%) had serious methodological limitations (e.g., quasi-experimental design, dependent variables not operationally defined). Furthermore, Forbes et al. (2020) noted in their systematic review examining the effect of PRT on linguistic and verbal behavior outcomes that studies frequently aggregated results or did not clearly distinguish between different verbal behavior functions. Similar methodological issues are present in the literature examining DIRFloortime®. Though the theoretical underpinnings of DIRFloortime® have empirical support (Cullinane, 2020; Hess, 2013; Mercer, 2017), few studies have examined the effectiveness of DIRFloortime® using methodologically rigorous experimental designs. In her review of published materials regarding DIRFloortime®, Mercer (2017) identified ten studies that systematically investigated the intervention. Though all studies reported successful outcomes of DIRFloortime®, only five had designs that provided a comparison/control group, randomized families to groups, or both. A similar concern was raised in a recent systematic review by Boshoff et al. (2020), who identified nine studies examining developmental outcomes following DIRFloortime®-based interventions, only three of which used randomized groups. Thus, both PRT and DIRFloortime® show promise as effective parent training programs for children with ASD but need further empirical support, particularly from methodologically rigorous studies.

Given the evidence of effective group-based BPT for children with disruptive behavior (Webster-Stratton et al., 2001) and for children with ASD (Tonge et al., 2012), Burrell and colleagues (Burrell et al., 2020) examined the efficacy of administering the Research Units Behavior Intervention (RUBI) parent training program in a group format to address disruptive behavior in children with ASD. As with PRT, the RUBI parent training program utilizes principles of applied behavior analysis and the Antecedent-Behavior-Consequence model to teach parents of children with ASD strategies to prevent and/or manage disruptive behavior problems that may arise in common daily situations, such as getting ready in the morning or at bedtime. The strategies covered in the 11 core session individual parent training program have demonstrated promise in reducing disruptive behaviors in children with ASD when delivered individually, with efficacy superior to parent psychoeducation alone (Bearss et al., 2015). These sessions include clinician-led training and brief modeling vignette videos designed to teach behavioral principles, the importance of schedules and routines, and preventing behavior difficulties. Additional behavioral principles covered throughout the parent training program include compliance training, praise, ignoring, and reinforcement, as well as teaching daily living and functional communication skills. Following the core sessions, there are seven optional supplemental sessions that may be used to address other daily functional difficulties (e.g., sleep, feeding, toileting), as well as information for home visits and follow-up "booster" sessions, for a total of 24 weeks of intervention (Bearss et al., 2018a). The adaptation to a group format included ten core sessions, one supplemental session, and one individual parent-child coaching session, delivered over 16 weeks in 120-minute treatment sessions, with parent homework tasks assigned to practice between sessions (Burrell et al., 2020). Although more research is necessary, the pilot data for offering the RUBI parent training program in a group format are promising and could increase the feasibility and availability of behavioral parent training to parents of children with ASD and related disruptive behaviors (Burrell et al., 2020). Similarly, pilot data demonstrate that the RUBI parent training program can be reliably administered via telehealth, which may further increase access to such care (Bearss et al., 2018b).

Behavior Parent Training with Special Populations

Research examining disparities in mental health services utilization has found less service use and poorer mental health outcomes among families of low SES and those who were identified as an ethnic or racial minority (Alegria et al., 2011; Young & Rabiner, 2015). Moreover, parents in underprivileged populations are more likely to experience barriers when trying to access care for their mental health, including a lack of familial support, language barriers, stigma, and transportation (Eiraldi et al., 2006). Thus, these families may require additional considerations regarding their access to care as well as treatment adherence. The following section describes adaptations of BPT for special populations as well as the extent to which BPT has been found to be efficacious across different groups.

Behavioral Parent Training with Foster Families

One such population for which there is limited research examining the utilization and effectiveness of BPT is foster families, which may be in part due to low utilization rates by child welfare agencies and high parental attrition rates for BPT interventions (Horwitz et al., 2010). Studies show that children in foster care exhibit alarming rates of mental health concerns, including externalizing and internalizing concerns as well as adjustment problems (Blair et al., 2020; Horwitz et al., 2012; Mersky et al., 2016). However, for children in foster care, mental health needs are often left untreated given the numerous barriers to adequate care that foster parents encounter (Burns et al., 2004; Zeanah et al., 2011). For example, such barriers encountered by foster parents include a lack of resources, overburdened case workers and foster parents, and limited interventions designed for this particular population (Kerker & Dore, 2006). In addition to the barriers encountered by foster parents, treatment providers encounter their own sets of barriers when implementing BPT interventions. In a pilot study by Horwitz et al. (2010), staff resistance in welfare agencies was a major obstacle to implementation of intervention due to staff members' lack of familiarity with treatment programs and fear of unemployment. Furthermore, evidence-based practices that were most likely to be adopted were those consistent with an agency's current practices and philosophy, limiting the treatment options available for welfare agencies and foster parents.

Despite the resistance to implementation, there is evidence to suggest that there are highly efficacious BPT programs for foster parents. In 2006, Timmer and colleagues published a case study of a four-year-old and his foster mother who completed PCIT. This case study was instrumental in showcasing the extent to which relationship-enhancing activities could help children in foster care adjust more easily and create a secure attachment with their foster parents. In addition, Timmer et al. (2006) demonstrated that PCIT was effective in reducing behavioral problems and in decreasing parenting stress. Evidence supporting the efficacy of adapted BPT programs for foster parents also comes from group-based studies. For example, Chamberlain et al. (2008) evaluated the effectiveness of the adapted BPT program KEEP (Keeping foster and kin caregivers skilled and supported) in increasing foster parents' use of positive parenting skills, reducing child behavior problems, and increasing placement stability. Participation in KEEP increased the chances of reunification with biological parents and mitigated the risk-enhancing effect for children who had been in multiple placements (Chamberlain et al., 2008). Leathers et al. (2011) conducted a pilot study of the KEEP group intervention and additional support for foster parents in the form of group and home visits. The authors adapted the KEEP intervention for predominantly African American foster parents in a large urban child welfare agency. Foster parents who participated in KEEP reported an impressive decrease in their child's behavioral concerns and a newfound confidence in implementing the parenting skills discussed throughout treatment. Similarly, Mersky et al. (2016) found that PCIT with foster parents was highly effective in reducing externalizing and internalizing behaviors in children over time. Lastly, Landers et al. (2018) conducted a recent systematic review examining the range of interventions available to foster parents of infants and toddlers. Approximately 66% of the interventions used by foster parents encompassed BPT or a BPT-related treatment, such as PCIT, and were generally aimed at improving parenting practices. Ultimately, findings demonstrated that BPT interventions improved foster parents' relationship with their foster child, reducing the potential for child abuse and/or neglect (Landers et al., 2018).

To further understand BPT in the child welfare system, Blair et al. (2020) examined practitioners' and foster parents' perceptions on the use of PCIT. PCIT practitioners from two welfare agencies and foster parents from southeast Wisconsin who completed PCIT participated in four focus groups, from which four main topics of discussion emerged: barriers to implementing PCIT in the child welfare system, specific factors that facilitate PCIT implementation, developing a trauma-informed approach to PCIT, and strategies to facilitate the translation of PCIT in the child welfare system. The barriers that practitioners identified focused on foster parents' perceived voluntariness in PCIT participation and effective assessment of possible overreporting of child behavioral problems. On the other hand, foster parents discussed their reservations in seeking professional assistance given the assumption that foster parents are experts in childcare. Nevertheless, both practitioners and foster parents were able to identify factors that facilitated PCIT implementation. For example, practitioners emphasized the importance of consulting with other clinicians when facing challenges during treatment, while foster parents emphasized the importance of the therapeutic alliance. Moreover, both foster parents and practitioners emphasized the need for a trauma-informed approach to PCIT, as many children in the foster care system experience adverse childhood events such as child abuse or neglect. Regarding strategies to facilitate the translation of PCIT into the child welfare system, foster parents suggested preservice training and peer recruitment, while practitioners suggested flexibility regarding treatment duration, session length, and delivery format (i.e., group vs. individual).

There is a demonstrated need for foster parents and children in the child welfare system to have access to readily available mental health resources. However, further research is needed to examine the efficacy of various parent training programs and additional resources that may improve foster parents' sense of self-efficacy and well-being.

BPT with Incarcerated Parents

The increased rates of incarceration in Western nations over the past decade have resulted in a significant increase in the number of parents and children affected by incarceration (Jeffries & Newbold, 2016; Walmsley, 2015). Global estimates indicate that between 45% and 87% of prisoners are parents (Atabay, 2008; Glaze & Maruschak, 2008). According to the United States Department of Justice, the number of children with incarcerated mothers increased by 131% between 1991 and 2007, impacting more than one million children (Glaze & Maruschak, 2008). Parental incarceration has several ramifications on the well-being of parents and their children. Studies have shown that children with an incarcerated parent experience reduced psychological well-being and are at an increased risk for antisocial and criminal tendencies (Murray et al., 2012; Roettger & Swisher, 2011; Shaw et al., 2015). Incarcerated parents further experience considerable stress and a sense of loss regarding their parenting role given their absence from their children's lives (Arditti et al., 2005; Shannon & Abrams, 2007). The need to address the mental health of incarcerated parents has prompted correctional facilities to support inmates who are parents and provide them with parenting interventions that emphasize behavioral or relationship-focused parenting education (Armstrong et al., 2018). Hence, numerous parenting programs have been adapted for incarcerated parents; however, there is limited knowledge as to the extent to which these interventions actually improve parental outcomes.

Armstrong et al. (2018) conducted a systematic review and meta-analysis of parenting interventions for incarcerated parents that aimed to improve parenting knowledge and skills, parental well-being, and the quality of the parent-child relationship. Studies included within their meta-analysis compared the experimental or treatment group with incarcerated parents receiving no treatment, parents enrolled in the waitlist control, or parents receiving treatment-as-usual. Of the 16 studies included in the meta-analysis, 13 studies indicated that parenting interventions were moderately more effective than the waitlist control, no treatment, or treatment-as-usual conditions for improving parenting knowledge and skills post-intervention. Results further suggested that parenting interventions improved the quality of the parent-child relationship post-intervention. Notably, there were no improvements for parental well-being when comparing incarcerated parents who participated in parenting interventions to parents in the waitlist control, no treatment, or treatment-as-usual conditions. In addition, the effectiveness of the parenting interventions was not maintained post-incarceration. Thus, further research is needed to evaluate the effectiveness of BPT with incarcerated parents.

Two variables that should be acknowledged are research setting and geographic location, as correctional institutions may differ in the types of services they provide as well as their treatment modalities. Armstrong et al. (2018) reported that researchers listed 11 types of correctional settings, some of which included correctional facilities, county jails, minimum- and maximum-security state prisons, reformatory for women, prison with mother-baby unit, and residential work-release centers. Notably, some settings allowed for children and family members to participate in treatment, while others did not. A survey of prison wardens in the United States conducted in 2010 revealed that 90% of women's correctional facilities offer some form of parenting program (Hoffman et al., 2010). However, these programs are highly variable with respect to treatment components and content given the absence of guidelines for developing parenting interventions for this population (Loper & Tuerk, 2011). The lack of standardization challenges researchers in evaluating the effectiveness of treatments across correctional settings and in determining which environmental variables influence treatment efficacy. One area in which this challenge is particularly relevant is parenting programs for incarcerated mothers (Tremblay & Sutherland, 2017).

Women involved in the criminal justice system face numerous barriers to receiving mental health services and in using effective parenting strategies (Green et al., 2005). This may be in part due to limited knowledge regarding parent and child roles, and a tendency for incarcerated mothers to view children's needs as secondary to their own (Grella & Greenwall, 2006). Although these findings speak of a lack of knowledge and understanding incarcerated mothers may have regarding parenting, incarceration is considered to be an ideal opportunity for mothers to participate in parenting interventions, as they become highly motivated to improve upon their parenting role (Burgess & Flynn, 2013). Within their systematic review, Tremblay and Sutherland (2017) found that larger effects regarding parenting outcomes were reported by more intensive parenting interventions with a higher frequency of sessions when compared to less intensive parenting interventions. In addition, Tremblay and Sutherland (2017) found that behavior-based parenting programs (i.e., PCIT and Filial Therapy) yielded large effects on parenting behavior, further demonstrating the efficacy of parenting programs that emphasize active parent participation and involvement. Behavior-based parenting programs are more likely to facilitate skill development than didactic instruction since parents are allowed to receive feedback and modify their behavior throughout training (Kaminski et al., 2008; Tremblay & Sutherland, 2017). Thus, BPT programs appear to be efficacious in improving parental practices in incarcerated parents. However, several factors should be considered in their future implementation.

High attrition rates are common among BPT programs with incarcerated parents. Hence, steps should be taken to increase participant engagement and motivation among incarcerated parents (Tremblay & Sutherland, 2017). Moreover, psychological interventions in general, including BPT, are extremely difficult to implement within a correctional setting. Researchers and treatment developers should consider modifying treatment duration and modality to allow for higher participation and lower attrition rates. The assistance of institutional staff and administrators may also be instrumental in improving implementation and adherence for incarcerated parents. Correctional staff and administrators could potentially increase opportunities for skills practice, as they can extend visiting hours or provide incarcerated parents with resources outside of the correctional setting so as to continue improving parental practices post-release (Tremblay & Sutherland, 2017). A vast majority of incarcerated mothers report ambivalence in accessing community resources following release due to negative past experiences with the system (Brown & Bloom, 2009). Providing incarcerated parents with resources in their community may be highly instrumental in the continued improvement of their parenting skills following release.

Cultural Considerations for BPT

In general, parents report greater socioeconomic and stigma-related barriers to obtaining mental health services than medical services (Young & Rabiner, 2015). Such findings highlight the importance of providing care that is easily accessible to families across different communities. One way to increase access to services is to adapt evidence-based treatments to various populations, so as to allow individuals to connect with the treatment offered and ensure that a working relationship with providers is established. Indeed, various BPT programs have modified their treatment to account for cultural factors and improve treatment adherence.

The Incredible Years Parent Training program has been adapted to numerous populations, making it an easily accessible and effective tool for parents learning to effectively manage their children's disruptive and oppositional behaviors. For example, Lau et al. (2011) created a culturally responsive version of the IYPT program that targeted risk factors associated with physical discipline in immigrant Chinese families. Several cultural factors incorporated in treatment included communication training to address recurrent conflicts common in immigrant families and specialized parental guidance for parents who were not fluent in English. Throughout treatment, parental concerns were also discussed in detail, including the concern that praise will "spoil" children or that time-out is not sufficiently punitive. Lau et al. (2011) found that not only were parents engaged and adherent to treatment, but the use of negative discipline, as well as children's levels of externalizing and internalizing problems, was substantially reduced. Similarly, studies exploring culturally responsive BPT programs for Hispanic parents have demonstrated their efficacy in reducing externalizing behaviors in children and increasing positive parenting skills (Gerdes et al., 2021; Martinez & Eddy, 2005). The success of these culturally responsive treatments is in part due to the inclusion of important cultural values; for example, in the Hispanic community, two common values include *familismo* and *respeto* (Barker et al., 2010; Calzada, 2010).

Familismo, or familism, emphasizes the loyalty and reciprocity family members owe to one another as well as to family members outside of the nuclear family unit (Andrés-Hyman et al., 2006). Parent training programs that wish to be culturally responsive should incorporate familism in treatment by considering the influence that extended family and friends may have within the relationship between parents and their children (Barker et al., 2010). Regarding *respeto*, or respect, clinicians should consider addressing patients formally and incorporating culturally related material throughout treatment, such as translating resources to Spanish and offering the services of bilingual therapists whenever possible (Barker et al., 2010). Acculturation should also be considered, as acculturative stress can influence the extent to which parents adhere to treatment as well as their attitude regarding mental health services for their children's well-being (Eiraldi et al., 2006; Lawton et al., 2014; Ramos-Sánchez & Atkinson, 2009). Practitioners using BPT programs with racial and ethnic minority groups are further encouraged to address the influence that cultural beliefs, values, and experiences have on parental receptivity to interventions. For instance, parents' perceptions of their parenting skills and their immigration experiences may affect how they respond to treatment (Butler & Titus, 2015). The cultural relevancy and literacy of intervention materials should be evaluated and addressed throughout treatment as well (Butler & Titus, 2015).

Other BPT programs, including PCIT and Triple P, have been adapted to include culturally relevant factors across populations. Morawska et al. (2011) examined the cultural acceptability of the Triple P-Positive Parenting program to parents of culturally diverse backgrounds and found that parents deemed all of the parenting strategies as highly useful, acceptable, and ergonomic. Although these results are encouraging, there is still a high demand for further research in this area. Baumann et al. (2015) conducted a systematic review to examine the extent to which researchers and developers of evidence-based parent training programs have tested cultural adaptation models, implementation strategies, and implementation outcomes when integrating these interventions into routine care. Eight papers documented a rigorous cultural adaptation process and only two evaluated the effectiveness of the strategies implemented. Several adapted treatments included BPT for Hispanic youth, PCIT for Puerto Rican and Mexican families, Triple P for Aboriginal and Torres Strait Islander families in Australia, and PMT-O® for Somali and Pakistani families living in Norway. Although cultural adaptations to treatments should be prioritized upon treatment delivery, further investigation is needed regarding the efficacy of said adaptations to optimize care for children and families. Moreover, future research should examine parental engagement in adapted interventions compared to non-adapted interventions and examine factors (e.g., immigration status; perceived stigma) that impact parental engagement across interventions (Butler & Titus, 2015).

Summary

Behavioral parent training has been an effective intervention tool for clinicians for decades (Bijou, 1984). As described, research in this area over the years has demonstrated efficacy for BPT in many areas including ADHD, ASD, disruptive behaviors, and treating these diagnoses in multiple populations. In addition, there is evidence demonstrating the efficacy of BPT for young children with ASD and sleep (Johnson et al., 2013) or feeding (Johnson et al., 2015; Sharp et al., 2014) difficulties, children with developmental and intellectual disabilities (Matson et al., 2009), adolescent suicide (Torok et al., 2019), adolescent substance use (Ladis et al., 2019; Newton et al., 2017), and childhood health problems such as obesity (Domoff & Niec, 2018). With the ever-increasing emphasis on affordable healthcare, BPT offers direct, effective treatment that is cost-effective (Goldfine et al., 2008; Matson et al., 2009; Khavjou et al., 2018) and, particularly with the increasing use of telehealth, accessible to families in multiple settings (i.e., rural locations; Rooks-Ellis et al., 2020). Cultural values, traditions, parenting practices, and systemic challenges to healthcare access should be considered research on the efficacy of BPT continues to expand. Moreover, the challenges and needs of different populations, such as foster and incarcerated parents, as well as families in low-income and rural areas, should be further evaluated to continue to expand this efficacious treatment across populations. With continued efforts, mental health providers and professionals in the field of psychology can provide parents the skills they need to feel confident in their parenting role and improve the well-being of families overall.

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Psychotropic Medication

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The Evolution of Psychotropic Medication

Psychotropic medications treat psychological disorders that impair a person's social, emotional, or behavioral functioning (Jonas et al., 2009). The initial development of psychotropic drugs began in the twentieth century and has since expanded to include a range of patient populations. In the 1930s, a serendipitous response to stimulant medication ignited psychotropic medication use in children and adolescents (Lorberg et al., 2019). This discovery led to the widespread use of stimulants for Attention-Deficit/Hyperactivity Disorder (ADHD), the most common neurodevelopmental disorder in school-age children worldwide (Rapoport, 2013; Ruiz-Goikoetxea et al., 2018). The observable and seemingly immediate benefits of stimulants indicated a promising treatment alternative for children and adolescents who were unresponsive to traditional psychotherapeutic treatments (Rapoport, 2013).

In the 1970s and 1980s, safer medication alternatives with fewer side effects emerged, prompting various antidepressants and antianxiety medications in child and adolescent populations (Chubinsky & Hojman, 2013). By the late 1990s, psychotropic medications were prescribed significantly higher than in previous decades (Chubinsky & Hojman, 2013; Rappaport & Chubinsky, 2000). With the notable exception of stimulants, most psychotropic medications first treated symptoms in adults and were later extended to child populations (Lorberg et al., 2019).

Several factors are posited for the dramatic increase in psychotropic medication use over time (Lorberg et al., 2019). Changes in medical and educational practices, patient and family expectations, new medications with fewer side effects, increased healthcare costs, and changes in diagnostic criteria have all been argued to contribute to psychotropic medication use (Chubinsky & Hojman, 2013; Rappaport & Chubinsky, 2000). Changes in mental health services or insurance coverage for hospitalization costs, including a shortage of child and adolescent mental health providers and the limited availability of psychotherapy sessions provided by psychiatrists, have also been suggested as influential factors (Chubinsky & Hojman, 2013; Goodwin et al., 2001; Olfson et al., 2003).

The pharmaceutical industry's role has also been implicated as a contributor to the growing use of psychotropic medications in children and adolescents. The industry often plays a role in funding clinical trials, providing medical continuing education and resident training (Baird, 2003; Brodkey, 2005;

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Perlis et al., 2005), as well as substantially increasing direct-to-consumer advertising since the 1990s (Chubinsky & Hojman, 2013; Kravitz et al., 2005). Regardless of the complex nature of influential factors that led to the vast growth of psychotropic intervention (Chubinsky & Hojman, 2013), research about the safety, benefits, and potential side effects of psychotropic use during core periods of development are limited in comparison (Cortese et al., 2019; Solmi et al., 2020).

Variability of Psychotropic Prescribing

At both national and international levels, the approaches to mental health and psychotropic treatment significantly differ; the potential implications of these differences have yet to be rigorously researched or understood (Lorberg et al., 2019). Some studies have suggested that prescribing variability cannot be solely explained by differences in disorder prevalence rates or classification; cultural, geographic, economic, and regulatory differences are potential contributing factors that require additional exploration (Lorberg et al., 2019; Vitiello, 2008).

International comparisons indicate stark psychotropic prescribing differences. For instance, Zuvekas and Vitiello (2012) report that over 80% of the world's stimulants are prescribed in the USA compared to other affluent countries. In addition, antidepressant and antipsychotic prescriptions are also higher in the USA (Fegert et al., 2006). Within the USA, stimulant use in Western coastal regions is significantly lower compared to the remaining areas (Zuvekas & Vitiello, 2012). Independent of economic factors, White children are more likely to be prescribed ADHD stimulants than Black or Hispanic children (Cohen et al., 2013). African American and Hispanic parents also report more concerns about adolescent addiction and dependency on psychotropic medication than White parents (Zhu et al., 2009; Lorberg et al., 2019). A study by Hsia et al. (2014) suggests that economic factors may influence prescribing differences between countries. A significant correlation was identified between a country's per capita GDP (gross domestic product) and psychotropic prescription rates when treating comorbidities in children and adults with autism spectrum disorder (ASD) (Lorberg et al., 2019).

Lorberg et al. (2019) suggest that many prescribing differences may be attributed to the influence of the pharmaceutical industry's marketing strategies on prescribing practices. While some literature suggests several factors that influence the prescribing variation of psychotropic medications, more research is required to determine the most influential factors and the potential impact of prescribing differences on patient outcomes and mental health treatment.

Types of Psychotropic Medications

Psychotropic medications are prescribed to treat a range of mental disorders such as ADHD, major depressive disorder (MDD), obsessive-compulsive disorder (OCD), anxiety disorders (e.g., separation anxiety, social anxiety, and generalized anxiety), tic disorders, and manic symptoms (Birmaher et al., 2003; Jensen et al., 2001; Riddle et al., 2001; Scahill et al., 2003; Wagner et al., 2004; Walkup et al., 2008). Researchers also report using medications for aggressive behavior and severe impulsivity in children with disruptive behavior disorders and ASD (McCracken et al., 2002; Papadopoulos et al., 2003; Schur et al., 2003).

Disturbances in the dopaminergic system form the basis of many psychological disorders; psychotropic medications target this system and influence expectation, reward, memory, activity, attention, motivation, and mood (Cohen & Carlezon, 2007). Atypicalities in neurotransmitters, such as structural or functional abnormalities in specific brain areas, have been linked to childhood mental disorders. Atypicalities can be caused by environmental and genetic factors (Walkup, 2009; Martin et al., 2003); these pathways can be treated by psychotropic medications (Martin et al., 2003; Walkup, 2009). Initially, psychotropic medications included stimulants, antidepressants, anticonvulsants, sedatives/hypnotics, benzodiazepines, miscellaneous anxiolytics, and lithium. Drug types then further merged as stimulants, antidepressants, and "other psychotropic medications," including anticonvulsants and mood stabilizers (Olfson et al., 2002). Presently, the most commonly prescribed psychotropic medications for children and adolescents are stimulants, antidepressants (or antianxiety medications), and antipsychotics. The following section briefly discusses the pathophysiology of these drug types and their everyday use in treating disorders in child and adolescent populations.

Stimulants

The most widely prescribed class of psychotropic medicine for childhood and adolescent disorders is stimulants (Oswald & Sonenklar, 2007; Sultan et al., 2018). Stimulants target the central nervous system (Winterstein et al., 2007) and are available in various dosage forms, including short-acting and long-acting formulations, as well as immediate and extended-release (Rapoport, 2013; Sultan et al., 2018). They are typically administered to children with attention deficit/hyperactivity disorder (ADHD) to mitigate inattention, hyperactivity, or impulsivity.

Antidepressants

Antidepressants treat depression and other psychological conditions (Ilyas & Moncrieff, 2012). Antidepressant medications were first tested on children with enuresis (Mikkelsen & Rapoport, 1980) and were later expanded to children with depression and anxiety disorders (Rapoport, 2013; Puig-Antich et al., 1980). Researchers further expanded antidepressant therapy to include pediatric anxiety disorders. Older forms of antidepressants include tricyclic antidepressants (TCAs) and monoamine oxidase inhibitors (MAOIs); while new or second-generation antidepressants include selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs; Bledsoe et al., 2007; Zhou et al., 2017). Each type uniquely influences neurotransmitters and receptors (Bledsoe et al., 2007; Hosenbocus & Chahal, 2012; Patel et al., 2018). MAOIs were the first antidepressants used in clinical practice. They work by inhibiting the MAO enzyme, which catalyzes the oxidative deamination of monoamines (Neves, 2021). TCAs induce a receptor blockade, inhibiting noradrenaline and serotonin reuptake with different selectivity. While TCAs have high efficacy, they are associated with numerous adverse effects (Neves, 2021). SSRIs are often the first-line of psychotropic treatment (Neves, 2021). SSRIs have more robust evidence for use in children and adolescents than other medication types and are the recommended antidepressant for psychopharmacology; SNRIs are discouraged as a primary treatment option given the lack of empirical evidence available (Garland et al., 2016). Additionally, SSRIs or SNRIs have not consistently demonstrated a significant reduction of depressive symptoms in prepubertal children (Garland et al., 2016), emphasizing the importance of age and level of development when considering antidepressant intervention.

Antipsychotics

Antipsychotics target the brain's dopaminergic, serotonergic, and adrenergic receptors (Kaar et al., 2020). Antipsychotics have long been utilized to treat childhood, adolescent, and adult-onset psychosis. Psychotropic medication use in adult populations for schizophrenia and other diseases that present similarly throughout development informs and guides drug choice and use for children and adolescents (McClellan et al., 2007; McClellan & Stock, 2013; Walkup, 2009). Positive symptoms (e.g., irrational thinking, delusions, and hallucinations) are associated with dopamine dysregulation and excess dopamine in the brain. Studies evaluating the impact of antipsychotic use have indicated a reduction of some positive symptoms but not all (Harvey et al., 2003; Hosenbocus & Chahal, 2012; Cuesta et al., 2001). Low-dose antipsychotic medicines are also used in pediatric psychiatry populations to treat Tourette's syndrome and other repetitive motor disorders (Findling et al., 2011). Antipsychotics' therapeutic use has also expanded to treat conduct difficulties, but with relatively low effectiveness (Hosenbocus & Chahal, 2012; Rapoport, 2013). Antipsychotic use in children and adolescents has a poorer risk-to-benefit ratio than in adult patients. Several studies show that drugs explicitly used to treat and manage psychotic symptoms and other associated conditions can cause metabolic abnormalities; in severe circumstances, cardiogenic complications can result from their use. Given the potential risk of long-term impacts during critical developmental stages, further study is required to more definitively evaluate the risk-to-benefit ratio of antipsychotic use in youth (Hosenbocus & Chahal, 2012; Stafford et al., 2015).

Safety, Adverse Side Effects, and Adherence

While the broader research regarding the long-term effects of psychiatric drugs remains limited, knowledge about certain psychotropic medications and their long-term safety has grown (Lorberg et al., 2019). Physicians should proactively research a prescription's known risks and potential adverse effects before offering a specific drug regimen (Lorberg et al., 2019). Practitioners should also assess the appropriateness of a proposed pharmaceutical regimen for their patient's age and severity of symptoms (Lorberg et al., 2019). The following section reviews the side effects and safety of psychotropic drugs used to treat children and adolescents.

Adverse Effects of SSRIs and Other Antidepressants

The first medication to treat clinical depression is often an SSRI due to its higher tolerance and safety than MAOIs and TCAs (Neves, 2021). Typical SSRI adverse effects include gastrointestinal (e.g., nausea, vomiting, diarrhea, decreased appetite, dry mouth, and heartburn) and fade within a few weeks (Strawn et al., 2015; Dobson & Strawn, 2016; Patel et al., 2018). In some children and adolescents, weight gain may be an issue, and they may not respond to caloric restriction and increased activity (Strawn et al., 2012; Patel et al., 2018).

TCAs may be considered for individuals with SSRI resistance or as an addition to SSRIs for reduced response in children with OCD. However, SSRIs and SNRIs are safer in excess doses than TCAs and MAOIs. TCAs are less preferred since they require EKG monitoring due to an increased risk of cardiac irregularities, carry a significant mortality risk in overdose, and produce constipation and sleepiness (Kodish et al., 2022). In overdose, they disrupt sodium channels like quinidine, which is harmful to individuals experiencing suicidal ideation (Neves, 2021). Dry mouth, constipation, urine retention, impaired vision, and orthostatic hypotension are typical side effects of TCAs (Neves, 2021). While TCAs alleviate depressive symptoms in adults, similar results were not found in children or teens adolescents (Hazell et al., 1995; Teng et al., 2022).

Like TCAs, MAOIs can induce many side effects, including orthostatic hypotension, weight gain, sexual dysfunction, urine retention, and serotoninergic syndrome. However, high blood pressure episodes and toxicity or overdose are the biggest concerns with MAOIs (Neves, 2021). Additionally, SSRIs and MAOIs should never be prescribed together, given the dangerous potential of interactions between their compositions and pathology; a history of medication use and existing medication regimens should always be identified before selecting a regimen (Patel et al., 2018).

SSRIs can also cause yawning and sweating (Creswell & Waite, 2016; Patel et al., 2018; Wehry et al., 2015). Some children excessively sweat, drenching their bedding (Patel et al., 2018; Stahl, 2020). SSRI-induced galactorrhea in men and women can last for months (Patel et al., 2018). SSRIs also cause lethargy, inappropriate antidiuretic hormone secretion, and increased bleeding, possibly gastrointestinal hemorrhage (Patel et al., 2018). Sleep disturbances can include delayed falling, frequent waking, shorter sleep, and altered dream states (Dobson & Strawn, 2016; Hussain et al., 2016; Murphy et al., 2008; Patel et al., 2018). Poor sleep quality can lead to daytime tiredness in children and teens (Patel et al., 2018). If sleep disturbance is significant, recommendations are often made to administer medication in the morning, implement a sleep hygiene routine, or use melatonin (Patel et al., 2018).

Some children and adolescents may experience withdrawal symptoms when SSRI medication is abruptly stopped, referred to as withdrawal or discontinuation syndrome (Henry et al., 2012; Patel et al., 2018). Short-half-life SSRIs, more extended use, and rapid withdrawal increase the risk (Murphy et al., 2008; Patel et al., 2018). Withdrawal symptoms include GI abnormalities, dysphoria, irritability, headache, sweating, chills, exhaustion, agitation, dizziness, sensory disturbances (e.g., electric shock-like feelings), anxiety, confusion, and sleep disturbances (Creswell & Waite, 2016; Murphy et al., 2008; Patel et al., 2018). Symptoms may not be seen for 2–10 days (Hussain et al., 2016; Murphy et al., 2008; Patel et al., 2018; Strawn et al., 2012) and usually resolve within a couple of weeks, though severe symptoms require a change in dose (Patel et al., 2018). Discontinuation syndrome symptoms differ from those of an anxiety disorder relapse (Patel et al., 2018).

The danger of suicidality connected with antidepressants is often debated (Patel et al., 2018). In 2004, the FDA warned that all antidepressants raise the risk of suicidality in children and teens. However, studies have yet to establish a solid evidence base that links antidepressant usage in young patients to an increased risk of suicidal tendencies (Dobson & Strawn, 2016; Patel et al., 2018; Wehry et al., 2015). Nevertheless, they warned that adolescents on antidepressants should be closely monitored for suicidal ideation when starting antidepressants (Patel et al., 2018). Multiple studies have yet to convincingly link antidepressant usage in kids to suicidal tendencies (Dobson & Strawn, 2016; Strawn et al., 2012; Patel et al., 2018). However, enhanced worry about the adverse effects of SSRIs and SNRIs on adolescents, including activation and growing suicidality, has impacted family readiness and professional practice to initiate pharmacotherapy, especially for children with increased levels of anxiety (Kodish et al., 2022; Singh et al., 2009).

SSRIs can cause bipolar switching in children and adolescents, though it is not a common side effect. Switching is when a depressed or anxious patient becomes manic or hypomanic. Switching symptoms tend to appear later in treatment and may persist after the SSRI is stopped (Patel et al., 2018). SSRIs must be discontinued if bipolar symptoms develop (Creswell & Waite, 2016; Patel et al., 2018). When treated effectively with an SSRI agent for anxiety or depression, children and adolescents may exhibit symptoms of comorbid mental health disorders (e.g., ADHD or conduct disorder) and require further evaluation and treatment (Patel et al., 2018). Cardiovascular side effects are also less common with SSRIs, but long QT syndrome (arrhythmia for extended periods) has been documented at higher doses or overdose (Hussain et al., 2016; Patel et al., 2018). Unless otherwise indicated by history and physical exam, an electrocardiogram is not suggested before starting SSRIs (Patel et al., 2018).

Serotonin Syndrome (SS) is a rare yet significant SSRI-related side effect (Hammerness et al., 2006; Murphy et al., 2008; Patel et al., 2018) and is induced by serotonin overactivity. High SSRI doses and numerous serotonergic medications enhance SS risk (Dobson & Strawn, 2016; Patel et al., 2018). Symptoms of SS include agitation, disorientation, tachycardia, hypertension, tremors, incoordination, muscle stiffness, myoclonus, hyperreflexia, fever, shivering, excessive perspiration, diaphoresis, and diarrhea (Patel et al., 2018). Complications of SS can include seizures, metabolic acidosis, rhabdomyolysis, DIV, renal failure, respiratory failure, coma, and death (Patel et al., 2018). As soon as SS symptoms are noticed, all serotonergic substances must be discontinued, and emergency medical care must be given (Patel et al., 2018; Stahl, 2020).

Lastly, underweight children and adolescents, those with hepatic or renal impairment, a history of atrial tachycardia or conduction issues, or those with extreme daytime sleepiness have a higher risk of SSRI-related side effects (Patel et al., 2018). Children with anxiety are also more vulnerable to SSRI and SNRI side effects, especially physical discomfort. SSRI and SNRI adverse events caused roughly twice as many RCT dropouts as placebo. Lower starting doses can help mitigate the risk of side effects (Kodish et al., 2022); however, physicians should collect adequate health information and comprehensive symptom presentation to proactively plan and account for possible factors that may increase a child's risk or negative experience of adverse effects.

Adverse Effects of Stimulants

Common side effects of stimulant use include sleep disturbances (e.g., lowered sleep duration, sleep latency, and sleep efficiency), suppressed appetite, and irritability; however, most of these effects are minimal and can be curbed with behavioral strategies (Brown et al., 2018; Kidwell et al., 2015). Additionally, stimulants can increase heart rate and blood pressure, but rarely to an abnormal level for age (Brown et al., 2018; Findling et al., 2011). However, children and teens are at higher risk for cardiovascular problems when taking stimulants (Dalsgaard et al., 2014; Schelleman et al., 2011; Brown et al., 2018). Children and adolescents should be assessed for cardiac illness or risk factors before starting stimulants or if cardiac symptoms arise (Brown et al., 2018).

Given that stimulants have the potential for abuse, concern has risen regarding whether or not psychotropic stimulant treatment in childhood sensitizes the brain and potentially raises the likelihood of drug dependency in adulthood (Vitiello, 2001; Lorberg et al., 2019). However, researchers have not established a relationship between childhood stimulant usage and adult drug use (Volkow & Swanson, 2008; Biederman et al., 2008; Lorberg et al., 2019; Wilens et al., 1995).

Adverse Effects of Antipsychotics

Tolerability and safety should guide antipsychotic treatment in children and adolescent populations. Psychotropic side effects can range from more immediate or obvious reactions (e.g., dystonias and appetite loss; Lorberg et al., 2019; Vitiello et al., 2003) to effects that may not be noticeable until later treatment (e.g., tardive dyskinesia or metabolic syndrome). While some side effects are induced by psychiatric medication (e.g., tremors, tics), others can occur after a drug is discontinued (e.g., antipsychotic withdrawal dyskinesias; Lorberg et al., 2019). Certain side effects are anticipated given their composition and impact on particular brain processes (e.g., sedation with antipsychotics); however, others can be unexpected and have the opposite outcome to what was expected (e.g., antidepressant-induced suicidality; Lorberg et al., 2019).

Children are more prone to extrapyramidal symptoms and metabolic and endocrine problems than adults. While acute and intermediate therapy safety has been explored, long-term benefit/risk remains unclear (Dinnissen et al., 2020). To develop effective preventive and treatment techniques, researchers must understand the mechanisms causing antipsychotic-induced toxicities (Vitiello, 2009). Antipsychotics are often prescribed off-label in children, which can be dangerous because their effects and side effects have not been sufficiently investigated (Dinnissen et al., 2020; Rettew et al., 2015). Weight gain, diabetes, sedation, extrapyramidal symptoms, elevated prolactin levels, and an elevated QT-interval can be side effects of antipsychotics (Caccia et al., 2011; Cohen et al., 2012; Jensen et al., 2015; Nielsen et al., 2014; Dinnissen et al., 2020). Children are more prone to adverse effects than adults; therefore, following guidelines is especially important in youth (Dinnissen et al., 2020; Woods et al., 2002). In younger patients, psychosis and various treatment variables indicated an increased incidence of tardive dyskinesia with antipsychotic use (Cohen et al., 2012; Garcia-Amador et al., 2015). Antipsychotics in children and adolescents should be prescribed exclusively for evidence-based purposes (Cohen et al., 2012).

Medication Adherence

Adherence is a term that represents a therapeutic alliance between the practitioner and consumer (McGuinness & Worley, 2010b). Adhering to psychotropic medication regimens as prescribed can be challenging to achieve in child and adolescent populations. Many factors can influence psychotropic drug adherence, particularly in youth. However, the attitudes and opinions of caregivers or parents about their child's diagnosis and prescribed medication are arguably the most influential factor (McGuinness & Worley, 2010a).

Medication adherence is ultimately the responsibility of the parents or caregivers to follow a medication regimen as prescribed; parents or caregivers should regularly monitor any changes in their child's physical and mental health to limit these potentially dangerous side effects (Lorberg et al., 2019). However, practitioners are continuously competing with various unreliable sources of information, which can influence a parent's or child's willingness to follow psychotropic regimens as prescribed. Additionally, as children age, their perspectives about their diagnoses, symptoms, and need for psychotropic medication may increase or alter (McGuinness & Worley, 2010a). Adolescents gain more power over their adherence decisions (Hamrin et al., 2010). Therefore, to best support medication adherence, a partnership between the prescribing physician, parents, caregivers, and in some cases, the adolescent is imperative (McGuinness & Worley, 2010b). A reliable provider connection can improve adherence (Hamrin et al., 2010).

Given the influence of side effects on treatment adherence, responsiveness, and quality of life, recognizing common side effects is crucial for client care. Successful management of side effects can increase adherence, inform adequate dosing, improve patient comfortability, and prevent premature termination of therapy. Appropriate management includes careful drug selection, anticipating side effects, and seeking the lowest effective dose and drug regimes that are easy but timely in producing positive outcomes. It comprises supplementary therapy to manage emergent problems (Kelly et al., 2022). Antidepressant side effects threaten treatment adherence and quality of life. Physicians may underestimate adverse effects and be hesitant to address them proactively because they fear exacerbating them (Kelly et al., 2022). Communication and patient education are vital to managing antidepressant side effects. Treatment-emergent side effects must be differentiated from residual depression symptoms, relapse, discontinuation-related adverse events, and intercurrent general medical concerns. Optimal side effect management involves dose reduction, changes to dose scheduling or medication preparation, behavioral techniques, pharmaceutical antidotes, and willingness to switch treatments. Adequate and appropriate side effect management is essential to symptom remission, patient safety, and quality of life (Kelly et al., 2022).

Benefits and Shortcomings of Psychotropic Treatment

As prescriptions of psychotropic medications for children and adolescents have substantially increased since the late 1990s, their benefits and shortcomings are equally discussed in the relevant literature (Chubinsky & Hojman, 2013; Olfson et al., 2002). The current data suggest that psychotropic drugs can result in symptom reduction and improved behavioral functioning. For instance, evidence supporting the short-term use of stimulant medication in children and adolescents includes a decrease in attention-deficit/hyperactivity disorder (ADHD) symptoms and enhancement of school functioning (Barbaresi et al., 2006, 2020; Bussing et al., 2007). Additionally, appropriate psychotropic treatment can result in a short-term reduction in the functional impact of major depression, anxiety disorders, and ADHD (Hosenbocus & Chahal, 2012; Mizuno et al., 2013). Psychotropic treatment has potential benefits that can result in improved family relationships and a lower level of parenting stress (Hamrin et al., 2010). While researchers have provided an enhanced understanding of the benefits and risks associated with using some psychotropics in children and adolescents, the present body of data is still insufficient (Cortese et al., 2019; Lorberg et al., 2019; Solmi et al., 2020).

Some drawbacks to the increase of psychotropic treatment in children and adolescents include the potential for inconsistent prescribing practices across providers (Chubinsky & Hojman, 2013), the risk of adverse side effects during a time of rapid development (Chubinsky & Hojman, 2013; Lorberg et al., 2019; Rappaport & Chubinsky, 2000), and the lack of comprehensive assessment, misdiagnosis, or underexplored treatment options before initiating psychotropic treatment (Chubinsky & Hojman, 2013). The influence of psychotropic treatment's unpleasant side effects, including social embarrassment, failure to respond, addiction fears, and changing the child's personality, has also been identified as costs (Hamrin et al., 2010).

Despite the advancements of the past decades, many children with diagnoses do not receive appropriate assessment and treatment (Satcher, 2000). While reports of the increased use of psychotropic medications in children (Olfson et al., 2002; Walkup, 2009; Zito et al., 2003) suggest that pharmacological treatment may be viewed as a helpful intervention in symptom reduction, the increase has also led to concerns of overdiagnosis and inappropriate pharmaceutical intervention (Walkup, 2009). The results of some studies suggest that some health professionals (i.e., pediatricians) may be more likely to prescribe psychotropic medications. In contrast, others (e.g., psychiatrists and psychologists) may be more reluctant to do so (Hsia et al., 2014). Further research is necessary to determine whether psychotropic drugs are appropriately prescribed, effectual, efficacious, and safe.

Some researchers argue that evidence supporting certain psychotropic drugs' long-term use in children and adolescents substantiates their short-term use. However, further research is needed to determine the necessity and implications of frequent and long-term use of psychotropic drugs during childhood (MTA Cooperative Group, 2004; Rynn et al., 2007; Walkup, 2009). Some researchers have questioned the long-term effects of certain medications being prescribed for 2 years or more (Jain & Dhawan, 2016; Kowatch et al., 2010), which raises questions regarding the durability of psychiatric drugs' therapeutic impact and their safety during a time of rapid development. Despite these limitations, psychotropic medication prescriptions are increasing and may continue to be prescribed at increasing rates (Correll et al., 2013; Sultan et al., 2018).

A related issue is whether or not childhood psychotropic medication improves adult functioning later in life. Unfortunately, controlled clinical studies are frequently short, limited in therapeutic generalizability, and hinder the possibility of identifying adverse or beneficial long-term effects (Solmi et al., 2018). However, naturalistic follow-up studies provide essential information regarding a medication's use over time, despite the lack of controlled research conditions. Additionally, the long-term effectiveness of a psychiatric drug may also be determined by the examination of many multiple placebo-controlled discontinuation trials (Lorberg et al., 2019). For best research practice, the foundational and clinical investigation of psychotropic drugs should include randomized control trials and evidence of the medication's effect on the human body and the body's impact on the medicine over time (Walkup, 2009). However, research designs should be improved and include variables that directly influence clinical practice for the prescribed medication populations. Unfortunately, some drugs are prescribed with only a single randomized control trial supporting their clinical use (Lorberg et al., 2019).

The typical methods used to research a drug are more limited when considering the use of psychotropic medicines during childhood and adolescence, which involve critical development. When researching a medication, meta-analyses typically prioritize the efficacy of a drug or how well it works as an outcome variable. While summarizing this information is essential for researchers and practitioners, meta-analyses often only include randomized controlled trials (RCTs) and exclude extensive evidence of a drug's safety or use for more than one disorder (Cortese et al., 2019; Solmi et al., 2020). For instance, RCTs are designed to minimize the influence of several sources of bias on estimates of medication effects in a population targeted for drug use (Solmi et al., 2020). Strict selection criteria are applied, reducing the generalizability and external validity of the results and information regarding off-label use (Solmi et al., 2020).

Moreover, RCTs are often relatively small in sample size and short in duration, which limits the identification of possible adverse effects from long-term use (Solmi et al., 2018, 2020). Researchers have recently determined a need for extensive evidence concerning the safety of prescribed psychotropic medications in children and adolescents. To inform clinical practice, it is recommended that comprehensive reviews include not only RCTs, extensive cohort studies, and real-world prescribing patterns (Solmi et al., 2020).

Prescribing Parameters

Pediatric psychopharmacology has become routine care (Vitiello & Davico, 2018). While the FDA has authorized psychotropic medicines for ADHD, depression, anxiety, and ASD, many are administered off-label or without standard care guidelines. Practice guidelines encourage the safe and proper use of psychotropic drugs in children and adolescents by emphasizing best prescribing practices (Walkup, 2009). Psychotropic treatment should only target disorders with moderate to severe presentations (Garland et al., 2016). When considering psychotropic treatment, physicians should conduct an adequate initial assessment to confirm the disorder and symptoms targeted for treatment (Garland et al., 2016). Prescribers should also use consistent, high-quality assessment and treatment strategies to help clients and their families understand, adhere to, and actively engage in treatment (Walkup, 2009).

The development of a psychosocial and psychopharmacological treatment plan, detailed psychoeducation, permission from the child and parent(s), an appropriate medication trial, and a monitoring plan to evaluate benefits and adverse effects are essential for the prescriber to promote ideal evidence-based practice (Walkup, 2009). Expectations should be mitigated by discussing predicted timetables for improvement, the limitations of medication, and efficacious treatment options used in combination, such as psychological therapies. To limit side effects and prioritize the health and safety of the patient, prescribers should titrate by starting with a low dose with a gradual increase over a time that is adequate to determine efficacy as well as adverse reactions (Garland et al., 2016). Once the medicine is effective, and the client is stable, practitioners should monitor the child and their family regularly to facilitate safe long-term medication management and psychosocial treatments. If the practitioner or client decides to stop the medication, the prescriber should conduct a withdrawal to limit the potential adverse effects of discontinuation and symptom recurrence (Walkup, 2009).

Practitioners who do not follow a consistent, high-quality diagnostic and treatment approach may adopt questionable techniques and procedures when medicating children. They may forgo or underuse beneficial psychosocial and pharmacological therapies and use inefficient treatment methods, inappropriate prescriptions, or pharmaceutical combinations. Low-quality care may dissuade patients and families from seeking future treatment. Low-quality psychiatric treatment may also influence public perceptions of prescribers, psychotropic medicines, and their use (Walkup, 2009). Some childhood mental disorders, including ADHD, may benefit from psychotropic medication (Walkup, 2009). However, psychological services are advantageous (Maalouf & Brent, 2012; Pelham Jr & Fabiano, 2008; Silverman & Hinshaw, 2008; Simon et al., 2015).

Polypharmacy

Polypharmacy, or the practice of prescribing a combination of psychiatric medications, has become more common among populations of children and teenagers. Despite clinical standards recommending monotherapy to treat children and adolescents, psychotropic polypharmacy continues to occur (Chen et al., 2011). The most widely accepted definition of psychotropic polypharmacy is the administration of two or more psychotropic drugs to treat the same symptoms (Kukreja et al., 2013). The use of psychotropic medications in children and adolescents is still debatable, and research is still being conducted to determine conclusive biological indicators. The polypharmacy literature is even more limited. It is implausible to identify all immediate and long-term consequences associated with polypharmacy (Hashimoto et al., 2012). However, psychotropic polypharmacy has been linked to several adverse effects. Some include drug interactions, nonadherence, increased healthcare expenses, comorbidities, and even mortality (Medhekar et al., 2019).

Any single medication cannot treat all symptoms of a disorder. Relying entirely on medicine to produce a change places unrealistic expectations on the drug and may result in disappointment if the effect is minimal. Treatment expectations that rely solely on pharmaceutical intervention can also encourage polypharmacy to alleviate all problems. These symptoms can co-occur in a child, medications are combined to treat multiple symptoms simultaneously, and polypharmacy results (Hosenbocus & Chahal, 2012).

Instead, it is recommended and often essential to combine psychotropic medicine with other psychological treatment techniques while ensuring that any medication or medication combination does not increase symptoms or result in adverse effects that impair functioning and increase health risks (Hosenbocus & Chahal, 2012).

Considerations for Specific Populations

As discussed previously, a person's developmental stage substantially impacts how they react to various psychotropic medications. Therefore, the pharmacological knowledge gained from adolescents is not always generalizable to younger children or other developmental stages, given the atypical responses that can occur in individuals with atypical brain development (King et al., 2009). Pharmacological intervention during early development can result in specific toxicities only seen in children or adolescents taking psychotropic medication (Lorberg et al., 2019).

The fragility of rapid development is also illustrated by a study conducted by Greenhill et al. (2006), which indicates that children with ADHD aged 3–5 years have a lower tolerance and therapeutic response when prescribed stimulants (i.e., methylphenidate) compared to older children.

Furthermore, animal studies investigating the potential impact of psychiatric medication on child development yield results that are limited in generalizability to human development (Ansorge et al., 2004; Lorberg et al., 2019). Given the pathways that psychotropic agents target and their potential to influence brain functions, the unknown risk level for long-term adverse effects is problematic, particularly during early development. Therefore, considerable caution and attention should be used when treating children under the age of 6 (Lorberg et al., 2019).

Psychotropic medications, particularly antipsychotics, antidepressants, and stimulants, continue to be prescribed to children, adolescents, and adults with ASD at increasing rates (Aman et al., 2005; Oswald & Sonenklar, 2007; Mandell et al., 2008; Murray et al., 2014; Esbensen et al. 2009; Williams et al. 2012). Despite the limited research, psychotropic drugs are frequently used as an intervention for adolescents and children (Broadstock et al., 2007; Murray et al., 2014). Additionally, psychotropic drugs are used as an intervention for comorbid conditions and associated behaviors with ASD (Broadstock et al., 2007; Murray et al., 2014). While the research on pharmacological treatments for individuals with ASD and comorbid disorders has consistently increased in recent years (Murray et al., 2014; Simonoff et al., 2013), it is still unclear whether or not pharmacological treatments are appropriate and safe to treat difficulties associated with ASD (Aman et al., 2003; Frazier et al., 2011; Murray et al., 2014). Additionally, current recommended psychotropic practices lack solid evidence for children or adolescents with ASD (Frazier et al., 2011).

International survey data of children and adolescents with ASD (Wong et al., 2014) revealed that risperidone was the most commonly prescribed medication in the United States, followed by methylphenidate in the UK and haloperidol in Japan. This variation in psychopharmacological treatment among countries may be attributable to differences in diagnostic criteria, clinical guidelines, and health care systems (Wong et al., 2014). In ASD populations, aggression, self-injurious behavior, hyperactivity, inattention, compulsions, repetitive or stereotypic behaviors, and sleep issues are frequently targeted by psychotropic medicines. However, researchers have linked reduced pharmaceutical effectiveness and significant adverse effects (e.g., increased irritability and social disengagement; Aman et al. 1997; Handen et al. 2000; Murray et al., 2014). Relatedly, SSRIs are unsuccessful in treating compulsions and repetitive behaviors, demonstrating how atypical brain development might influence medication response (King et al., 2009).

While the FDA has approved psychiatric medicines (such as risperidone and aripiprazole) to treat irritability, severe tantrums, and aggression (Volkmar et al., 2014), the paucity of evidence on the efficacy and safety of many psychotropic drugs prescribed for people with ASD indicates that more research is needed to inform prescribing practices (Hsia et al., 2014; Wong et al., 2014). Information regarding the long-term safety of pharmacological treatment in ASD is also limited; an additional investigation is imperative to ensure the health and safety of children taking medication (Hsia et al., 2014; Murray et al., 2014; Wong et al., 2014).

When performing evaluations, practitioners should regularly integrate ASD screenings and coordinate an appropriate multidisciplinary assessment, which has become a standard of clinical practice. After an ASD diagnosis, practitioners should engage with the client and family to get structured educational and behavioral treatments. However, because children with ASD frequently have a specific target symptom or comorbid condition, and research supporting pharmaceutical treatments for such behaviors is limited (Volkmar et al., 2014), there are no clinically established standards or up-to-date guidelines for psychotropic prescribing in the ASD population (Murray et al., 2014). Regardless of pharmaceutical therapy, side effects and medication effects of illness in ASD should be appropriately researched and analyzed. ASD and ADHD in young children should be addressed with caution until research into pharmacological therapies for children and adolescents progresses.

Psychotropic Medication in Conjunction with Psychological Treatment

The main treatment options for children and adolescents with mental disorders are psychological or behavioral therapy and pharmacotherapy (Keeton et al., 2009; Rapoport, 2013; Roberts et al., 2003). It is advantageous for children and adolescents with disorders to receive treatment, given the increased risks of experiencing short- and long-term difficulties associated with not receiving therapy (Bhide & Chakraborty, 2020; Keeton et al., 2009). Evidence for psychotropic and psychological interventions has expanded over the decades, and psychotropic medication is routinely used in conjunction with behavioral treatment (Walkup, 2009).

However, the rise in child and adolescent psychiatry and psychotropic use presents challenges for integrating psychopharmacology with other effective treatment modalities. Factors influencing the accessibility and feasibility of a multidisciplinary treatment approach include financial considerations, time demands, insurance costs, and child practitioner shortages (e.g., psychiatrists and psychologists; Chubinsky & Hojman, 2013; Walkup, 2009). Additionally, concerns about overprescribing and limited communication between psychological and pharmacological-based therapies have been raised.

Nevertheless, medication is rarely curative in psychiatry (Lorberg et al., 2019), and medication alone does not change behavior, teach social skills, build academic skills, or teach emotional regulation strategies. For children and adolescents, psychological therapies are typically favored (Bhide & Chakraborty, 2020; Hamrin et al., 2010; Hazell, 2022) given their absence of exposure to adverse side effects and positive effects on symptom reduction (Brown et al., 2018; Lorberg et al., 2019). Psychotropic interventions frequently require psychological interventions to maintain improved functioning over time (Emslie et al., 2007; Lorberg et al., 2019).

Research suggests that psychotropic medication and psychological treatment can be advantageous when the drug of choice and dosage are appropriately paired and titrated with evidence-based behavioral therapy (Kodish et al., 2022). The increase in empirical evidence for the combination of treatment approaches likely contributes to the rise in the use and acceptance of psychotropic medication (Rapoport, 2013). However, selecting an integrated treatment approach should be based on the client's age, symptom presentation and severity, and the presence of co-occurring disorders, among other factors (Walkup, 2009).

Acceptance and commitment therapy (ACT), cognitive behavioral therapy (CBT), dialectical behavior therapy (DBT), family therapy, group therapy, interpersonal therapy (IPT), parent training, and parent-child interaction therapy (PCIT) are among the most common evidence-based psychotherapies that treat disorders in childhood and adolescence (Bhide & Chakraborty, 2020). When considering treatment approaches, it is notable that CBT has a more significant effect size for anxiety disorders than depression (Compton et al., 2004; Garland et al., 2016). However, the combination of psychotropic medication and behavioral therapy is more successful than any single therapeutic method for many moderate to severe symptoms of anxiety and depression (Lorberg et al., 2019; Vitiello, 2009). The use of psychotropic medication in conjunction with psychological or behavioral therapy is the most effective (compared to either treatment alone) in treating childhood depression, anxiety, and OCD (Domino et al., 2008; Garland et al., 2016; Piacentini et al., 2014; Rapoport, 2013; Walkup et al., 2008). The main categories of ADHD treatment are pharmacologic and nonpharmacologic treatments, including counseling, behavioral, and environmental modification strategies. Each treatment can be effective. However, a combination of treatment methods is most effective (Brown et al., 2018)

Pharmaceutical intervention is typically required for individuals with psychotic disorders as the first step in treatment (Lorberg et al., 2019). Clients with nonpsychotic or mild-to-moderate symptoms may benefit entirely from evidence-based psychological therapies (Lorberg et al., 2019). However, experts recommend that the use of psychotropic medicines in children and adolescents should be restricted to more clinically impaired cases (Garland et al., 2016; Hazell, 2022; Patel et al., 2018).

A psychopharmacologist typically prescribes the medication when conducting a conjoined psychotropic-psychological approach, whereas a psychologist provides psychotherapy. Each role must be clearly defined, treatment approaches must be compatible, and efficient communication is essential; a therapeutic alliance is the core of dual treatment. Education and communication about the multifaceted components of prescribing, based on psychological therapies and overall factors affecting treatment, improve therapist-prescribing collaboration between disciplines, which, in turn, maximizes the therapeutic benefit for children and adolescents (Chubinsky & Hojman, 2013; Chubinsky & Rappaport, 2006). Therapeutic alliances involve shared goals between physicians and therapists, children or adolescents, parents, schools, and other systems. Even if there is an initial agreement, differing goals may cause stress as treatment progresses. When multiple alliances may need to be negotiated (and renegotiated) for therapy to be successful, the therapeutic alliance, which is crucial to excellent treatment, is not as simple as one might expect. Without a therapeutic alliance, effective prescribing can be challenging (Chubinsky & Hojman, 2013; Chubinsky & Rappaport, 2006; Walkup, 2009).

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26

Prevention Strategies: Prevention and Promotion in Child Mental Health

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The majority of chronic mental health problems begin in childhood, with half beginning by age 14 (World Health Organization [WHO], 2020). Given the enormous individual and societal cost of mental health disorders (Walker et al., 2015; Whiteford et al., 2013), advancing understanding of how to prevent mental health challenges in youth is critical. In the context of mental health, **prevention** efforts share a broad goal of reducing the incidence, prevalence, and recurrence of mental health disorders. They often aim to address risk factors for mental health degradation, promote protective factors or bolster positive mental health (**mental health promotion**), and/or target putative causal mechanisms all *before* a child develops a mental health disorder (Arango et al., 2018). This ambitious goal is predicated on the premise that (a) we can readily detect and alter some risk factors for mental health challenges throughout childhood, (b) sensitive periods in childhood represent critical developmental windows to maximize impact, and (c) promotion of early childhood mental health will translate to profound improvements in health and well-being.

Prevention and promotion efforts are by no means specific to mental health; however, for the purposes of this chapter, we use the general terms "prevention" and "promotion" to refer to efforts to prevent mental health challenges and promote adaptive mental health among youth. Thus, in using the term "preventive interventions," we are referring to interventions designed to prevent youth mental health challenges. Also for the purposes of this chapter, we generally use the terms "child" and "youth" interchangeably to refer to the period of development before adulthood. When discussed in relation to "adolescence," we at times use "childhood" to refer more specifically to the broad developmental period before puberty.

Efforts to prevent mental health challenges are often conceptualized as seeking to prevent categorically-measured undesired outcomes. While measuring categorical outcomes is certainly a viable approach to evaluation, a complementary approach is to conceptualize prevention as altering life course trajectories. A preventive intervention may alter a child's life trajectory such that he experi-

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ences less severe depressive symptoms than he would in the absence of the intervention. An evaluation focused on categorical diagnoses as an outcome may overlook this potentially substantial impact on the child's life course. Thus, assessing deflections in life course trajectories may be important to fully understand the impact of preventive interventions on youth mental health (Kellam & Van Horn, 1997).

Prevention efforts in the field of mental health have been developed, implemented, and evaluated for decades. A 1997 meta-analysis of 177 primary prevention programs for youth found that most demonstrated significant positive effects on social and behavioral problems, with few observed negative outcomes (Durlak & Wells, 1997). However, despite some promising findings and despite the recognition of the early roots and far-reaching impact of mental health problems, we have yet to witness meaningful translation into widespread prevention efforts. The goal of this chapter is to review the field of prevention strategies in childhood to date, while highlighting areas of growth. We begin with a review of concepts central to **prevention science**, or the study of evidence-based approaches to promote health and prevent undesirable health outcomes. Next, we provide an overview of preventive initiatives and programs, organized by common settings for preventive efforts in mental health. We conclude with future directions.

A Framework for Conceptualizing Mental Health Prevention and Promotion

Prevention efforts in mental health can be considered based on a number of dimensions. Previous reviews have covered interventions and their components by using a guiding framework of "who," "what," "where," "why," and "how" questions (e.g., Kohrt et al., 2018). Similar questions can provide a helpful framework for conceptualizing prevention and promotion efforts in childhood mental health. Below, we outline different dimensions of prevention efforts, using "who," "what," "when," "where," "why," and "how" as guiding questions.

Who

Who Receives the Preventive Intervention? Regarding the dimension of "who," we might first ask: who is the prevention program intended to support? Some programs are delivered directly to children (**person-centered**, or "direct"), while others seek to facilitate change in children's environment (**environment-centered**; Durlak & Wells, 1997). The classification system used by the Institute of Medicine (IOM) provides one common framework for defining prevention efforts according to their target population. The IOM describes three categories based on level of risk: universal, selective, and indicated (Haggerty & Mrazek, 1994). **Universal interventions** target the general population and are not designed for any specific risk group (e.g., a school-based program to reduce self-injurious behaviors by providing psychoeducational resources to the entire student body). **Selective interventions** are preventive efforts designed for higher-than-average risk subgroups (e.g., a program to reduce the likelihood of self-injury in students with depressive symptoms). Lastly, **indicated interventions** are designed for the highest risk individuals, who are often symptomatic (e.g., a program aiming to reduce the likelihood of future self-injury among students with a history of self-injury). Each approach has advantages and disadvantages; for example, universal interventions have the potential to address important community-level factors (an advantage) but can have a smaller effect on the individual relative to selective and indicated interventions (a disadvantage; Offord et al., 1998).

A phenomenon referred to as the **prevention paradox** highlights one rationale for taking a universal approach to prevention (Foxcroft & Tsertsvadze, 2011): by definition, it is likely that a larger *proportion* of a higher-than-average risk subgroup will develop a disorder relative to the rest of the population. However, if the higher-than-average risk subgroup constitutes a relatively small portion of the population (as it often does), then it is likely that a smaller *number* of individuals from the higher-than-average risk subgroup will develop a disorder relative to the rest of the population. By this logic, preventive interventions should address the whole population (rather than the higher-than-average risk subgroup alone) to achieve population-level impact. Still, different approaches may be appropriate to match different settings and objectives.

Who Delivers the Preventive Intervention? In addition to whom the preventive intervention targets, another consideration is who delivers the intervention. Those delivering interventions to prevent child mental health challenges can include professionals, paraprofessionals, or others in children's life such as teachers. The delivery of prevention programs by paraprofessionals is particularly promising in settings where there is a shortage of professional providers, including many low- and middle-income countries (LMICs; Bruckner et al., 2011). In light of this, systematic reviews have evaluated the role of community health workers in delivering interventions to prevent mental health challenges (e.g., Barnett et al., 2018). Some interventions also involve the use of **community coalitions**, where groups collaborate to share resources and facilitate change (Wandersman & Florin, 2003).

For Whom Does the Preventive Intervention Work? A related question is whether the preventive intervention is particularly effective for certain individuals or groups. Do factors such as a child's cultural background, family income, personality traits, or parental psychopathology influence an intervention's effectiveness in preventing mental health challenges? It cannot be assumed that a preventive intervention's impact will generalize across children. Identifying moderating factors can be important for guiding preventive intervention development and implementation to maximize impact.

What

What Does the Preventive Intervention Include? Some preventive interventions are largely **psychoeducational** (e.g., Moreno-Peral et al., 2020), primarily providing information to youth and/or others in their lives. Others are more active or skills-based, engaging youth and their communities in activities and/or discussion to improve mental health (e.g., van Genugten et al., 2017). Environment-centered programs may seek to shift risk and protective factors through changes in policy or access to resources. In general, across prevention research, programs that include active components (e.g., teaching skills, homework) tend to demonstrate superior outcomes relative to programs that are more didactic (e.g., Stice et al., 2007, 2009). Mindfulness-based programs have recently gained traction in primary and secondary school settings, with empirical support for a range of programs (e.g., Carsley et al., 2018; Sapthiang et al., 2019).

What Outcomes Does the Preventive Intervention Target? Of course, preventive interventions can vary in the target outcomes. Some target specific mental health disorders (e.g., Berkowitz et al., 2011), while others target more general clusters of symptoms, such as internalizing and/or externalizing symptoms (e.g., Yap et al., 2016). Preventive interventions can also be transdiagnostic, identifying and addressing factors known to be associated with multiple manifestations of psychopathology; such factors may include certain patterns of irritability and difficulties with self-regulation (e.g., Romer et al., 2021; Wakschlag et al., 2019).

When

When in a Child's Lifetime Is the Preventive Intervention Implemented? An important question related to timing, or "when," is whether a preventive intervention is designed to address children within a specific age range. Preventive interventions can target risk factors across ages, from the preconceptual period to adolescence (Kieling et al., 2011). Some programs target perinatal maternal depression, which is a risk factor for the emergence of later mental health disorders in children (e.g., Poyatos-León et al., 2017), while other programs go even further back to the preconceptual period, targeting prospective parents (Kieling et al., 2011).

When Will a Preventive Intervention Have the Greatest Impact? When developing and investing in prevention efforts in mental health, it is important to consider when impact may be greatest. **Sensitive periods** are developmental periods in which the child's brain is especially responsive to change based on environmental input (Nelson & Gabard-Durnam, 2020). **Critical periods** are similar to sensitive periods, but less flexible; changes that occur during critical periods are largely permanent, and once the developmental window closes, changes that typically occur during a critical period cannot occur outside of that period. Most sensitive and critical periods occur during early childhood, when the brain is particularly malleable, making early childhood a time when prevention efforts have the greatest impact. Indeed, economic analyses suggest that investing in early childhood programs is financially wise at a policy level (e.g., Heckman et al., 2010). Increasingly, evidence suggests that adolescence may also be characterized by sensitive periods, supporting prevention efforts during this period; notably, however, there may be considerable variation in the onset and offset of sensitive periods during adolescence (Blakemore & Mills, 2014; Fuhrmann et al., 2015). With all prevention efforts, but especially those implemented early in a child's life, it is critical to consider *patterns* of behavior; for example, Wakschlag et al. (2019) discuss the value of early universal screening for abnormal patterns of irritability early in life (e.g., through administering computer adaptive tests in primary healthcare settings). Importantly, they highlight that some level of irritability is developmentally normative, but that detecting early abnormal patterns (e.g., through administering computer adaptive tests in primary care settings) may guide early intervention to prevent later mental health difficulties among those whose patterns suggest higher risk.

When Is the Intervention Implemented in Relation to Indicators of Risk? A related "when" question is when prevention efforts are implemented relative to the onset of mental health risk factors or disorder. In one three-level conceptualization, **primary prevention** refers to efforts implemented before evidence of disorder, with the goal of risk reduction (e.g., reducing tobacco availability). **Secondary prevention** refers to efforts implemented before a disorder is fully symptomatic, with the goal of early identification and treatment (e.g., tobacco abuse screening among adolescents who have tried tobacco). **Tertiary prevention** refers to efforts implemented after a disorder is identified, with the goal of preventing progression (e.g., early tobacco abuse treatment). While primary prevention has the benefit of addressing concerns before they become problematic, resources are often directed toward secondary and tertiary efforts for a number of reasons, including constraints related to formal and informal societal and professional systems that value remediation over prevention (Cowen, 2000).

Where

Where in the World Is the Preventive Intervention Delivered? Ninety percent of youth live in low- and middle-income countries (LMICs); however, Kieling et al. (2011) highlight that only 10% of randomized controlled trials evaluating mental health prevention and intervention efforts published between 2000 and 2010 were conducted in LMICs, with most evaluating pharmacological interventions. There have been several more recent efforts to review prevention and intervention efforts in LMICs (e.g., Barry et al., 2013; Kieling et al., 2011; Kohrt et al., 2018). Together, these research efforts provide evidence for the feasibility and effectiveness of a variety of programs in these settings, while highlighting important considerations.

Regardless of the country of implementation, cultural and environmental variables are essential to consider. At least one meta-analysis suggests that culturally adapted psychological preventive interventions may demonstrate lower effect sizes than culturally adapted treatments; however, most research synthesis efforts have neglected to examine the distinct effects of prevention versus treatment programs (Hall et al., 2016). Factors such as relatively low base rates of some outcomes may at least partially explain smaller effect sizes (Cuijpers, 2003).

Where Is the Setting of Delivery? Another important consideration related to the "where" dimension is the setting of delivery. The Center for Substance Abuse Prevention highlights six domains for prevention: individual, family, peer, school, community, and environment/society (Delaware Health and Social Services, n.d.). Settings of delivery can further vary within these domains. For example, family-based programs may be delivered through the home, community, primary care, policy, or more specialized settings, such as foster care.

Why

Why Invest in Preventive Interventions? Mental disorders are the leading cause of disability (Whiteford et al., 2013), and it is estimated that poor mental health translates to costing the world economy $2.5 trillion a year, with trends predicting significant increases by 2030 (The Lancet Global Health, 2020). Despite research highlighting the cost effectiveness of investing in prevention efforts (Mihalopoulos et al., 2011), a strikingly small proportion of funding toward mental health initiatives is invested in prevention (see Arango et al., 2018). This is likely in large part due to the challenge of convincing funding agencies of the value of investing in prevention programs, which may have a less direct or visible impact than clinical interventions (Giesen et al., 2007). Indeed, having more observable benefits is one factor that increases the likelihood of an intervention being adopted (see Greenhalgh et al., 2004). There are myriad reasons why prevention efforts are invaluable in reducing the burden of mental health disorders in youth; however, specific programs may be based on different rationale or causal models.

How

How Do Preventive Interventions Prevent Undesired Mental Health Outcomes? Most prevention efforts are predicated on an understanding of risk and protective factors. In the context of considering mental health across development, **risk factors** are factors internal or external to the child that increase the child's likelihood of developing an undesired mental health outcome (Rae-Grant et al., 1989). **Protective factors**, by contrast, are factors that reduce the child's likelihood of developing an undesired mental health outcome, often by way of promoting positive mental health (sometimes referred to as **promotive factors**) and/or providing a buffer to minimize risk factors (Ernestus & Prelow, 2015; Masten & Barnes, 2018). Risk factors frequently co-occur, such that some children experience particularly elevated risk and others experience significantly less risk (Ernestus & Prelow, 2015). Risk factors can be fixed (unmodifiable and unchanging across time; e.g., country of birth) or variable (modifiable and/or changing across time; e.g., educational background; see Giesen et al., 2007). Identifying and targeting variable risk factors that are known to directly or indirectly affect the development of undesired mental health outcomes (i.e., causal risk factors) is particularly valuable when developing prevention programs (Giesen et al., 2007). As with interventions, developing and testing a "**theory of change**" that outlines and targets proposed mechanisms by which risk factors lead to undesired mental health outcomes, and by which prevention strategies interrupt this trajectory, can be invaluable for maximizing impact (Fisher et al., 2020; Schindler et al., 2017). This includes identifying hypothesized moderators of impact, or factors that may predict the extent to which a particular individual is likely to benefit from a preventive intervention.

When considering prevention efforts, it is important to note that exposure to risk factors for a particular mental health outcome does not mean that a child will necessarily develop the outcome. Rather, consistent with the concept of **multifinality**, two children can be exposed to the same set of risk factors and show two very different mental health profiles (Cicchetti & Rogosch, 1996). Because mental health disorders have fairly low base rates (that is, the majority of individuals do not experience any particular mental health disorder), the presence of risk factors may indicate increased risk relative to the general population but still low risk overall (i.e., low absolute risk; Cuijpers et al., 2021). This reality has important implications for prevention science, highlighting the limits of risk factors as predictive tools, the value of understanding absolute risk for a particular population in a particular time period, and the importance of remembering that the presence of risk factors does not guarantee outcomes. Conversely, consistent with the concept of **equifinality**, two children can be exposed to very different sets of risk factors and experience the same mental health outcome (e.g., substance abuse in adolescence; Cicchetti & Rogosch, 1996).

Acknowledging the realities of multifinality and equifinality, understanding risk factors for mental health challenges can be a valuable tool for guiding prevention efforts to maximize impact. Prevention efforts can operate by reducing exposure to risk factors, promoting protective factors, or identifying children with risk factors to deliver selective or indicated interventions. Giesen et al. (2007) identify targeting evidence-based risk and protective factors as an essential characteristic of effective prevention programs in mental health. As one example, Wakschlag et al. (2019) identify irritability or dysregulation (specifically, certain patterns of irritability/dysregulation) in early childhood as a salient risk factor for a wide range of undesired mental health outcomes, proposing early universal screening for patterns of irritability that indicate risk to guide further prevention.

While risk factors can occur at all levels relative to the individual (e.g., genetic, family, community), there has been increasing recognition of **social determinants** of mental health, or societal-level factors that can impact mental health across development through various mechanisms, likely including epigenetic mechanisms (Compton & Shim, 2015). Social determinants of mental health include factors such as discrimination, poverty, and inadequate education, and contribute to considerable disparities in some mental health outcomes (Compton & Shim, 2015). Thus, efforts addressing social determinants, such as policy changes, may be critical to reduce disparities, promote equity, and disrupt intergenerational patterns of mental health disorders.

How Are Preventive Interventions Developed, Implemented, and Evaluated? The development, implementation, and evaluation of preventive interventions fall under the umbrella of **translational science**, which—by one definition—aims to facilitate the application of research findings to real-world settings to improve health and wellbeing (Woolf, 2008). This section will focus on evaluation, as development and implementation vary by delivery setting. In response to increasing recognition of the need for **empirically-supported prevention strategies**, Biglan et al. (2003) provide guidelines for evidence recommended for prevention programs for youth. The authors recommend that a preventive intervention be disseminated if its efficacy is supported by at least two randomized controlled trials or at least three studies using an interrupted time-series design, where the studies are conducted by different research groups. Ideally, an intervention will also have evidence of effectiveness in the setting for which it was designed to be implemented.

Preventive interventions are difficult to evaluate for several reasons. First, as noted above, despite their far-reaching consequences, many mental health outcomes have relatively low base rates; accordingly, a large sample size is required to detect effects (Durlak & Wells, 1997). Utilizing epidemiological data may allow for more sophisticated and widescale tracking of incidence and prevalence to guide and assess prevention efforts (Biglan et al., 2003). Second, as mental health outcomes may emerge at different points throughout development, longitudinal designs are most appropriate for tracking long-term effects; however, longitudinal studies can be resource and time-intensive. Third, Durlak and Wells (1997) explain that showing that a mental health outcome has *not* developed is not straightforward following primary prevention. Other challenges exist as well, some of which we discuss throughout the remainder of the chapter.

Nevertheless, appropriately assessing preventive interventions is critical to ensure that investments in prevention efforts benefit child mental health. Multiple dimensions can and ought to be evaluated, including efficacy, effectiveness, fidelity, acceptability, and feasibility. **Efficacy** refers to a program's demonstrated association with desired outcomes in a controlled context, while **effectiveness** refers to positive outcomes observed in a context that more closely parallels the "real world," where less experimental control may be present (Giesen et al., 2007). **Fidelity** refers to the extent to which an intervention is implemented according to protocol; while greater fidelity is generally associated with greater effect sizes, programs can be successfully adapted when appropriate variables are considered (August et al., 2010). In addition to these dimensions, evaluating program acceptability and feasibility are important to facilitate implementation and ensure that programs are adopted (Giesen et al., 2007). Offering **technical assistance**—which may take the form of a team offering ongoing training, consultation, and resources—may facilitate dissemination, providing support to those delivering preventive interventions as they encounter roadblocks and increasing treatment fidelity (Wandersman & Florin, 2003).

Importantly, while many evaluations focus on main effects of preventive interventions, mechanisms of change are also critical to evaluate. In early intervention research, theoretical models are often underspecified, with evaluations focused on effect sizes (Fisher et al., 2020; Schindler et al., 2017). Underspecified models make it difficult to determine whether changes are occurring through expected mechanisms. Identifying mechanisms, including moderating variables, may be particularly valuable when adapting preventive interventions for settings other than the setting for which they were initially developed (August et al., 2010).

Another limitation of main effects pertains to the goals of prevention. As previously described, the goal of prevention is generally to deflect a child from one trajectory toward a different, more desirable trajectory. Such a shift may not be detected by effect sizes for a certain categorical outcome (e.g., a specific diagnosis). Zalta and Shankman (2016) outline different outcomes that may be appropriate to consider when conducting trials investigating main effects and mechanisms; such outcomes include not only categorical criteria but also dimensional criteria such as delays in onset of relevant outcomes. An increasing focus on mechanisms has been especially evident in the contributions of neuroscience to prevention. **Translational neuroscience** facilitates the application of knowledge about neurobiological processes underlying mental health challenges to improve health and wellbeing. Translational neuroscience can be used to inform prevention efforts based on understanding of malleable neurobiological risk and protective factors and biomarkers that predict intervention response (Horn et al., 2019).

Ecological Systems View of Prevention in Child Mental Health

We organize the remainder of the chapter by setting of delivery, while addressing questions across dimensions. Specifically, we review considerations in employing preventive interventions at the family level, in school settings, in primary healthcare settings, at the community level, and at the policy level, although it is important to note that preventive interventions can span different settings. Implementing preventive interventions across multiple settings reflects an ecological systems view of mental health. The **ecological systems view** is rooted in the idea that a child's development, including their emotional and cognitive development, is shaped by factors at multiple levels of the child's environment, including both immediate (e.g., relationships with individuals with whom they directly interact) and less direct (e.g., relationships between others in their environment, broad cultural patterns) influences (Bronfenbrenner, 1979). Consistent with this perspective, prevention and promotion efforts may seek to address factors at various levels of the child's environment in order to reduce risk of mental health difficulties. After reviewing considerations related to prevention efforts in several settings, we conclude by discussing future directions in the area of child mental health promotion and prevention.

Family-Based Preventive Interventions for Children

Directing preventive efforts toward families and parents is a promising strategy, when considering that many risk and protective factors related to child mental health disorders exist at the family level (e.g., parental depression [McAdams et al., 2015]). Extensive research has found at least small to moderate associations between certain factors related to parenting, such as parental hostility, and child mental health difficulties (Yap et al., 2014; Yap & Jorm, 2015). As a protective factor, positive caregiving can serve as a buffer against negative effects of early life stress and adversity (Gunnar, 2017). An extensive number of family-based prevention programs have been developed, as well as programs with components that include family members and/or are implemented in homes. Positive outcomes have been observed in reducing risk of both internalizing and externalizing difficulties, with evidence of some lasting effects more than 6 months after delivery (e.g., Kaminski et al., 2008; Van Ryzin et al., 2016; Yap et al., 2016).

Family-focused preventive interventions can include both parent-focused and youth-focused components (Van Ryzin et al., 2016). Universal family-focused preventive interventions generally include at least some components directed toward the parents, such as teaching parenting skills related to limit-setting and praise (Foxcroft & Tsertsvadze, 2011; Van Ryzin et al., 2016). Kumpfer and Alvarado (2003) conducted a review identifying three evidence-based parent components for preventing problem behaviors in youth: behavioral parent training, family skills training, and family therapy. Behavioral parent training tends to be most effective for parents of younger children and involves teaching empirically-based skills to parents to improve interactions with their children (e.g., praise, active ignoring). Family skills training is characterized by a combination of approaches, teaching skills to both parents and children and providing opportunities for practice. Kumpfer and Alvarado (2003) found relatively less empirical support for family therapy, explaining that it is typically used when some risk factors and symptoms are present in children. In general, including both parent and youth-focused components may strengthen programs, especially when relationship problems are present (Kumpfer & Alvarado, 2003; Van Ryzin et al., 2016). One meta-analysis found that youth-centered components, including components focused on improving family relationships and youth's thoughts and feelings about the future, were especially predictive of more positive mental health outcomes (Van Ryzin et al., 2016). Of course, family-based components can also be combined with components at other levels of preventive interventions, including school-based or community-based components (for one example, see Williamson et al., 2014).

While family-based programs can be effective in preventing mental health difficulties among children, challenges in implementation exist. One challenge is recruiting parents; in response to documented difficulties, Finan et al. (2018) explored factors associated with parent enrollment in and engagement with prevention programs. Their systematic review indicated that child mental health symptoms were the sole reliable predictor of parent engagement. More broadly, there was variation in observed predictors across included studies, perhaps suggesting that a multipronged approach is needed to improve engagement across settings.

School-Based Preventive Interventions for Children

Children spend a significant portion of time in school, making school an important setting for mental health prevention and promotion. For children from lower-income households and racial and ethnic minority groups, schools are a primary access point to mental health services (Ali et al., 2019). The Multi-Tiered System of Support (MTSS) framework has three tiers that broadly align with IOM (Hertz & Barrios, 2021). Below, we discuss the tiers of the MTSS framework with corresponding examples.

School-based prevention programs may target modifiable risk factors linked to mental health problems. The KiVa program, for example, is an anti-bullying prevention program that has been shown to reduce symptoms of depression and anxiety and to increase positive peer perceptions. These outcomes were predicted by reductions in victimization (Williford et al., 2012). Such findings highlight that reducing key risk factors, such as bullying and peer victimization, can have profound downstream impacts on children's mental health.

Tier 1 programs typically include social and emotional learning programs (SEL) aiming to reduce risk factors and/or bolster protective factors among all students. The SEL programs often work to improve socioemotional skills, attitudes, and behaviors. A meta-analysis of 213 SEL-oriented school programs observed increased prosocial behavior, reduced conduct and internalizing problems, and improved academic performance (Durlak et al., 2011). Universal screening for mental health also constitutes a Tier 1 approach. In concert with the Centers for Disease Control and Prevention, Hertz and Barrios (2021) note important components necessary for effective school-based mental health screening, including sufficient available and trained mental health professionals, predetermined timelines and efficient feedback systems, staff to respond to crises and implement immediate intervention when necessary, and partnerships with youth-friendly health services for students needing more individualized care.

Tier 2 approaches focus on serving smaller groups of students who may need additional support. Tier 2 programs might be implemented by a community health professional or school counselor and focus on specific strategies, such as grief processing (Hertz & Barrios, 2021). Tier 2 approaches often align with selective prevention strategies. The Coping Power (CP) program is one example of a Tier 2 approach. The program is based on cognitive behavioral principles and targets students at risk for delinquency who are transitioning to middle school (Lochman et al., 2008). The CP program has demonstrated a positive impact on improving social competence, reducing aggression, and increasing problem-solving capabilities (Lochman & Wells, 2002).

Tier 3 approaches target students who are already experiencing mental health difficulties, with the primary goal of preventing symptom development (Hertz & Barrios, 2021). Individual counseling is an example of a Tier 3 approach, as well as group-based programs designed for emerging mental health problems. The Prevention Program for Externalizing Problem Behavior (PEP) provides group training to parents and teachers of young children with externalizing problems by emphasizing behavior modification techniques (Plück et al., 2006). In school-aged children and adolescents, anxiety and depression are frequently targeted via school-based indicated prevention programs, with positive results observed (Hugh-Jones et al., 2021).

Preventive Interventions for Children in Primary Healthcare Settings

Routine primary care is an essential access point for children and families, as physicians interact with families at regular intervals and can build trusting relationships with the family (Purewal et al., 2016). Within primary healthcare settings, two key goals of prevention are effective screening tools and implementation of prevention programs to detect and reduce risk of mental health challenges.

Mental health prevention *screening* can take many forms in a primary healthcare setting. One avenue is screening for risk factors that increase a child's likelihood of developing mental health problems. A notable example is the Adverse Childhood Experiences (ACEs) screener, which screens for early adverse experiences known to be correlated with negative health outcomes (Felitti et al., 1998). Screening children for ACEs represents an opportunity to prevent future mental health problems and may be most effective when paired with questions about common symptoms observed in adversity-exposed children; the goal of such an approach is to then coordinate the child's care with an interdisciplinary clinical team (Purewal et al., 2016). Other key risk factors proposed for screening include parental psychopathology, parental substance misuse, and infant temperamental difficulty (Bayer et al., 2007). While universal screening for social risk factors and early mental health symptoms has been encouraged by several agencies (Davidson et al., 2020; American Academy of Pediatrics, 2010), one study found that over half of primary care providers report never or rarely using standardized mental health screeners (Kuhlthau et al., 2011). Collaborative programs to improve youth mental health screening in primary care have been successful at improving screening practices (Beers et al., 2017).

Prevention programs in primary healthcare settings often target high-risk youth, such as those already exhibiting symptoms of mental health disorders. For example, Project CATCH-IT is an internet-based depression prevention program for adolescents with subclinical depression. The program was implemented by primary care physicians and led to reduced depressive symptoms (Van Voorhees et al., 2009). Studies have also demonstrated the feasibility and efficacy of implementing family interventions in primary care. The Triple P-Positive Parenting Intervention, an evidence-based program, was successfully provided to parents of preschool-aged children in a primary healthcare setting and led to lower levels of child behavior problems and parental anxiety (Turner & Sanders, 2006). Other avenues include the integration of psychoeducational materials in the primary healthcare setting, which may facilitate communication with the provider about mental health-related topics. One study found that including a violence prevention video in primary care led to increased discussion between the parent(s) and provider about child behavior and management strategies (Scholer et al., 2008). Obstacles to mental health screening and prevention in primary healthcare settings include short appointment times, insufficient referral options or coordination with mental health providers, and minimal financial reimbursement for providers (Ward-Zimmerman & Cannata, 2012). Utilizing screening tools sensitive enough to detect risk, but brief and easy to administer presents a tradeoff (Ritchie et al., 2020). A strong collaboration is required between the leaders, providers, and staff to successfully implement prevention services in a primary care context.

Community-Based Preventive Interventions for Children

Community-based prevention efforts are predicated on a recognition that factors contributing to mental health disorders exist at multiple levels in a child's ecosystem. Inherently diverse, community-based preventive interventions targeting youth mental health can be implemented through a range of sectors and by individuals with a range of backgrounds; in fact, community-level preventive interventions are sometimes characterized by their implementation at multiple levels of a child's environment and across multiple settings (Barnett et al., 2018; Wandersman & Florin, 2003). In addition, preventive interventions that are typically delivered in a more specific setting [e.g., primary care] can include community components (Kohrt et al., 2018). We discuss the benefits of community interventions in preventing youth mental health challenges, as well as challenges and important considerations.

Implementing prevention efforts at the community level has many potential advantages. Community-level preventive interventions account for multiple levels of influence, which is important given extensive research highlighting broad-level risk factors such as neighborhood disadvantage in predicting mental health outcomes (e.g., Compton & Shim, 2015; Leventhal & Brooks-Gunn, 2003). In addition, community-level interventions often promote participation of stakeholders (e.g., Fancourt et al., 2021; Hawkins et al., 2009). Community-level preventive interventions also have the potential for greater reach than interventions at other levels, by addressing higher-level systems than the individual or family unit and by involving community members who are familiar with the community. Community-level preventive interventions can be particularly suitable for low-resource settings, as they often focus on mobilizing existing community resources (Kieling et al., 2011; Kohrt et al., 2018). When well-executed, community-level prevention can be sustainable and effective in improving youth mental health outcomes (e.g., Barry et al., 2013; Kuklinski et al., 2021).

There are also a number of challenges and considerations in developing and implementing community-level preventive efforts. Coordination between sectors can present a challenge, as well as ensuring that recipients receive sufficient dosage to produce population-level impact (Wandersman & Florin, 2003). Regarding evaluation, identifying appropriate comparison groups and using random assignment is often not straightforward, and effects can be difficult to detect due to the indirect nature of some efforts (Wandersman & Florin, 2003).

While not specific to youth, Fancourt et al. (2021) outline one iterative process being utilized in the United Kingdom, which involves first identifying stakeholders, inviting stakeholders to generate research questions, combining responses, and inviting stakeholders to vote on all responses to indicate their priorities. Other frameworks are based on steps such as clearly identifying the problem, considering how to target risk and protective factors, engaging stakeholders and staff to evaluate acceptability, piloting the intervention, conducting efficacy trials, conducting effectiveness trials across sites, and finally, implementing widely, with procedures for providing ongoing support to those delivering the intervention (Kieling et al., 2011; Wandersman & Florin, 2003). The bridge from research to practice can be difficult; however, successful implementation and maintenance is certainly not impossible. Community-level preventive interventions can be modified to match the resources and needs of the delivering organizations (**adapted interventions**), as well as the needs of recipients (**adaptive interventions**) to facilitate the transition between science and practice (August et al., 2010).

Policy Implications

Mental health promotion and prevention can also take place via policy. While we do not explore policy as prevention extensively, it is an important area to consider. Worldwide, policies specifically focused on improving the mental health of children and adolescents are lacking (Shatkin & Belfer, 2004); while progress in this area is needed, policies do not need to directly target youth mental health in order to have an impact on mental health. For example, immigration policy leading to child-caregiver separations can have deleterious effects on the mental health of youth, while policies that provide support for families forced to migrate may have far-reaching preventive effects (Hodes et al., 2018; Wood, 2018).

Summary and Future Directions

In this chapter, we have reviewed considerations in preventing mental health challenges among youth, using a framework guided by questions pertaining to "who," "what," "when," "where," "why," and "how" and focusing on considerations at various levels of a child's environment. To conclude, we briefly turn to a final "where" question: "Where is the field going?"

Future Directions

Countless preventive interventions have been developed and implemented to reduce mental health challenges among youth, and many efforts have been extensively evaluated. At the same time, other prevention programs continue to be implemented with limited evidence of their effectiveness (for one discussion of the "science-to-practice" gap, see Wandersman et al., 2008). Continued evaluation of preventive interventions in real-world settings, as well as systems to facilitate the translation from science to practice, are critical for advancing the clinical utility of prevention research. In addition to advances in these areas, recent and ongoing advances in several additional areas may hold promise in reducing the burden of youth mental health disorders. We briefly review advances in five areas, corresponding with five important perspectives in the field: dimensional, digital, methodologically novel, social, and global.

Applying Dimensional Frameworks Within the broader field of intervention science, there has been a recent shift toward an increasingly dimensional approach to classifying psychopathology, based on concerns that a categorical classification system may not adequately represent psychopathology or account for mechanisms (Zalta & Shankman, 2016). While some prevention efforts are transdiagnostic, there remains an emphasis on assessing categorical outcomes, such as incidence of a particular disorder. As assessment and intervention research moves toward an increasingly dimensional approach (e.g. with the introduction of RDoC; Cuthbert & Insel, 2013), prevention research in the field of child mental health may likewise benefit from a more dimensional and transdiagnostic approach (Zalta & Shankman, 2016). This may be beneficial and appropriate given the aforementioned note that prevention efforts may function by deflecting a child's trajectory rather than shifting their categorical standing.

Harnessing Advances in Digital Technology Another potential area of advancement is digital mental health, although greater research is needed in this area (Ebert et al., 2017; Hayes et al., 2016). While not specific to youth, one systematic review and meta-analysis found that engagement with digital preventive interventions that directly addressed suicidality was associated with decreases in suicidality measures (Torok et al., 2020). Recent investigations have also explored ways to harness advances in machine learning to predict suicidal behavior, although much of this research has focused on adults, and there remain ethical and logistical barriers to widespread application among youth (Bernert et al., 2020; Torous et al., 2018). Machine learning may additionally be helpful in detecting and preventing the progression of mental health difficulties and neurodevelopmental conditions, as well as differentiating between diagnoses in their early stages (e.g., Carpenter et al., 2016; Faedda et al., 2016; Liu et al., 2016).

Employing Novel Designs Advancing methodology for evaluating preventive interventions holds potential for increasing understanding of mechanisms, increasing personalization, and preserving resources. Two examples of such advances, which may be applicable to prevention research in child mental health, are the use of adaptive and fractional factorial designs. **Adaptive designs** alter modifiable components of an intervention based on an individual or family's specific risk (Collins et al., 2004). Adaptive designs may preserve resources by providing a higher dose of a preventive intervention only to individuals with a risk profile warranting greater intervention; they may also improve compliance and satisfaction by providing a dosage and set of components corresponding with the recipient's particular needs. Thus, adaptive designs are both personalized and parsimonious. Based on the understanding that most interventions have a number of components, **fractional factorial designs** involve the manipulation of multiple variables in a single intervention trial (Watkins & Newbold, 2020).

In the context of prevention of child mental health challenges, both adaptive and fractional factorial designs offer insight into mechanisms of change. Adaptive interventions may be particularly valuable for channeling resources toward children who will benefit most from a preventive intervention, while still providing widespread prevention. Fractional factorial designs are particularly appropriate in prevention as preventive interventions are often multicomponent. Overall, both these designs and others have the potential to propel the field toward more personalized approaches to prevention.

Emphasizing Social Determinants Given their extensive role in the development and maintenance of mental health challenges, addressing social determinants of mental health is crucial for reducing the burden of childhood mental health challenges. Even if not intended to directly impact child mental health, programs and policies that reduce early life stress (e.g., maternity leave policies supporting mother-infant attachment; programs addressing food insecurity) may have far-reaching benefits in preventing mental health difficulties among youth (Compton, 2014; Van Niel et al., 2020). A recognition of social determinants also calls for continued prevention efforts in specialized settings targeting mental health risks and protective factors unique to specific groups. Such groups may include youth in foster care (Chamberlain et al., 2008) and refugee youth (for review in high-income settings, see Fazel & Betancourt, 2018).

Adopting a Global Perspective The final perspective that we will address here is the importance of a global perspective when considering mental health prevention and promotion efforts. As noted, much prevention research has been conducted in high-income countries, although the vast majority of youth live in low- and middle-income countries (LMICs; Kieling et al., 2011). Thus, the existing body of research on mental health prevention and promotion efforts might offer a limited picture.

Nevertheless, there is evidence that prevention and promotion efforts can be successfully implemented in LMICs, warranting further research (Barry et al., 2013; Kieling et al., 2011). Again, addressing social determinants and related factors such as physical health may lead to population impact in reducing the global mental health burden.

Conclusion

To conclude, there are many dimensions to consider when developing, implementing, evaluating, and adapting interventions to prevent mental health disorders and promote positive mental health across childhood. When well-executed, prevention and promotion efforts can be cost-effective and have population-level impact in reducing child mental health difficulties. Continual advances in understanding mechanisms of change and establishing infrastructure to facilitate the translation of research to practice, as well as the integration of a variety of perspectives paint a hopeful picture for child mental health.

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Part V

Assessment of Neurodevelopmental Disorders in Children

27

Assessment of Autism Spectrum Disorders

Thomas E. Myers and Shane S. Bush

Autism Spectrum Disorder (ASD) is currently conceptualized as a neurodevelopmental disorder characterized by two core groups of symptoms: (1) persistent deficits in social communication and social interaction; and (2) restricted, repetitive patterns of behavior, interests, or activities (APA, 2013). However, the roots of ASD can be traced back to Dr. Leo Kanner's (1943) description of 11 children's histories in a paper entitled *Autistic Disturbances of Affective Contact*, in which he described "extreme autism, obsessiveness, stereotypy, and echolalia" and discussed how these children differed "from all other known instances of childhood schizophrenia" (Kanner, 1943, p. 248). Kanner (1943) also pointed out noteworthy features of these children's parents (e.g., "very few were really warmhearted fathers and mothers") while ultimately concluding that "these children have come into the world with the innate inability to form the usual, biologically provided contact with people, just as other children come into the world with innate physical or intellectual handicaps" (p. 250). A year after Kanner's (1943) publication, Dr. Hans Asperger (1944; reproduced in 1991) published a description of a child who exhibited "severe characteristic difficulties of social integration," for which Asperger had "chosen the label autism" and described "the clinical picture of autistic psychopathy." Fifty years later, a new diagnosis appeared in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) that would bear his name (i.e., Asperger Syndrome) only to be removed 19 years later with the publication of the DSM-5 (APA, 2013).

Despite the use of the term *autism* in the scientific literature, the only reference to autism in the DSM-II was under the diagnosis of *schizophrenia, childhood type*, which noted that the "condition may be manifested by autistic, atypical, and withdrawn behavior" (p. 35). The DSM did not include a formal diagnosis of autism until the publication of the DSM-III in 1980, when the diagnosis of infantile autism was described. The diagnosis was listed within a subclass of pervasive developmental disorders (PDD) under the category, Disorders Usually First Evident in Infancy, Childhood, or Adolescence. The essential features of infantile autism involved "a lack of responsiveness to other

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people (autism), gross impairment in communicative skills, and bizarre responses to various aspects of the environment, all developing within the first 30 months of age". When the DSM-III was revised in 1987 (DSM-III-R), the previous diagnoses of infantile autism and childhood onset pervasive developmental disorder were combined into a new diagnosis labeled autistic disorder, which was noted to have a prevalence of 4 to 5 out of 10,000 children. The DSM-IV continued to include the PDD category, but presented five diagnoses: Autistic Disorder, Rett's Disorder, Childhood Disintegrative Disorder, Asperger's Disorder, and Pervasive Developmental Disorder Not Otherwise Specified (NOS). The essential features of the DSM-IV diagnosis of Autistic Disorder involved the presence of "markedly abnormal or impaired development in social interaction and communication and a markedly restricted repertoire of activity and interests", and was also referred to as early infantile autism, childhood autism, or Kanner's autism. The prevalence rate of Autistic Disorder in the DSM-IV-TR was reported to be 5 cases per 10,000, but it was also noted that rates ranged from 2 to 20 per 10,000.

When the DSM-5 was published in 2013, the five diagnoses listed in the DSM-IV/DSM-IV-TR were condensed into one diagnosis, labeled Autism Spectrum Disorder, which was created to reflect "a scientific consensus that four previously separate disorders are actually a single condition with different levels of symptom severity in two core domains" (Highlights of Changes from DSM-IV-TR to DSM-5, pp. 1–2; https://www.psychiatry.org). Thus, the three symptom clusters (i.e., social reciprocity, communicative intent, restricted, and repetitive behaviors) from the DSM-IV were condensed into the two noted at the beginning of this chapter: deficits in social communication and social interaction and restricted, repetitive patterns of behavior, interests, or activities. The DSM-5 clarified that individuals with DSM-IV diagnoses of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder (APA, 2013). A separate diagnosis of social (pragmatic) communication disorder was added to the DSM-5 for individuals with marked impairments in social communication but who do not demonstrate the restricted, repetitive patterns of behavior, interests, and activities, which is required for the diagnosis of ASD. The prevalence of ASD was noted to have "approached 1% of the population" (APA, 2013, p. 55) at the time the DSM-5 was published in 2013 (although see the discussion of prevalence rates later in this chapter). The DSM-5 states that "standardized behavioral diagnostic instruments with good psychometric properties, including caregiver interviews, questionnaires and clinician observation measures, are available and can improve reliability of diagnosis over time and across clinicians" (APA, 2013, p. 55). However, no other guidance is provided on how to assess the symptoms.

ASD tends to be associated with both intellectual and language impairments, which are specifiers in the diagnosis based on the DSM-5 (APA, 2013). Although these represent the core features of ASD, there is significant heterogeneity in both the expression of symptoms and the degree of impairment across individuals with ASD. The heterogeneity in clinical presentation is reflected in the name Autism *spectrum* and is one of the reasons that a thorough assessment of ASD is important.

ASD has a strong genetic basis, which is evident in the comparison between concordance rates between monozygotic twins (60–92%) and dizygotic twins (0–10%), leaving little variance accounted for by environmental factors (Muhle et al., 2004). The genetic influences in ASD are also reflected by the high rates of ASD in genetic conditions such as Fragile X syndrome (the most common single-gene condition associated with ASD), 22q11.2 deletion (e.g., velocardiofacial) syndrome, Angelman syndrome, Prader–Willi syndrome, Rett syndrome, and tuberous sclerosis (Schaefer et al., 2013). The American College of Medical Genetics and Genomics (ACMG) 2013 practice guidelines estimated that genetic evaluation may identify an etiology in 30–40% of ASD cases (Schaefer et al., 2013). Given these high comorbidity rates, the DSM-5 includes a specification to indicate if ASD is associated with a known medical or genetic condition.

The range in impairment among individuals with ASD is reflected in the level of support needed based on the core symptoms (i.e., social communication and restricted, repetitive behaviors). As outlined in the DSM-5, the severity of impairment ranges from level 1, “Requiring support,” to level 3, “Requiring very substantial support.” Level 1 severity indicates that without supports in place, there are “noticeable impairments” and/or “significant interference with functioning in one or more contexts.” Level 3 severity is characterized by “severe deficits… severe impairments in functioning, very limited initiation of social interactions, and minimal response to social overtures from others,” and/or “inflexibility of behavior, extreme difficulty coping with change, or other restricted/repetitive behaviors markedly interfere with functioning in all spheres” (APA, 2013, p. 52).

The prevalence of ASD has been steadily increasing over time. The US Centers for Disease Control and Prevention (CDC) has been monitoring the prevalence of ASD since 1996 when the Autism and Developmental Disabilities Monitoring (ADDM) Network was established. The initial reports from ADDM indicated a prevalence rate of one in 150 between the years 2000 and 2002 (CDC, 2007), whereas the most recent report assessing rates from 2016 revealed a rate of one in 54 children (Maenner et al., 2020).

As previously described, the classification systems and diagnostic labels used to reflect conditions believed to represent the core features of ASD have changed several times over the last century. These changes reflect scientific advances that have increased the understanding of ASD. However, many questions remain unanswered, and, as is the case for most psychiatric disorders, diagnostic accuracy remains imperfect (Taylor et al., 2017). Ultimately, assessment of ASD is an essential component of understanding this complex condition. As such, the purpose of this chapter is to provide a broad overview of the current assessment methods and serve as a reference for clinicians who may encounter or work with persons with ASD.

Screening Methods

The purpose of screening measures is to assist parents in identifying symptoms of ASD that they may not report spontaneously. They also provide an opportunity for clinicians to identify signs and symptoms that may not be observed in an office visit. Indeed, this was demonstrated in a study (Gabrielsen et al., 2015) in which psychologists with expertise in ASD were shown two 10-minute video samples of children who screened positive and were subsequently diagnosed with ASD. The experts missed 39% of ASD cases due to a high level of more typical behavior (89%) exhibited by the children with ASD.

Screening measures were developed based on evidence that there were significant gaps between when parents first expressed concerns regarding their child’s development (1.5 years old), when diagnostic evaluations were initiated (2.5 years old), and when a diagnosis of autism was made (4.5 years old; Siegel et al., 1988). Use of screening measures leads to earlier identification of ASD, which is desirable because of evidence that earlier intervention is associated with improved outcomes (Zwaigenbaum et al., 2015). However, it should be noted that a US Preventive Services Task Force (USPSTF) (Siu et al., 2016) review found that evidence for treatment in 18- to 30-month-old children screened for ASD in the absence of concerns for ASD was inadequate.

There are two types of screening measures, classified as level I or level II (Robins & Dumont-Mathieu, 2006). Level I screening measures are those used in the general population (i.e., those not specifically identified as being at risk for a condition), target a broader population, are generally briefer, and are more likely to be used by generalist practitioners (e.g., primary care physicians). Level II measures are used when an individual is known to be at risk for developing a condition of interest (i.e., ASD in this case). As such, they are targeted toward a narrower population (e.g., those who screened positive on a level I screen), are more time-consuming to administer, and are more likely to be used by specialists. Of course, the distinction between a level I and level II screening measure is not always clear, so some measures may be characterized as hybrid measures (Petrocchi et al., 2020).

The AAP recommends that all children be screened at primary care (well-child) visits for ASD at 18 and 24 months, the earliest age at which the diagnosis can be made (Hyman et al., 2020). However, the USPSTF (Siu et al., 2016) reviewed the evidence for and against the use of screening in the absence of concerns about the presence of ASD. Based on the balance of potential harms and benefits of this type of screening, they concluded that the evidence was insufficient to recommend screening all children between the ages of 18 and 30 months. It was explicitly noted in the USPSTF's statement that their recommendation was *not* against screening, but, rather, that more research was needed to make a recommendation for screening. Despite the AAP's recommendation to screen *all* children for ASD at both 18- and 24-month visits, a recent study indicated that only 51% and 41% of primary care physicians (79% pediatricians) administered ASD screening tools at 18- and 24-month visits, respectively (Mazurek et al., 2021).

What constitutes a "screening" measure in the research literature is not always clearly defined and varies across studies. For example, Hyman et al. (2020) identified the Modified Checklist for Autism in Toddlers (M-CHAT; Robins et al., 2001), Social Communication Questionnaire (SCQ; Rutter et al., 2003a), and the Screening Tool for Autism in Toddlers and Young Children (STAT; Stone & Ousley, 1997; Stone et al., 2000) as screening measures. However, according to the M-CHAT website, this measure, and the revised versions are freely available for download and are designed to be administered and scored without training. In fact, the website indicates that "parents also can self-administer the questionnaires." The SCQ is a proprietary instrument that must be purchased through a test publishing company (WPS) and may only be administered by persons with a master's degree in psychology, school counseling, occupational therapy, speech–language pathology, social work, education, special education, or a related field. The STAT is described as a level II screener designed to be used by "a wide range of community professionals working with young children in assessment or intervention settings… psychologists, pediatricians, speech-language pathologists, social workers, preschool teachers, and early intervention specialists." In contrast to the M-CHAT and SCQ, the STAT requires training and involves observations of children's behavior. Thus, although they may all be screening tests in the sense that they are used to distinguish those with and without a condition of interest, they are quite different in terms of the settings in which they are likely to be used.

A commonly use screening measure for ASD is the Modified Checklist for Autism in Toddlers (Petrocchi et al., 2020; M-CHAT; Robins et al., 2001). The M-CHAT was developed as a screening instrument that could be easily administered with young children. The Checklist for Autism in Toddlers (CHAT; Baron-Cohen et al., 1992), which was a precursor to the M-CHAT, was developed and validated in the United Kingdom and included a "home health visitor" who would observe the child in the home. Because the CHAT was developed outside of the United States and required a home observation, this prompted the development of the M-CHAT.

The M-CHAT consists of 23 yes/no items (9 of which came from the CHAT) completed by parents to indicate their child's current skills and behavior. The items were designed to assess the "primary deficits" of autism (based on the research available at that time) and includes items to assess sensory and motor abnormalities (under-sensitive to noise, unusual finger movements, climbing), social interchange (eye contact, smiling in response to parent's smile), early joint attention/theory of mind (bringing objects to show parents, pointing to indicate interest, following adult's point), and early language and communication (pointing to request, understanding "no," indicating own wishes). The M-CHAT items were included in the Robins et al. (2001) measure, and the instrument (as well as the modified versions developed later) is freely available at https://mchatscreen.com/m-chat. The initial validation sample consisted of 1122 children screened during 18-month well-child visits and a high-risk sample of 171 children screened through early intervention service providers between 18 and 30 months. Six (out of the 23 total) items were identified as “critical items” based on discriminant function analysis: protodeclarative pointing, response to name, interest in peers, bringing things to show parents, following a point, and imitation. A positive screen is based on any 3 of the 23 total items or 2 of the 6 critical items and was followed up by a telephone interview designed to clarify parents’ endorsement of items on the M-CHAT. If children continued to be identified as at-risk following the telephone interview (44% of those who screened positive on the M-CHAT), they subsequently received a developmental evaluation for ASD (Robins & Dumont-Mathieu, 2006).

The authors of the original M-CHAT subsequently developed the Modified Checklist for Autism in Toddlers with Follow-Up (M-CHAT-F). As the name implies, the M-CHAT-F includes a set of follow-up interview questions for which only the items endorsed on the M-CHAT indicating increased risk of ASD are probed. The interview questions are scored as either “pass” or “fail,” and examples of behaviors are included to confirm that the items endorsed on the M-CHAT are in fact indicative of ASD. The interview items have been shown to reduce the false positive rate of the M-CHAT (Chlebowski et al., 2013). The M-CHAT-F was later revised (i.e., M-CHAT-R/F; Robins et al., 2009) to simplify the wording of the original M-CHAT (3 items were also removed so that M-CHAT-R/F contains 20, rather than 23 items) and to improve detection of ASD.

The M-CHAT-R/F are available on the author’s website along with the instructions for use and scoring algorithm that “maximizes the psychometric properties of the M-CHAT-R.” A “No” response to all items except items 2, 5, and 12 (for which “Yes” contributes to the total scores) is reported to indicate ASD risk. A total score of 0–2 is considered “low risk,” and a second screen is recommended for children younger than 24 months old. Total scores of 3–7 indicate “medium risk,” and administration of the Follow-Up (second stage of M-CHAT-R/F) to get additional information about at-risk responses is “strongly recommended.” A score of greater than or equal to 8 at follow-up (as noted previously, scores tend to decrease at follow-up) is considered a positive screen, and diagnostic evaluation (and assessment of eligibility for early intervention) is recommended. Otherwise, re-screening at future well-child visits is recommended. The authors recommend that, for total scores of 8 or higher, follow-up may be bypassed in lieu of a diagnostic evaluation. Robins et al. (2014) provided data on several of the psychometric properties of the M-CHAT-R and M-CHAT-R/F scores. They found that the total score functioned optimally and provided recommendations for the three risk ranges (described previously).

A systematic review of 16 (6 level I; 4 level II; 6 “hybrid”) screening measures using the Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) guidelines and Consensus-based Standard for the selection of health Measurement INstruments (COSMIN) checklist was recently published (Petrocchi et al., 2020). The review classified the measures into three categories: 4 observational checklists, 10 questionnaires, and 2 interviews. Tables present the type of design used (11 longitudinal and 19 cross-sectional), populations studied (general population; other developmental disorders; Pervasive Developmental Disorder [PDD]/PDD—not otherwise specified; typically developing children), and psychometric properties when available (sensitivity, specificity, and positive and negative predictive values). However, several of the psychometric properties were not reported in the studies reviewed.

Another well-researched screening measure for very young children is the Baby and Infant Screen for Children with aUtIsm Traits (BISCUIT; Matson et al., 2007). This is a standardized scale designed to be completed by the parents or other caretakers of infants and toddlers ranging in age from 17 to 37 months, to assist with the diagnosis of ASD and provide a means of monitoring treatment over time. The scale consists of four components. The first component is an informant-based measure read to the patient or other caregiver to assess symptoms of autism spectrum disorders in infants and toddlers. The second and third components assess symptoms of emotional difficulties and challenging behaviors that commonly occur with autism spectrum disorders. The fourth component obtains information related to the child's response to name, interest in peers or others, eye contact, pretend play, and engagement in reciprocal play; information on the fourth component is purely based on the information obtained from the first three components. The authors noted that when evaluating a child for autism, it is important to make assessments beyond the typical autism symptoms alone and should include symptoms of co-occurring disorders, because 70–75% of individuals with autism have clinically significant symptoms of another psychiatric disorder, with more than 40% meeting criteria for more than one co-occurring disorder (Matson, 2013). Such co-occurring disorders include anxiety, depression, eating disorders, sleep disorders, and attention deficit hyperactivity disorder. Cutoff scores for the BISCUIT have been established for different ages and severity levels, and the measure has been translated into multiple languages.

Because the purpose of screening tools is to identify those at risk of developing ASD so that a more thorough assessment can be completed, sensitivity is typically emphasized (i.e., avoidance of false negative results) at the expense of specificity (i.e., false positive results). More comprehensive assessment should always follow a positive screen. However, it is important to be aware that diagnostic confirmation will not always correspond with the results of screening measures, and some populations may be at greater risk for false positive screens (e.g., children born prematurely; Stephens et al., 2012) than others.

Training and educational resources are available for clinicians working with young children to improve their identification of the signs and symptoms of ASD. For example, the CDC developed the Autism Case Training (http://www.cdc.gov/ncbddd/actearly/autism/case-modules/index.html) and the Health Resources and Services Administration (http://mchb.hrsa.gov/programs/autism/trainingforprofessionals.html). Parent resources have been developed as well. For example, the CDC developed the "Learn the Signs. Act Early" website, which includes downloadable apps to track developmental milestones (https://www.cdc.gov/ncbddd/actearly/index.html), and many other resources are available as well (http://www.cdc.gov/ncbddd/autism/families.html; https://www.psychiatry.org/patients-families/autism/what-is-autism-spectrum-disorder).

Neurodevelopmental History

Because ASD is a neurodevelopmental disorder and the DSM-5 requires that symptoms must be present "in the early developmental period" (but may not be apparent until social demands increase), the history of symptoms is particularly important. Research indicates that there is a delay between when parents first develop concerns about a child's development and the age at which a comprehensive evaluation is performed to diagnose ASD (Baio et al., 2018). By taking a careful history, clinicians not only obtain information important for making a diagnosis and understanding a child's functioning, but they also develop a rapport/working alliance that facilitates the assessment process and treatment (Plotts & Webber, 2002).

A neurodevelopmental history consists of multiple components, beginning with a prenatal history. Relevant factors to assess include maternal age, previous pregnancies, prenatal exposures (e.g., prescription/illicit drug use, alcohol use, infections), and systemic illnesses/infections (e.g., cytomegalovirus and Zika virus), and prenatal ultrasound results. The history of labor and delivery may include gestational age, details of labor (e.g., length, spontaneous/induced, and use of vacuum/forceps extraction), birth weight/length/head circumference (some studies suggest children with ASD have increased head circumference; although this finding is age-dependent and is certainly not diagnostic), Apgar scores (at 1, 5, and 10 min), and need for neonatal intensive care and any complications. History in the newborn period should assess for the need for neonatal intensive care, seizures in the neonatal period and other signs of neonatal encephalopathy, poor feeding, impaired sucking and swallowing, and sleep-wake abnormalities.

Assessment of acquisition of typical developmental milestones is a standard part of the neurodevelopmental history. In chronological order, the age at which specific milestones were attained includes the ages at which a child smiles responsively (2–3 months); reaches for objects (4–5 months); can remain seated upright (6 months); crawls and babbles (9–10 months); walks with support (10–11 months); walks independently and speaks single words (13–14 months); uses simple phrases (18–19 months), and uses two- to three-word phrases (24 months) (Glascoe & Marks, 2009). Specific inquiries can include whether a child reached, gestured, or used words to get things that they wanted, as these can provide information about early social communicative behaviors.

Among the earliest indicators of ASD is decreased eye contact, which has historically been described as a hallmark feature of ASD. Research indicates that this can be detected prior to age 6 months and that a pattern of decreased eye fixation between 2 and 6 months of age predicts later diagnosis of ASD (Jones & Klin, 2013). However, detection of these differences is currently limited to the use of eye-tracking technology, so this marker is of limited utility for clinical evaluations currently. At 6 months of age, gaze toward faces, shared smiles, and vocalizations to others are comparable between children who do and do not develop ASD, but reduced frequencies in these behaviors are apparent by 12 months in the children who are later diagnosed with ASD (Ozonoff et al., 2010).

Other behavioral markers that become apparent in children who later develop ASD include reductions in orienting to name, visual tracking, and imitation, and prolonged latency to disengage visual attention (Zwaigenbaum et al., 2005). Early temperament has also been found to differentiate children who do and do not develop ASD. Zwaigenbaum and colleagues (2005) described a pattern in which children who develop ASD display increased passivity and decreased activity at 6 months, but by 12 months, extreme distress reactions, decreased expression of positive affect, and increased fixation on specific objects in the environment become apparent. Parental concerns about vision and hearing have been shown to be predictive of later diagnosis of ASD.

Between 1 and 2 years of age, signs and symptoms of ASD become more apparent, and this is the timeframe when the earliest diagnosis becomes possible. The AAP (Hyman et al., 2020) identified the absence of responding to name at 12 months, pointing to objects to show interest at 14 months (e.g., showing or offering a parent a toy), and engaging in pretend play at 18 months as "red flag early symptoms of ASD." Clinicians should also inquire about the presence of repetitive behaviors, imitation, and delays in expressive and receptive language.

Delayed speech has long been considered a core feature of ASD, as is evident from the diagnostic criterion (for "Infantile Autism") of "gross deficits in language development" in the DSM-III, which also stated that, if speech is present, it was noted to be "peculiar" and characterized by patterns such as immediate and delayed echolalia, metaphorical language, and pronoun reversal. In the DSM-IV, "stereotyped and repetitive use of language or idiosyncratic language" were part of the diagnostic criteria, and it was the presence of language impairment that distinguished this diagnosis from Asperger's Disorder in which the delay in language development was absent. Currently, in the DSM-5, ASD can be specified as occurring with or without language impairment. Although the DSM-5 no longer considers impaired communication separate from impairment in social interaction, it does note that "many individuals have language deficits, ranging from complete lack of speech through language delays, poor comprehension of speech, echoed speech, or stilted and overly literal language," and that, "even when formal language skills (e.g., vocabulary, grammar) are intact, the use of language for reciprocal social communication is impaired." Delayed language development continues to be still considered one of the first symptoms in ASD. Gernsbacher and colleagues (2016) reviewed what they termed "three communication phenomena" believed to be unique to autism, which included pronoun reversal, echolalia, and “a reduced or even reversed production-comprehension lag.” They concluded that none of these phenomena were unique to ASD.

General “red flag” early symptoms of ASD identified by the AAP (Hyman et al., 2020) include avoidance of eye contact, desire to be alone, difficulty understanding one’s own or another’s feelings, delayed speech/language, echolalia, giving unrelated answers to questions, becoming upset by minor changes, obsessive interests, repetitive movements (e.g., hand flapping, rocking, spinning in circles), and unusual sensory reactions to sounds, smells, tests, sights, and feelings (i.e., the hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment criterion in DSM-5).

Regression of social and/or language skills should be inquired about because this occurs in 20% of ASD cases, and may be either gradual or rapid. Most commonly, such regression occurs between the first and second year, but may occur after 2 years of “normal development.” Pointing in order to indicate interest to others, referred to as protodeclarative pointing (Baron-Cohen et al., 1992), is another behavior to be inquired about. Specific signs of ASD that should be asked about include: avoidance of eye contact, preference to be alone, trouble understanding others’ feelings or talking about one’s own feelings, delayed speech and language skills, excessive repetition of words or phrases (i.e., echolalia), responding to questions with unrelated answers, becoming upset by minor changes, demonstrating obsessive interests, repetitive movements such as flapping hands, rocking, or spinning in circles, and unusual reactions to sounds, smell, taste, sights, or tactile sensations (Hyman et al., 2020).

Structured interviews, such as the Parent Interviews for Autism (PIA), can be administered to assess for history of specific ASD symptoms. Additionally, such interviews inform clinicians about the areas to be inquired about. The PIA uses a six-point Likert-type scale (1—“almost never”; 5—“almost always”) to provide information across nine dimensions that include social relating, affective responses, imitation, peer interaction, object play, imaginative play, language understanding, nonverbal communication, motor behaviors, sensory responses, and need for sameness. There are several other interviews that have been developed as well that assist with history taking. However, the most well-known and widely accepted is the Autism Diagnostic Interview—Revised (ADI-R; Rutter et al. 2003a, b). Because the ADI-R was developed to provide a more definitive diagnosis of ASD, it is described under the Diagnostic Assessment Instruments in the next section.

Diagnostic Assessment Instruments

Comprehensive discussion of instruments that are used for assessment and diagnostic purposes must consider the psychometric properties, the scope of which is beyond this chapter. However, the reader is referred to the *Standards for Educational and Psychological Testing* (referred to as, the *Standards*, currently in its sixth edition; American Educational Research Association, American Psychological Association, & National Council on Measurement Education, 2014), which was developed to provide guidelines for the development and use of tests and testing practices, including assessment of the reliability and validity of assessment instruments/tests. Briefly, reliability refers to the degree of consistency in measurement, which also indicates the amount of error involved in measurement. There are several types of validity, but, in general, validity refers to the degree to which evidence and theory support the interpretations of test results for the intended purpose. Any assessment measure used should have known psychometric properties, and users of assessment measures are responsible for knowing and understanding the psychometric properties of the instruments they use.

In addition to reliability and validity, there are other test properties that are important to consider when making diagnostic decisions based on the use of assessment results (e.g., scores). Briefly, when using specific values to make diagnostic decisions, sensitivity refers to the probability of detecting a condition (i.e., a true positive result), whereas specificity refers to the probability of determining that an individual does not have a condition (i.e., true negative result). It is the combination of these values that determines how well assessment instruments distinguish between individuals with and without a condition. Positive and negative predictive values indicate the proportion of time the correct diagnostic decision is made on the basis of a particular test result, which is influenced not only by the sensitivity and specificity but also by the base rate (i.e., prevalence) of a condition. The interested reader is referred to Anastasi and Urbina (1997) and Nunnally and Bernstein (1994) for more information on these psychometric concepts.

Autism Diagnostic Observation Schedule, Second Edition (ADOS-2)

The ADOS-2 (Lord et al., 2012a, b) is a semi-structured assessment tool used to allow standardized behavioral observations. Play-based activities are used to assess communication, reciprocal social interactions, and restricted and repetitive behaviors (i.e., the DSM-IV diagnostic criteria for Autism). It has been published in 20 languages and is listed as “in press” for 2 more (“simplified Chinese” and “Mandarin: traditional characters”).

There are five modules (only one is selected) that can be administered based upon age (the range is 12 months through adulthood), developmental level, and language skills of the examinee. Each takes 40–60 mins to administer. The Toddler Module is administered for children between 12 and 30 months of age who do not consistently use phrase speech. Modules 1–4 are used based on both increasing age and verbal fluency (i.e., module 1 for youngest, and least verbal; module 4 for oldest and most verbal examinees). Structured activities and interactive materials are used to allow the examiner to make observations and take notes. The number of activities varies across the modules. Module 4 includes five optional activities that include unstructured conversation, structured situations, and interview questions. The examiner codes the behaviors observed and takes notes during the administration on the record forms. Scoring algorithms are used to compare an examinee’s score to the cutoff scores provided in the manual.

An overall cutoff score, based on the sum of the domains (Social Affect, which includes items assessing communication and reciprocal social interaction; and Restricted and Repetitive Behaviors) in the scoring algorithm, is used to determine one of three classifications: autism (more severe), autism spectrum (less severe), or non-spectrum. However, in the Toddler Module, “ranges of concern,” rather than classification scores, are provided, which is intended to quantify the risk of developing ASD in cases where a child may not be old enough to be diagnosed (e.g., 12 months). There are four samples described that compose the comparison groups in the ADOS-2 manual, which are based on the DSM-IV-TR diagnostic system. These include a group with ASD (i.e., autistic disorder, Asperger’s disorder, pervasive developmental disorder not otherwise specified [PDD-NOS]); a group labeled autism (i.e., Autistic Disorder from the DSM-IV-TR); non-Autism ASD (i.e., Asperger’s disorder or PDD-NOS); and individuals who did not meet criteria for any of the pervasive developmental disorders but may have had an alternative diagnosis (e.g., language disorder). For modules 1–3, an additional “comparison score” is available to assess an examinee’s “overall level of autism spectrum-related symptoms” in comparison to children with ASD who are similar in age and language skills.

The items from the ADOS-2 are noted to be identical to the original ADOS. The updates include revised protocols (i.e., record forms), scoring algorithms, the new “Comparison Scores” noted previously, and the addition of a Toddler Module. Because the items remained “functionally” the same, the ADOS-2 manual indicates that the reliability information provided by the original ADOS can be applied to the ADOS-2. It is generally accepted that the ADOS-2 has adequate psychometric properties, although there is variability across the modules, with the lowest values, not unexpectedly (given the young age), observed in the Toddler Module. c ranged from 0.50 to 0.66 across the modules) and test-retest reliability (0.83–0.87 for modules 1–3) were adequate. Higher mean scores in the module are obtained by children with autism compared to PDD-NOS, who score higher than children without any PDD, supporting the validity of the ADOS-2. Sensitivity ranged from 60% (comparing the non-autism ASD group and non-spectrum group) to 98% (autism and non-spectrum comparison), whereas specificity values range from 50% (module 1—Few to No Words, Nonverbal Mental Age ≤ 15 Months) to 100% (comparing the autism group to the non-autism and non-spectrum groups).

According to the publisher's website, the ADOS-2 can be administered by anyone with a master's degree in psychology, school counseling, occupational therapy, speech–language pathology, social work, education, special education, or a related field. However, because the administration and coding of the ADOS-2 are highly standardized, additional training is required in order to ensure the validity of the assessment. There are a variety of training options available through the test publisher's website (https://www.wpspublish.com/product/product-schedule). A 2-day workshop is offered (currently at a price of $525 as of July 2021) during which attendees observe demonstrations of the administration and scoring, and then practice scoring. Once trained in the use of the ADOS-2, video and online self-study options are available, but are designed only for those who have already completed the live training workshop.

There is certainly research supporting the utility of the ADOS-2. However, Kaufman (2020) described a number of concerns with the status that the ADOS-2 has received among some practitioners. Indeed, the authors of the ADOS-2 noted, "In cases where ADOS-2 classification differs from the overall clinical diagnoses, clinical judgment should overrule the ADOS-2 classification in achieving a best-estimate clinical diagnosis" (Lord et al., 2012b, p. 187). Moreover, the ADOS-2 does not assess certain DSM-5 criteria for the diagnosis of ASD, such as developmental history and age of onset of symptoms, nor does it assess intellectual or adaptive function, both of which are needed to specify the full diagnosis (i.e., the specification of "with or without intellectual impairment"). The training requirements, time to administer, and cost represent significant barriers to the widespread use of the ADOS-2.

Autism Diagnostic Interview—Revised

The Autism Diagnostic Interview—Revised (ADI-R; Rutter et al., 2003b) is also used to diagnose ASD. As the name implies, the ADI-R involves a comprehensive interview of a parent or caregiver who is knowledgeable about the developmental history and current behavior of the individual being evaluated. The ADI-R can be used to assess children who have a "mental age above 2 years, 0 months" through adults, with the understanding that finding a parent or caretaker who is accurately able to report the developmental history becomes more complicated the older an individual being assessed becomes.

The ADI-R consists of 93 questions that assess three functional domains: Language/Communication; Reciprocal Social Interactions; and Restricted, Repetitive, and Stereotyped Behaviors and Interests. The administration time is estimated to be between 90 and 150 min, including scoring time. As with the ADOS-2, the ADI-R (published in 2003) was created to assess ASD using the DSM-IV criteria. Interview questions cover eight content areas that include: the individual's background (e.g., family, education, previous diagnoses, and medications); overview of the individual's behavior; early development and developmental milestones; language acquisition and loss of language or other skills; current functioning regarding language and communication; social development and play; interests and behaviors; and clinically relevant behaviors, such as aggression, self-injury, and seizures.

Responses to interview questions are recorded and then coded so that one of five ADI-R algorithms can be used. One of two *Diagnostic Algorithms* can be used based on the full developmental history to make a formal diagnosis. One of three *Current Behavior Algorithms* is used to describe present functioning (i.e., based on behavioral observations in the "most recent months") and is used for treatment and educational planning. However, the manual states that the primary application of the ADI-R is the *Diagnostic Algorithm* and that "this is the use that is fully researched and validated."

Summary scores are calculated for each of four domains: Qualitative Abnormalities in Reciprocal Social Interactions; Qualitative Abnormalities in Communication; Restrictive, Repetitive, and Stereotyped Patterns of Behavior; and Abnormality of Development Evident at or Before 36 Months. Because the interview items focus on behaviors that are rare in non-ASD individuals, categorical algorithms are used to determine the presence of ASD based on a cutoff for ASD. There is no further classification beyond the diagnostic determination of present/absent, as is the case with the ADOS-2 (i.e., autism, autism spectrum, or non-spectrum), and there are no normative scores provided.

Interrater reliability and test-retest reliability coefficients are provided in the ADI-R manual. Weighted kappa values are broken down by age, with values ranging from .63 to .89 (36–59 months old) and .37–.95 (5–29 years old). Intraclass correlation coefficients for the Diagnostic Algorithm domains ranged from .93 to .97. Sensitivity and specificity values are not provided in the ADI-R manual. A systematic review and meta-analysis (Lebersfeld et al., 2021) reported sensitivity and specificity values to range from .89 to .92 and .75 to .82, respectively, although specificity values tend to be high in research as compared to clinical samples (Research = .85, Clinical = .72).

As was the case with the ADOS-2, standardized and valid assessment results based on use of the ADI-R require training. The test publisher (WPS) offers the recommended training program in the form of an online self-study format through the use of videos (16 h), a Training Guidebook, and the ADI-R protocol and algorithm forms. The manual indicates that interviewers who use the ADI-R must be well conversant with the concepts and manifestations of behavior in ASD, have generic interviewing skills and knowledge of how to inquire specifically about behaviors assessed in the ADI-R (i.e., those on the protocol form), and be familiar with the coding of behaviors on the protocol form. Because the ADI-R has been used extensively in research, the ADI-R provides guidelines for researchers to ensure competence in the use of this instrument. Specifically, researchers must attend an approved training program and be assessed for competence in the use of the ADI-R. The training program involves a detailed discussion of interview codings and viewing of videotaped interviews undertaken by the trainee to demonstrate an acceptable level of agreement with consensus codings. Further, videotaped interviews ("usually one or two") completed after the training course must be submitted, along with "codings on one or more further teaching tapes for which consensus codings are available."

The ADI-R manual cautions that "a clinical diagnosis is based on multiple sources of information, including direct observations, and can be produced only by a licensed physician or psychologist. The ADI-R diagnosis is simply the 'mechanical' result of combining coded information from the interview." An obvious limitation of the ADI-R is that it is based almost exclusively on parent/caregiver report. Research studies have found that the use of the ADOS-2 and ADI-R improves diagnostic accuracy and that each instrument provides independent, additive contributions to an ASD diagnosis.

Autism Spectrum Rating Scale

The Autism Spectrum Rating Scale (ASRS; Goldstein & Naglieri, 2009) is a norm-referenced instrument that can be completed by parents and teachers. It uses a five-point Likert scale (0 = Never; 4 = Very Frequently) to assess the frequency with which specific behaviors are observed over the past month in the areas of socialization, communication, stereotypical behaviors, behavioral rigidity, sensory sensitivity, and self-regulation. Forms are for early childhood (2–5 years) and school age

(6–18 years) for both parent and teacher ratings, for both the full form (71 items) and short form (15 items).

The ASRS provides norm-referenced T-scores (mean = 50; SD = 10) for the Total Score, three ASRS Scales (Social/Communication, Unusual Behaviors, and Self-Regulation [6–18 years old only]), DSM-IV-TR and DSM-5 (developed in 2014, after the ASRS was published and includes items related to hyper- and hypo-reactivity to sensory input, or unusual interest in sensory aspects of the environment) scales, and eight treatment scales (Adult Socialization, Attention [6–18 years; "Attention/Self-regulation" for 2–5 years], Behavioral Rigidity, Emotionality, Peer Socialization, Language, Sensory Sensitivity, and Unusual Interests). The ASRS was initially developed based on DSM-IV criteria for ASD (i.e., autistic disorder, Asperger's disorder, and PDD-NOS). However, an update was released by the test publisher in 2014 to align the ASRS with the DSM-5 criteria for ASD. The test authors reported that "overall, the impact of the new ASD criteria on the ASRS is minimal." The primary update was in the development of the DSM-5 scale, and the Delay of Communication items were removed from the scoring algorithms. A technical report for the DSM-5 update was released in 2014, and, currently, both the DSM-IV and DSM-5 computerized scoring options remain available.

The normative comparison sample for the ASRS included both parent and teacher ratings for non-clinical (*n* = 2560; from across the United States) and clinical groups. The latter included children with ASD (Autism, Asperger's, Pervasive Developmental Disorder—Not Otherwise Specified), Attention-Deficit/Hyperactivity Disorder, Mood and Anxiety Disorders, Disruptive Behavior Disorders, and other conditions. Reliability of the ASRS was demonstrated based on high levels of internal consistency (alpha ranging from .74 to .97) and test-retest reliability (over a 2- to 4-week interval) values ranging from .72 to .93. Reliability values are further specified based on parent and teacher ratings, forms used based on age ranges (2–5 years and 6–18 years), and the individual scales. Validity was evaluated by discriminant function analyses to predict group membership in the ASD or General Population groups, with a mean overall correct classification rate of 92%. Sensitivity, based on the total score, ranged from 89.8% to 91.1%, and specificity ranged from 88.6% to 92.2%.

Childhood Autism Rating Scale, Second Edition

The Childhood Autism Rating Scale, Second Edition (CARS-2; Schopler et al., 2010) is available in a Standard Form (CARS-2-ST), which is equivalent to the original 1988 edition of the CARS, and is designed for children under age 6, or over age 6 and "with estimated overall IQ of 79 or lower or with notably impaired communication." A High Functioning (CARS-2-HF) version was developed to assess individuals aged 6 and older, "with an estimated overall IQ of 80 or higher, with fluent communication." In addition, there is a Questionnaire for Parents or Caregivers (CARS2-QPC), which is not scored but was developed to acquire information from parents or caregivers to assist the clinician in making ratings on the CARS2-ST or CARS2-HF. According to the publisher's (WPS) website, anyone with a master's degree in psychology, school counseling, occupational therapy, speech–language pathology, social work, education, special education, or related field, can administer the CARS-2.

The CARS-2 was developed based on the work of Kanner (1943) and is reported to "capture the basic symptoms addressed in all editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM)." Both CARS-2 forms (i.e., ST and HF) contain 15 categories that are rated on a scale of 1 (within normal limits) to 4 (severely abnormal), although ratings half-way between (i.e., 1.5, 2.5, and 3.5) are permitted as well, thus creating seven total possible ratings. The categories across the two forms are similar and have similar (e.g., "Emotional Response" on the ST form compared to

"Emotional Expression/Regulation" on the HF form) or identical names for 13 of the categories rated (one of which is a "General Impression" rating). Thus, the 12 categories that are similar include: Adaptation to Change/Restricted; Body Use; Emotional Expression/Regulation; Fear or Anxiety; General Impressions; Level/Consistency of Intellect; Listening Response; Nonverbal Communication; Object use; Relating to People; Taste, Smell, and Touch Response; Verbal Communication; and Visual Response. The CARS-2HF contains two categories, Social-Emotional Understanding and Thinking/Cognitive Integration, and the CARS-2-ST contains two categories, Activity Level and Imitation.

The CARS-2 manual indicates that ratings are based on observations made in various settings and can include psychological testing or classroom participation, parent reports about their children, comprehensive clinical records, or a combination of these sources, and ratings should not be made until the collection of all relevant information has been completed. The ST form can be completed based on information from a single source (e.g., parent interview or direct observation), but the HF form requires both observation and an interview with someone who knows the person whose behavior is being rated across different settings.

The general considerations for making ratings are similar for the ST and HF forms and should be made in comparison to "that of a typically developing individual of the same age." Atypical behaviors are rated based on the peculiarity (defined as "the extent to which a behavior is unusual or odd in general, as opposed to whether it is delayed or like the behavior of a younger child"), frequency, intensity, and duration of the behaviors. The ST form is more likely to be administered to young children, so the guidance for making ratings on the HF form is written in a more general way with respect to the age of the person being rated. There is a separate chapter in the CARS-2 manual for how to make observations and ratings for the two forms, and the manual cautions against relying on the descriptions provided on the protocol form when making ratings. The parents should not complete either of the rating forms, but information from parents should be obtained from the QPC form and interview to inform clinician ratings.

Item scores for the 15 categories are summed to obtain a total score, which is then used to determine the following severity groupings for the HF form: Minimal-to-No Symptoms of ASD (15–27.5), Mild-to-Moderate Symptoms of ASD (28–33.5), and Severe Symptoms of ASD (34 and higher). For the ST form, there are slight variations in score interpretation based on age: Minimal-to-No Symptoms of ASD (15–29.5; 15–27.5 for ages 13+), Mild-to-Moderate Symptoms of ASD (30–36.5; 28–34.5 for ages 13+), and Severe Symptoms of ASD (37 and higher; 35 and higher for ages 13+). Total raw scores can also be converted to age-adjusted (2–12, 13 and older, or all ages) T-scores/percentiles based on comparison to individuals with ASD diagnosis.

The three samples used for the development of the CARS-2 are described in the manual and include the original 1998 CARS sample (N = 1606), the CARS2-ST Verification sample (N = 1034), and the CARS2-HF Development sample (N = 994). Internal, interrater, and test-retest reliability data are presented in the CARS-2 manual. Total score internal consistency estimates were .93 and .96 for the ST and HF forms, respectively. Interrater reliability and item rating reliability for the total raw scores on the Original CARS and the CARS-2-HF were .84 and .95, respectively. Test-retest correlations for the Original CARS were .90 and .78 at 1- and 2-year time intervals, respectively. The CARS-2 manual reports data on the internal structure, factor analytic results, and the relationship of total scores to clinical diagnosis. Two factors were identified for the CARS-2-ST, related to communication and sensory issues and emotional issues. Three factors were identified for the CARS-2-HF, related to social and emotional issues, cognitive functioning and verbal ability, and sensory issues. The following means were reported for the total scores of the clinical comparison groups: High functioning autism (M = 35.3); Asperger's Disorder (M = 32.7); PDD-NOS (M = 33.6); Mixed clinical (M = 24.8); ADHD (M = 19.6); Learning disorder (M = 18.7); Nonverbal learning disorder

(M = 19.0); Special education students (M = 17.0); and General education (M = 17.3). Sensitivity and specificity values using the Total raw score (30 or higher) of the Original CARS compared to clinical diagnosis of Autism were .88 and .86, respectively. Sensitivity and specificity values using the Total raw score on the CARS-2-HF (28 or higher) to identify cases of ASD (autism, Asperger's Disorder, or PDD-NOS) were .81 and .87, respectively, but dropped to .77 and .58 when non-ASD clinical cases were included.

Social Communication Questionnaire

The Social Communication Questionnaire (SCQ; Rutter et al., 2003a) is a 40-item companion screening measure designed based on ADI-R items (Rutter et al., 2003b) that uses a yes/no response format and can be completed independently by parents in less than 10 min. The items for the SQC were chosen to match the ADI-R items based on discriminative diagnostic validity and provide content coverage similar to the ADI-R.

The SCQ is available in two forms, Lifetime and Current, which are completed in reference to the individual's entire developmental history and the most recent 3-month period, respectively. It may be used with individuals "above age 4.0 years provided that their mental age is at least 2.0 years." As with the ADI-R, behaviors that are assessed are rare in nonaffected (i.e., non-ASD) individuals, so cutoff, rather than dimensional (i.e., normative), scores are used. The primary application of the SCQ is to use the Lifetime form cutoff score (Total score of 15 or greater) to determine the need for a more extended evaluation. However, subscales are available that can align with the domains on the ADI-R (Qualitative Abnormalities in Reciprocal Social Interaction; Qualitative Abnormalities in Communication; and Restricted, Repetitive, and Stereotyped Patterns of Behavior).

The primary standardization sample was based on 200 individuals who had previously participated in studies of ASD and included 160 individuals with ASD (which the manual specified as autism, "atypical autism," Asperger syndrome, Fragile X, and Rett syndrome), and individuals with other developmental disorders. All participants had previously been assessed with either the ADI or ADI-R. Reliability was demonstrated based on alpha coefficients between .84 and .93 and measures of internal consistency between .81 and .92. Validity was evaluated via factor analysis (a four-factor solution identified: Social Interaction, Communication, Abnormal Language, and Stereotyped Behavior), discrimination of groups based on items (33 items were significant), and receiver-operating characteristic (ROC) analysis (AUC Total Score = .90). Using the SCQ Total score of 15 as the cutoff to differentiate ASD from non-ASD cases, sensitivity and specificity values of .85 and .75 were reported, respectively.

Social Responsiveness Scale, Second Edition

The Social Responsiveness Scale, Second Edition (SRS-2; Constantino & Gruber, 2012) is a 65-item screening instrument that has four forms available based on age, two of which are designed for children. The Preschool (ages 2.5–4.5 years) and School-Age (4–18, composed of the same items that appeared on the original SRS) forms can be completed by parents or teachers (with 1 month of experience with the individual being rated) and take approximately 15–20 min to complete. The Adult Form (age 19 years and up) can be completed by a relative or friend and is also available in Self-Report format.

Items are rated on a four-point scale (1 = Not true to 4 = Almost always true) that provides a Total score and five Treatment subscales: Social Awareness, Social Cognition, Social Communication, Social Motivation, and Restricted Interests and Repetitive Behavior. In addition, two DSM-5–Compatible subscales, Social Communication and Interaction and Restricted Interests and Repetitive Behavior, are provided that align with the diagnostic criteria for ASD so that a comparison can be made between ratings and DSM-5 diagnostic criteria. The raw scores from all subscales are summed for the raw score of the Social Communication and Interaction subscale. The Repetitive Behavior subscale is summed from the individual items for that subscale. The Total Raw score is based on the sum of all items.

Raw scores for each of the Treatment subscales, DSM-5 Compatible subscales, and Total scores are converted to T-scores based on age (Preschool, ages 2.5–4.5 years; or School-Age, 4–18), rater (parent or teacher), and gender. Only the Total Score is used for screening and assisting with diagnosis. The treatment scales are not recommended to be used clinically, but rather, for research. The test authors recommend the following interpretations for the T-scores for the Total score: 59 T and below are within normal limits and are generally not associated with clinically significant ASD; T-scores of 60 and above indicate deficiencies in reciprocal social behavior that are clinically significant. T-scores of 60T–65T may lead to mild to moderate interference with everyday social interactions and are typically associated with non-ASD conditions (e.g., ADHD, language disorder). T-scores of 66T–75T are considered moderate and lead to substantial interference with everyday social interactions. Scores in the range from 66T to 75T are considered typical for children with ASD of moderate severity and social (pragmatic) communication disorder. T-scores of 76T or higher fall in the severe range, reflect severe interference with everyday social interactions, and are strongly associated with clinical diagnosis of ASD.

The normative comparison samples used in the SRS-2 included parent and teacher ratings for the Preschool and School-Age forms with demographic characteristics matched to the 2009 US Census data. A clinical sample included individuals between the ages of 4 and 18 years who were diagnosed with ASD (Autistic Disorder, Asperger's Syndrome, PDD-NOS, PDD, and ASD; n = 4891) prior to completing the SRS-2 and unaffected siblings (n = 3030).

Reliability was assessed based on internal consistency, test-retest/temporal stability, and interrater reliability. Using the standardization sample, internal consistency alpha coefficient values were reported between .92 and .97 for the total scores of parent and teacher ratings for both the Preschool and School-Age forms. Values were not reported for the subscales. The internal consistency alpha coefficient in the clinical sample (School Age form only) was .95. Interrater reliability coefficients between parent and teacher forms ranged from .42 to .77 for the School Age form and from .70 to .78 for the Preschool form. Constantino (2021) made the distinction between the retest reliability and temporal stability construct validity based upon the duration of the interval between assessments, with the former on the order of a few weeks to months and the latter being 6 months to years. Constantino (2021) contended that "the evidence of longer interval construct stability above, with correlations on the order of 0.80–0.90 [citing research on the SRS in clinical samples], tends to obviate the need to put resources into documenting short interval retest reliability" (p. 4460).

Construct validity was supported based on the high levels of stability in measurement over extended time intervals (i.e., 6 months or more). Confirmatory factor analysis was reported to support a social communication and interaction factor (most items load on this factor) and restricted interests and repetitive behavior factor (the remaining items that form the Restricted Interests and Repetitive Behaviors treatment subscale), consistent with proposed criteria for ASD in the DSM-5 (not yet published when the SRS-2 was released). Studies are cited in the SRS-2 manual documenting correlations between the SRS (i.e., the School Age form of the SRS-2) and the SCQ in mixed clinical groups that range from $r = .58$ to $r = .68$, correlations with the ADOS domain scores ranging from a low of $r = .15$ (teacher reports) to a high of $r = .58$ (parent reports), and correlations with the ADI-R ranging from a low of $r = .26$ (teacher reports) to a high of $r = .77$ (mother reports). Using a total raw score of 60 to differentiate those with and without ASD in the clinical sample, sensitivity and specificity values of .93 and .91 were reported. Using a total raw score of 75, sensitivity and specificity were .84 and .94, respectively.

Comprehensive Diagnostic Evaluations

Because ASD is a heterogeneous and complex condition that can range from a completely nonverbal child with an aversion to social interaction to a child with only the subtlest indications of social impairment and restricted interests that are difficult to differentiate from normality, a comprehensive diagnostic evaluation is commonly needed so that effective treatment and support can be provided based on individual needs. An incorrect diagnosis in either direction (i.e., false positive or false negative) does a disservice to, and can be harmful for, the person with ASD and their family members, which underscores the need for a comprehensive diagnostic evaluation in many instances.

The evaluation of ASD tends to be an ongoing process. Given the rapid changes that take place over the course of normal development, more frequent evaluations may be warranted in childhood (as opposed to adulthood). Such evaluations depend on clinical need and are likely to change over time. A variety of professionals, including pediatricians/developmental pediatricians, psychologists/neuropsychologists, neurologists, psychiatrists, speech-language pathologists, and others (e.g., physical therapists and occupational therapists) may be involved in the assessment and treatment of children with ASD. Such multi-disciplinary assessments are commonly referenced in the literature as “best practice.” However, rather than suggesting that multiple disciplines must necessarily be involved, it is more accurate to assess multiple areas of functioning (Huerta & Lord, 2012).

Given the importance of early identification of ASD, so as not to delay the earliest possible intervention, a comprehensive diagnostic evaluation begins with (or is preceded by) a positive screen or an expression of concern. This prompts further assessment so that more detailed information can be obtained. Signs and symptoms suspected to be indicators of ASD must be differentiated from both typical development and non-ASD conditions with overlapping symptoms. An interview with a parent is necessary to obtain a neurodevelopmental history as was described previously. Initial observation of the child is usually necessary to inform the clinician of how to proceed with more formal observation and assessment. Observations and assessment results must be understood within the broader context of the child’s history as provided by parents.

Given that no definitive test exists for ASD (although genetic testing is recommended), the diagnosis is based on history, symptoms, and observations, as is the case with most other psychiatric diagnoses. It is well documented in the scientific literature that clinical judgment is subject to a number of biases in the decision-making process (see Kaufman, 2020 for a review as it applies to assessment of ASD), and for this reason, more objective or structured assessment is clearly warranted.

It is critical that the assessment methods chosen have appropriate psychometric properties and have been subjected to scientific investigation, but the specific instrument chosen will frequently be influenced by practical limitations. As a result, a one-size-fits-all approach is impractical and should not be used to impose limitations on services on the basis of whether specific methods were used (Gwynette et al., 2019). With this in mind, a combination of use of a structured interview, such as the ADI-R, as well as structured observations, such as the ADOS-2, is well-supported. In the absence of these methods, other scientifically supported methods can be substituted. For example, the CARS-2 is scientifically supported and involves both observations and history from other sources.

Because of the need to specify intellectual functioning, as well as rule out intellectual disability as a better explanation for symptoms that would otherwise be attributed to ASD, formal assessment is critical. Although severity is specified based on social communication impairments and restricted, repetitive patterns of behavior, assessment of adaptive functioning is also an important part of characterizing the functioning of a child aside from either test performances or symptoms of ASD. That is, the functional impairment should also be objectively quantified using a validated adaptive functioning measure (e.g., Adaptive Behavior Assessment System [ABAS-3] or the Vineland Adaptive Behavior Scales, Third Edition [Vineland-3; Sparrow et al., 2016]).

Assessment of intellectual and adaptive functioning are standard components of the neuropsychological evaluation of ASD. The presentation of ASD, including the profile of cognitive strengths and weaknesses, tends to be extremely variable from one individual to another. However, there are patterns of cognitive functioning that have been described as characteristic of ASD (e.g., deficits in executive functioning) that are an important component to a comprehensive understanding of children with ASD.

A discussion of neuropsychological evaluations in ASD is beyond the scope of this chapter; the interested reader is referred to several publications for more information (Corbett & Iqbal, 2018; Joseph et al., 2013; Pennington et al., 2019). However, given the comprehensive nature of neuropsychological evaluations, which would address several of the areas discussed in this chapter, neuropsychological evaluation is an important consideration as part of any assessment of ASD.

Conclusions

Evidence-based assessment of persons with suspected ASD helps clarify the diagnostic picture and can serve as a basis for interventions and allocation of services and benefits. However, the assessment of ASD is complicated by a number of factors, which include changing diagnostic criteria, developments in the nature of the condition, and heterogeneity in the presentation of ASD across individuals. There are a number of comorbid conditions that must be assessed in addition to ASD, so a comprehensive, multifactorial assessment is important to understanding the presentation of any one child with ASD. Given the increasing prevalence rates that are likely to be related to the assessment process used to identify ASD, a scientifically informed assessment is critical. With such an approach, sensitive and thoughtful clinicians who possess knowledge of the assessment process as outlined in this chapter are well positioned to serve children with ASD and their families.

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Assessment of Intellectual Disabilities (ID) and Comorbid Disorders in Children

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Introduction

An intellectual disability (ID) is a neurodevelopmental disorder that is characterized by deficits in both intellectual capacity and adaptive functioning. ID impacts functioning over the course of an individual's lifespan and is marked by onset in the developmental period. Prevalence rates in the general population have been estimated to be approximately 1%, with significant variability noted based on factors such as age (APA, 2013). For children birth to 5 years of age who present with significant intellectual delays, a diagnosis of global developmental delay (GDD) is frequently rendered. A diagnosis of GDD is appropriate when norm-referenced assessments indicate that two or more developmental domains of functioning are significantly below expected milestones and the use of standardized intellectual assessments is not clinically feasible or warranted (APA, 2013). Prevalence estimates suggest that between 1% and 3% of children birth to 5 years of age have GDD (Srour & Shevell, 2014). Although developmental delays may resolve as the child matures, approximately two-thirds of children diagnosed with GDD are estimated to meet the diagnostic criteria for a diagnosis of ID after 5 years of age (Shevell, 2008). As part of routine healthcare visits, the American Academy of Pediatrics (AAP) recommends developmental surveillance at every well-child visit and formal developmental screening at ages 9, 18, and 24 months (American Academy of Pediatrics, 2018).

While the onset of developmental delays must manifest prior to the age of 18, the presentation of characteristics and features of ID depends on etiology and severity. Both genetic and environmental factors contribute to this condition, with the most common causes of the disorder being linked to genetic or chromosomal abnormalities, metabolic disorders, fetal exposure to teratogen or illness, and perinatal complications (Toth et al., 2015). Recent estimates have suggested that a known etiology can be determined in approximately 70% of ID cases, with chromosomal abnormalities and metabolic errors accounting for between 40% and 50% of these cases (Toth et al., 2015). The remaining 20% to 30% of cases with known causes are associated with environmental influences, such as perinatal complications and acquired medical conditions (Srivastava & Schwartz, 2014). Given that genetic differences account for the preponderance of known causes, the American Academy of Pediatrics (2014)

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has provided guidance to practitioners concerning the optimal medical genetics evaluation for children.

Individuals with ID also present with a wide variety of comorbid conditions including developmental disorders, neurological disorders, and behavioral disorders (Johnson et al., 2006). The degree of diversity in etiology and associated medical, psychiatric, and social features in this population presents numerous diagnostic and intervention planning challenges (Turygin et al., 2014b). While a comprehensive review of all forms of comorbidity is beyond the scope of the present chapter, an overview of a few fundamental clinical considerations is necessary. The central clinical issue facing practitioners relates to symptom overlap between common co-occurring conditions and ID that make differential diagnosis and treatment planning particularly challenging (Tureck et al., 2014). For example, autism spectrum disorders (ASD) have received considerable attention for its diagnostic overlap with ID (Bamburg et al., 2001; LoVullo & Matson, 2009; Matson & Shoemaker, 2009; Smith & Matson, 2010; Wilkins & Matson, 2009). As a practitioner faced with the complex task of making an initial diagnosis, the clinical presentation of social skills deficits, stereotypic behaviors, and adaptive skills deficits are common in both disorders. Differential diagnosis between these two conditions often becomes even more complex when evaluating young children whose language ability is only beginning to emerge. In these clinically ambiguous situations, practitioners must resist the temptation to succumb to the tendency to consider all abnormal behavior observed in individuals with intellectual deficits as a manifestation of their cognitive limitations, which is a bias often referred to as diagnostic overshadowing (Matson & Scior, 2004). The clinical acumen required to render sound decisions in these situations must be grounded in the empirical literature concerning dual disorders (Hennessey & McGowan, 2020).

A multimethod, multisource approach is recommended practice for conducting comprehensive assessments of children suspected of having a disability (Christ & Aranas, 2014; Mash & Barkley, 2007; Whitcomb, 2018). This approach to assessment utilizes a variety of direct and indirect methods of assessment to diagnose, problem-solve, and generate interventions for the child (Armstrong et al., 2013). For example, observing a child's behavior in a classroom setting or administering an intelligence test to a child would be considered direct method. Examples of indirect methods would include reviewing a child's medical records or using behavior rating scales. This approach to assessment also seeks to gather data from different informants including the child, their parents, and others who know the child well. Ideally, these varied data sources would provide the practitioner with a better understanding of how the child functions in different settings, that is, home or school.

This chapter will review direct and indirect assessment measures used to evaluate children's cognitive, adaptive, behavioral, emotional, and social functioning that are important when considering diagnostic and treatment planning for children with ID. Current diagnostic practice guidelines emphasize the importance of an assessment of intellectual ability and adaptive functioning; while also taking into consideration an investigation of etiology and comorbid mental, emotional, and behavioral disorders (American Psychiatric Association [APA], 2013). Prior to considering evidence-based assessment measures, we will first provide a brief review of important diagnostic considerations that have changed how ID is conceptualized and comorbidity is considered in youth.

Diagnostic Considerations

Although the diagnostic criteria have not changed substantially over the past 50 years, the way the criteria are used to arrive at the diagnostic formulation for ID has evolved in accordance with advances in the field (Buntinx & Schalock, 2010). These advancements have resulted in two paradigm shifts in how ID is conceptualized. These advances have moved the field away from a primary descriptive model of disability to a functionality model that can be used for diagnosis, classification, and planning support (Luckasson & Schalock, 2013).

Within the functionality model, a multidimensional framework of human functioning is used to guide clinical judgment (Luckasson & Schalock, 2015; Schalock et al., 2010). The model adopts a social-ecological approach to understanding human functioning that takes into consideration intellectual abilities, adaptive behavior, health, participation, and context (Luckasson & Schalock, 2013). These five dimensions are used diagnostically (see Tassé et al., 2016) and for classifying individuals according to their level of independent functioning (see Schalock & Luckasson, 2015). Intellectual limitations may impact an individual's reasoning, problem-solving, planning, abstract thinking, judgment, or capacity for learning. Adaptive limitations represent an inability to meet normative expectations for independence and self-sufficiency in daily living due to deficits in conceptual, social, and practical adaptive skills. The health dimension requires an understanding of an individual's physical, mental, and social well-being. The participation and context dimensions include an understanding of an individual's interaction with their environment including the performance of social activities and factors that either facilitate or inhibit social engagement, respectively.

The second shift relates to how classification occurs. Classification provides a means for describing functional levels, operationalizing the level of support needed, considering health factors that may be of clinical importance, and evaluating legal status (Shalock & Luckasson, 2015). With this shift, the focus has changed from the historical reliance on IQ scores for classifying an individual's level of functioning to one that is based upon the individual's adaptive behavior. This change in diagnostic nomenclature has been adopted by the American Association on Intellectual and Developmental Disabilities (AAIDD; Schalock et al., 2010) and the American Psychiatric Association (APA, 2013). The World Health Organization (WHO) has also adopted a similar classification system in the *International Classification of Diseases-11th Edition* (ICD-11; WHO, 2018) that is based on the consideration of both intellectual ability and adaptive functioning for classifying individuals. While the classification system continues to be comprised of four levels (e.g., mild, moderate, severe, and profound), the *DSM-5* now uses a descriptive approach to operationalize severity levels (see Table 28.1) rather than the score ranges associated with previous IQ bands. It is also relevant to note that researchers have introduced analogous bands based upon adaptive behavior levels that may be used when considering other taxonomies, that is, *ICD-11* (Tassé et al., 2012). The American Association on Intellectual and Developmental Disabilities (AAIDD) also recommends conceptualizing ID in terms of needed supports based upon how long and how much support is needed in various areas of functioning. The AAIDD has published a semi-structured interview to assist clinicians with identifying the type and intensity of supports needed for adolescents (Thompson et al., 2016). The clinical implications of this change mean that, while intelligence tests continue to play an important role in determining that the criteria necessary for diagnosing ID have been met, clinical determinations concerning the degree of impairment are based on more readily observable behaviors that form the foundation for treatment planning and progress monitoring (Horn & Fuchs, 1987). Within this comprehensive view of ID as a multifaceted construct, a nuanced appreciation of the role dual disorders may play in diagnosis and treatment is warranted. Therefore, a brief review of the literature will be followed by an introduction to the primary constructs required for the diagnoses of ID that will highlight diagnostic and clinical implications associated with selecting and interpreting these instruments.

Table 28.1 Intellectual disability severity levels

Severity level	Conceptual domain	Social domain	Practical domain
Mild	Based on age-related expectations, children demonstrate difficulties with learning academic skills, with particular difficulty understanding abstract concepts being noted.	Social interactions are immature, with communication, conversations, and language being more concrete. Difficulties regulating emotional and behavioral functioning may be noted.	In childhood, the individual may function in an age-expected manner. Adolescents may need assistance with complex living tasks.
Moderate	Developmental delays in cognitive and language are generally evident in preschool. Grade school children demonstrate learning and performance deficits in all curricular areas, with proficiency rarely exceeding an elementary skill level in adolescence.	Social judgment and decision-making are limited. Communication is simplistic in nature and interpersonal skills are less complex, with difficulties interpreting social cues often noted.	While self-sufficiency may be achieved by adolescence, development of personal care skills requires an extended period of teaching with ample opportunities for practice.
Severe	Conceptual skills are limited, with little understanding of written language, numeracy, time, or money.	Vocabulary and grammar are limited to simplistic words or phrases. Communication is used for socialization rather than conveying thoughts or ideas.	Ongoing support for all activities of daily living is required, with constant supervision being needed for safety. Maladaptive behaviors, that is, self-injury, may be present.
Profound	Conceptual skills are limited to an understanding of the physical world. Use of objects in a goal directed fashion may be learned with practice. An ability to match and sort objects may be achieved, but co-occurring motor and sensory impairments may limit functioning.	Communication is usually nonverbal, with a limited understanding of instructions or gestures. While co-occurring sensory and physical impairments may prevent many social activities, individuals will use gestural and emotional cues to initiate or respond in social interactions.	Children and adolescents are dependent on others for all aspects of physical care, health, and safety. Maladaptive behavior, that is, stereotypies, may be present. Co-occurring sensory and physical impairments may greatly limit functioning.

Based on DSM-5 (APA, 2013)

Comorbidity

As noted previously, comorbidity is common among individuals with ID. Consequently, an understanding of how comorbidity impacts diagnoses and treatment is critical for any practitioner working with this population. While a comprehensive review of all forms of comorbidity is beyond the scope of the present chapter, an overview of a few fundamental clinical considerations is necessary. The central clinical issue facing practitioners relates to symptom overlap between common co-occurring conditions and ID that make differential diagnosis and treatment planning particularly challenging (Tureck et al., 2014). For example, autism spectrum disorders (ASD) have received considerable attention for their diagnostic overlap with ID (Bamburg et al., 2001; LuVullo & Matson, 2009; Matson & Shoemaker, 2009; Smith & Matson, 2010; Wilkins & Matson, 2009). As a practitioner faced with the complex task of making an initial diagnosis, the clinical presentation of social skills deficits, stereotypic behaviors, and adaptive skills deficits are common in both disorders. Differential diagnosis between these two conditions often becomes even more complex when evaluating young children whose language ability is only beginning to emerge. In these clinically ambiguous situations, practitioners must resist the temptation to succumb to the tendency to consider all abnormal behavior observed in individuals with intellectual deficits as a manifestation of their cognitive limitations, which is a bias often referred to as diagnostic overshadowing (Matson & Scior, 2004). The clinical acumen required to render sound decisions in these situations must be grounded in the empirical literature concerning dual disorders. Within this body of research, a few emerging trends need to be addressed due to their clinical relevance to the assessment and diagnosis of ID.

First, the severity of the intellectual deficit plays an important role in understanding vulnerability to other comorbid conditions. In general, a negative correlation has been observed between the severity of cognitive deficit and the prevalence of comorbidities (Medeiros et al., 2014; Minjarez et al., 2011; O'Brien & Pearson, 2004; Tureck et al., 2014). In other words, the lower the intelligence quotient (IQ) the greater the prevalence rate for co-occurring symptoms. This general observation has been noted among various comorbid disorders including ASD (Matson & Shoemaker, 2009) and psychiatric disorders (Dekker & Koot, 2003; Turygin et al., 2014a). Also, research has noted that children and adolescents with moderate and profound ID frequently suffer from higher prevalence rates of co-occurring physical and/or neurological handicaps that impact their language, motor, hearing, and vision (Minjarez et al., 2011). Lastly, a lower IQ has also been suggested to be a predictor of poorer prognosis and response to intervention (Ben Itzchack et al., 2008).

The second empirical trend relates to the relationship between comorbidity and impairment. There is a positive correlation that has been observed between the number of comorbidities and the pervasiveness of the limitations on the individual's functional independence (Dekker & Koot, 2003; Matson et al., 1999a, b; Smith & Matson, 2010). Some researchers have attempted to explain this correlation by suggesting that having multiple comorbid disorders exacerbates functional limitations for individuals with ID by making their condition more severe (Turygin et al., 2014a, b). However, these differences are noted both in terms of the severity of core symptoms as well as the increased prevalence rates for other co-occurring problems, for example, stereotypies and self-injury (Matson et al., 2009a, b; Munson et al., 2008). For example, research findings have suggested that individuals with co-occurring ASD and ID have more diverse behavioral challenges and skill deficits by comparison to counterparts who present with only one of these conditions (Boucher et al., 2008). Likewise, Hahn et al. (2015) noted that comorbidity played a role in predicting the developmental trajectories of individuals with ID who were able to achieve greater functional independence.

Thirdly, there is preliminary research to suggest that understanding the type of comorbidity may be useful for guiding diagnosis and treatment efforts. While this line of research has typically focused on between-group differences based on comorbidity, research has also included attempts to identify symptom clusters that may be more prevalent in this population (Tremblay et al., 2010; Turygin et al., 2014a, b). For example, Matson et al. (2003b) investigated group differences in adaptive behavior among individuals who were diagnosed with ID and either ASD or psychosis. In this study, the group with a comorbid diagnosis of ASD demonstrated more significant deficits in social and adaptive behavior by comparison to those who presented with comorbid psychosis. In a study by Kozlowski et al. (2011), the authors found significant correlations among psychopathology symptom clusters in a sample of individuals diagnosed with ID. Among these individuals, the most commonly occurring were mood, mania, and anxiety symptom clusters. Regardless of methodological differences, these emergent trends underscore the importance of considering comorbid conditions as part of routine assessment practices of practitioners working with individuals who present with ID. More importantly, the impact that dual disorders have on the developmental trajectories and ultimate functional independence of these individuals underscores the importance of incorporating treatment planning efforts to address dual disorders. In reviewing available assessments, we will provide a brief overview of the primary constructs that form the basis for the diagnosis of an ID followed by a discussion of the various considerations and adaptations that may be warranted when assessing individuals with dual disorders who present with language, motor, sensory, and social, emotional, or behavioral challenges.

Intellectual Assessments

Normed-referenced intelligence instruments have been utilized over the past 100 years to assist clinicians in making diagnostic decisions regarding the presence of an ID. Of the most renowned contemporary intelligence tests, the authors have categorized these assessments under three classifications when assessing a dual diagnosis of an ID with a language, physical, sensory, social-emotional, or behavioral impairment. For this review, these classifications were created solely based on the range of modifications permitted during standardized administrative practices.

The first classification grouping includes assessment tools that permit few or limited modifications to standardized administration procedures. The Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V; Wechsler, 2014), the Differential Ability Scales, Second Edition (DAS-II; Elliot, 2007), and the Kaufman Assessment Battery for Children, Second Edition (KABC; Kaufman & Kaufman, 2004a) are instruments that fall under this category. These measures offer clinicians limited flexibility in their discretion to use accommodations beyond options to administer portions of the test to acquire an estimation of intellectual functioning (see Table 28.2). For example, the DAS-II's Special Nonverbal Composite is helpful in assessing estimates of intellectual functioning in children with hearing impairments. By contrast, for individuals with severe orthopedic and motor impairments, verbal and diagnostic subtests may be utilized to acquire a limited sample of an individual's cognitive capacities that serve as an approximation of intellectual ability (Elliot, 2007). When using the full-scale IQ index scores for these instruments, however, no adjustment for an individual's impairment is made, and resulting intelligence estimates represent normative comparisons to same-age peers.

On the opposite end of this continuum, assessment instruments including the Stanford-Binet Intelligence Scales, Fifth Edition (SB5; Roid, 2003a), and the Woodcock-Johnson IV Tests of Cognitive Abilities (WJ IV COG; Schrank et al., 2014), permit examiners to use a wide range of manualized accommodations when assessing the intellectual ability of individuals with language, physical, sensory, social-emotional, or behavioral impairments (see Table 28.2). This second classification group allows clinicians to acquire an estimate of individuals' cognitive abilities under optimal conditions. Optimal conditions are understood to represent adaptations that intentionally mitigate the impact of an individual's deficit on their performance of the task. For example, an individual who presents with a physical handicap that impacts movement may be permitted to respond orally instead of transcribing answers. It is important to note that these assessment batteries have been criticized for their flexibility in allowing the use of accommodations, which may conceal deficits as well as impact their reliability and validity (Sattler, 2007).

Finally, the last classification group covers tests that were created for use in the assessment of individuals with comorbid communication disorders. Instruments that fit into this category include, the Universal Nonverbal Intelligence Test-Second Edition (UNIT-2; Bracken, & McCallum, 2016a), the Leiter International Performance Scale-Third Edition (Leiter-3; Roid et al., 2013a), the Comprehensive Test of Nonverbal Intelligence- Second Edition (CTONI-2; Hammill et al., 2009a), and the Test of Nonverbal Intelligence- Fourth Edition (TONI-4; Brown et al., 2010a). Collectively, the test design and administration procedures are specifically constructed to minimize the impact of examinee impairment through modifications to instructions or to how the examinee responds to each task. However, these instruments also produce an estimate of intellectual functioning that is based on a limited sample of an individual's cognitive capacities by comparison to the other two classification groups. Therefore, a comprehensive assessment of individuals' overall intellectual functioning, as described by the CHC model, is not able to be achieved. In the sections that follow, we will discuss assessment considerations for individuals with a dual diagnosis based on the nature of the impairment.

Table 28.2 Assessment considerations for selecting intelligence measures to identify children and adolescents with intellectual disabilities

Assessment instrument	Normative and/or clinical sample included in manual				Suggested modifications provided in manual				Assessment accommodation considerations
	LI	PI	SI	SE/ BI	LI	PI	SI	SE/ BI	
Comprehensive Test of Nonverbal Intelligence, Second Edition (CTONI-2; Hammill et al., 2009a)			✓		✓		✓		The CTONI-2 is a “language reduced” assessment that solely requires the examinee to point to their responses (Hammill et al., 2009b, p. 1). Nonverbal instructions can be provided to individuals with language and hearing impairments (Hammill et al., 2009b). For examinees who have a severe hearing impairment or who are deaf, clinicians may use “American sign language, manually coded English, aural/oral English, or signed supported speech” (Hammill et al., 2009b, p. 9). No accommodations are mentioned in the examiner’s manual for individuals with severe orthopedic or motor impairments (e.g., not being able to point to responses). The normative or clinical samples do not include individuals with visual impairments.
Differential Ability Scales, Second edition (DAS-II; Elliot, 2007)	✓		✓		✓				The Special Nonverbal Composite is helpful in assessing estimates of intellectual functioning in children with hearing impairments. By contrast, for individuals with severe orthopedic and motor impairments, verbal and diagnostic subtests may be utilized to acquire an estimation of intellectual functioning (Elliot, 2007). Administration instructions are provided in American Sign Language for parts of the assessment battery. Also, individuals may utilize communication modalities such as simultaneous communication, cued speech, and auditory amplification (Elliot, 2007). Per the administration guidelines, pointing and gesturing are permitted; however, “these types of responses on psychological tests have been reported to be ambiguous for children who are deaf and may be a source of potential error in scoring and interpretation” (Elliot, 2007, p. 213). Children with severe motor impairments may be disadvantaged on subtests that require the use of manipulatives. General assessment considerations per subtest are provided in Tables 9.1 and 9.2 for individuals who are deaf or hard of hearing (Elliot, 2007). The examiner’s manual also states that minimal modifications to standardized administration procedures are recommended to ensure reliable and valid results (Elliot, 2007). The normative or clinical samples do not include individuals with visual impairments.
Kaufman Assessment Battery for Children, Second Edition, (KABC-II; Kaufman & Kaufman, 2004a)	✓	✓	✓	✓	✓		✓		The Nonverbal scale is intended for use for children with severe speech/language and hearing impairments. All nonverbal subtests can be administered in “pantomimes such as pointing, demonstrations, and facial gestures” (Kaufman & Kaufman, 2004b, p. 27). The examinee may present their responses in American sign language for all subtests (Kaufman & Kaufman, 2004b). The complex and lengthy directions on the KABC-II can lead to difficulties with understanding task demands, especially for children with impaired language functioning (Flanagan et al., 2013). The normative or clinical sample of individuals with sensory impairments only includes individuals with hearing impairments (Kaufman & Kaufman, 2004b).

(continued)

Table 28.2 (continued)

Assessment instrument	Normative and/or clinical sample included in manual				Suggested modifications provided in manual				Assessment accommodation considerations
	LI	PI	SI	SE/ BI	LI	PI	SI	SE/ BI	
Leiter International Performance Scale, Third Edition (Leiter-3; Roid et al., 2013a)	✓	✓	✓	✓	✓	✓	✓		The Leiter-3 offers nonverbal instructions as a standardized administration procedure for all subtests on this assessment. (Roid et al., 2013b). Manipulatives were redesigned in the Leiter-3 to accommodate individuals with physical disabilities (Roid et al., 2013b). The manual discusses, in detail, modifications for examinees with significant motor or communication deficits. Specific adaptations for individuals with physical or communication disabilities include "touch/scan responses, use a stop sign, design a Yes/No response system, and use of eye gaze" (Roid et al., 2013b, p. 70–71) A recommended accommodation for individuals with visual impairments include the use of "color cues" to help individuals separate visual images on the response cards (Roid et al., 2013b, p. 72) The normative or clinical samples do not include individuals with visual impairments.
Stanford-Binet Intelligence Scales, Fifth Edition, SB5; Roid, 2003a)	✓	✓	✓	✓	✓	✓	✓		Verbal and nonverbal formats for each factor measuring intelligence (g) allows for examiners to discern if language, visual, or motor impairment(s) are impacting intellectual functioning (Flanagan et al., 2013) Specific adaptations for orthopedic impairments and motor skills deficits include the use of assistive technology such as keyboards, touchpad devices, testing trays, and vocalization amplifiers can be used during administration if needed (Roid, 2003b). For individuals with visual impairments, magnification devices can be utilized. In addition, "portions of the verbal routing subtest and the verbal levels could be administered orally" (Roid, 2003b, p. 116). Specific guidelines are discussed in the examiner's manual (see Appendix E) for providing accommodations, such as using sign language interpreters and cued speech, to individuals with hearing impairments (Roid, 2003b). There are no Braille or large-print editions of the SB5 available (Roid, 2003b). The SB5 was last modified and re-normed in 2003. Since the inception of the SB5, the diagnostic criteria for some disabilities have considerably been modified per the Diagnostic and Statistical Manual of Mental Disorder, Fifth Edition (DSM-5). Thus, the normative sample may not be representative of the current population of individuals with certain disabilities. Flexibility with administration procedures may influence the reliability and validity of this assessment (Sattler, 2007).
Test of Nonverbal Intelligence, Fourth Edition (TONI-4; Brown et al., 2010a)	✓	✓			✓		✓		The instructions for the TONI-4 can be administered verbally or via pantomimes for individuals with language and/or hearing impairments (Brown et al., 2010b). The examinees provide their responses largely motor-free through means of pointing (Brown et al., 2010b). There were no accommodations mentioned in the examiner's manual for individuals with significant orthopedic or motor impairments (e.g., not able to point to responses) as well as visual impairments.

Universal Nonverbal Intelligence Test, Second Edition (UNIT-2; Bracken & McCallum, 2016a)	✓		✓	✓	✓		✓		This instrument is useful to rule in or out an ID diagnosis in special populations with communication or language deficits (Bracken, & McCallum, 2016b). The Unit-2 assessment is also recommended for individuals who are deaf or hearing impaired, due to no verbal responses are required (Flanagan et al., 2013). Responses are limited to gestures for most subtests, which may impact children with severe motor impairment (Bracken, & McCallum, 2016b). Cube design subtest may be difficult for individuals with severe motor impairments to complete. Normative or clinical sample does not include individuals with visual impairments.
Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V; Wechsler, 2014)	✓			✓					The administration and scoring manual suggests for children with limited motor skills, use verbal subtests for estimates of cognitive ability (Wechsler et al., 2014). By contrast, the Non-verbal Index is useful to rule in or out an ID diagnosis in special populations such as language impairment and autism spectrum disorder with language impairment (Wechsler et al., 2014). Examinees with significant language visual, hearing, and/or motor deficits may not have the ability to perform one or more subtest(s); therefore, the examiner is not able to compute all Index and Full-Scale IQ scores for this instrument (Sattler, 2007). Motor demands are complex on Coding Subtest of the WISC-V, which may underestimate a child with orthopedic or motor impairment's ability to process information. Administering only the nonverbal portion of the WISC-V assessment for individuals with visual impairments may result in over or underestimating the intellectual ability of an examinee (Flanagan et al., 2013).
Woodcock-Johnson IV Test of Cognitive Abilities (WJ IV COG; Schrank et al., 2014)	✓			✓	✓	✓	✓	✓	The WJ-IV COG provides specific guidelines (see Table 3–2 in manual) for each test, for using communication accommodations such as American sign language, manually coded English, signed supported speech, and aural/oral English (Mather & Wendling, 2014, p. 50). For individuals with motor impairment, examiners may allow the examinee to type responses instead of writing answers in the response booklet. In addition, some responses may be provided via pointing or orally (Mather & Wendling, 2014). Accommodations for individuals with hearing impairments include the use of an interpreter, use of amplification system, administer audio-recorded test orally, and use of voice recorder (Mather & Wendling, 2014, p. 47–48). Accommodations for individuals with visual impairments include use of "prescribed optical devices, adaptations to materials, provide appropriate light source, if needed; provide black-lined response sheets or a black felt-tip pen instead of a pencil or enlarging print, acetate to reduce glare or increase contrast between stimulus and background, may need to mask parts of a page to reduce visual clutter; and consult with visual specialist to interpret results" (Mather & Wendling, 2014, pp. 49–50). The WJ-IV COG provides suggested subtests (see Table 3–3 in manual) to administer to individuals with either low vision or blindness (Mather & Wendling, 2014, p.54). Accommodations for individuals with attention and behavioral difficulties include informing examinee of expectation, removing distractions from testing room, and providing positive reinforcement (Mather & Wendling, 2014). Similar to the SB5, flexibility with the use of accommodations during the administration of the WJ IV cog may impact the reliability and validity of this instrument.

Note. LI language impairment, *PI* physical impairment, *SI* sensory impairment, *SE/BI* social-emotional, or behavioral impairment

Adaptive Behavior

Adaptive behaviors form the foundation for personal independence and social competence. In the most simplistic terms, adaptive functioning is defined by the individual's interaction with his or her environment. As such, behaviors are deemed to be adaptive based upon the situational demands and cultural norms in the environment. For example, a behavior may be judged to be adaptive in the home environment but may be deemed inappropriate in the school environment. Further, the nature of the demands placed upon an individual also changes based upon age. For example, adaptive behavior for a young child would include assisting the caregiver with putting away their belongings, by comparison to an older school-age child who would be expected to use small electrical appliances independently. Therefore, adaptive behavior is understood to be a dynamic construct that is likely to be interpreted differently across situations and over time.

Theoretical conceptualizations of adaptive behavior have also evolved over time. This evolution has gone from a single, broadly defined domain to an empirically validated multifaceted construct that includes agreed upon elements. Contemporary definitions are now understood to include conceptual, social, and practical adaptive skills that have been learned by an individual and are used in community settings in the service of performing daily tasks (Schalock et al., 2010; Tassé et al., 2016). This definition has given rise to new developments in standardized instruments used to measure adaptive behavior (Tassé et al., 2012). As with all psychological instruments, the available measures of adaptive behavior come with various psychometric strengths and weaknesses. However, unlike intellectual assessments, the assessment of adaptive behavior includes both direct and indirect assessments. The use of indirect assessment, for example, asking teachers or parents to rate an individual's behavior, allows examiners a means for gathering data that may have been otherwise unavailable. For example, communication or cognitive deficits often make it difficult to obtain reliable information about symptoms from the individual. Therefore, a diagnosis is often made using objectively observable behaviors that can be reported by informants who have observed the individual in different settings. Given the dynamic nature of the construct and the susceptibility to bias due to cultural or environmental norms, the benefits of incorporating multi-rater methods cannot be overstated. When gathering information directly from the individual, there are a number of considerations and accommodations that can be used during the assessment. These considerations include repetitiveness in the standardization sample, reading items to examinees, use of an interview format, and use of communication devices or alternative means of communication (see Table 28.3).

While not designed as a comprehensive measure of adaptive behavior, the Supports Intensity Scale-Children's Version (Thompson et al., 2016; SIS-C) is a standardized assessment designed to measure support needs of children, ages 5 to 16 years, with intellectual and developmental disabilities. The SIS-C is organized into two sections. Medical conditions and behavioral concerns that may require substantial levels of support are included in the first section. The second section includes an assessment of the areas of home living, community and neighborhood, school participation, school learning, health and safety, social activities, and advocacy. Each item is rated according to frequency, amount, and type of support needed in each area. An adult version of the SIS-C is also available for individuals ages 16 years and older. A digital version of the SIS-C is also available. The SISOnline is a web-based platform designed to support administering, scoring, and reporting. The SIS-C holds particular promise for use in transition assessments (Seo, et al., 2017).

Table 28.3 Assessment considerations for selecting adaptive functioning instruments to identify children and adolescents with intellectual disabilities

	Norms/clinical sample included in manual				
Assessment instrument	LI	PI	SI	SE/BI	Assessment considerations
Adaptive Behavior Assessment System-Third Edition (ABAS-3; Harrison & Oakland 2015)	✓	✓	✓	✓	For the ABAS-3, respondents who present with visual impairments or a reading disability may have items on the rating scale read to them. Questions may also be read to respondents in the form of an interview if warranted (Harrison & Oakland, 2015). Clinical studies suggested that this instrument lacks construct validity for individuals who are deaf or hard of hearing on adaptive domains and adaptive skills areas on this assessment (Harrison & Oakland, 2015).
Adaptive Behavior Scale-School – Second Edition (ABS-S:2; Lambert et al., 1993)	✓	✓	✓	✓	The ABAS:2 can be administered via an interview format to allow information to be collected by an informant who presents with a physical or sensory impairment (Lambert et al., 1993). The ABS-S:2 was last modified and re-normed in 1993. Therefore, the norming population may not be representative of the current population of individuals with specific disabilities (Lambert et al., 1993).
Scales of Independent Behavior-Revised (SIB-R; Bruininks et al., 1996)			✓	✓	For the Social Interaction and Communication subtest of this instrument, respondents may rate the examinee's skills with the use of accommodations for communication such as American Sign Language and PEC boards (Bruininks et al., 1996). The SIB-R can be administered via a structured interview, which allows for information to be acquired from respondents who present with severe visual and motor impairments (Bruininks et al., 1996). Individuals with hearing impairments and behavior disorders were rated similarly on broad independent scores to a sample of individuals without disabilities when controlling for age and sex (Bruininks et al., 1996). Since the inception of the SIB-R, the diagnostic criteria for selected disabilities have considerably been modified per the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). Thus, the norming sample may not be representative of the current population of individuals with specific disabilities.
Supports Intensity Scale-Children's Version (SIS-C; Thompson et al., 2016)	✓	✓	✓	✓	The SIS-C measures the level of support children and adolescents with intellectual and developmental disabilities require. The SIS-C is administered by a trained professional via a semi-structured interview with two or more respondents who have knowledge of the child's level of functional independence (Thompson et al., 2016). The norming sample of the SIS-C included individuals from the following diagnostic classifications, Low Vision/Blindness, Deafness/Hearing Impairment, Psychiatric Disability, Developmental Delay, Physical Disability, Chronic Health Condition, Autism Spectrum Disorder, Brain/Neurological Damage, Speech Disorder, Language Disorder, Learning Disability, and Attention-Deficit/Hyperactivity Disorder (Thompson et al., 2014).
Vineland Adaptive Behavior Scales-Third Edition (Vineland-3; Sparrow et al., 2016)	✓	✓	✓	✓	The Vineland-3 can be administered via an interview format, which allows for respondents to participate if he/she is not able to complete the rating scale independently due to a physical or visual impairment (Sparrow et al., 2016). Examinees that utilize "sign language or electronic communication aids should receive the same scores as would be given if the behaviors were performed by speaking" (Sparrow et al., 2016, p. 45). The Vineland-3 assesses for internalizing and externalizing emotional and behavioral concerns as well as provides a helpful guide to assist with intervention planning (Sparrow et al., 2016). For individuals with sensory or motor impairments, use of assistive technology for accommodating for reading and writing deficits should not be counted against examinees for items pertaining specifically to reading and writing. Refer to the manual for specific administration recommendations (Sparrow et al., 2016). Although, permitting respondents to rate examinee's adaptive functioning with use of accommodations may result in overestimating the examinee's level of functional independence.

Note. LI language impairment, *PI* physical impairment, *SI* sensory impairment, *SE/BI* social-emotional/behavioral impairment

Behavioral, Emotional, and Social Assessments

As noted previously, behavior problems are common among individuals with ID. Individuals with more severe forms of ID or with comorbid psychiatric disorders have the highest prevalence rates for behavior problems (Einfeld et al., 2006; Gardner & Hunter, 2003; Holden & Gitlesen, 2004; Lecavalier, 2006; Moss et al., 2000; Magyar et al., 2012; Rojahn et al., 2004). Behavior problems are generally defined as actions that significantly interfere with safety, learning, or social functioning. Estimates suggest that approximately 7 to 15% of youths with ID demonstrate behavior problems (Emerson, 2005; Myrbakk & von Tetzchner, 2008). Common displays of behavior problems include aggressive behavior, self-injurious behavior (SIB), and stereotypic behavior (Medeiros et al., 2014). Emerging evidence also suggests that approximately 40% of children and adolescents with ID have a co-occurring psychiatric disorder. The most common comorbid disorders are disruptive behavior disorders (25%), Attention Deficit Hyperactivity Disorder (9%), and anxiety disorders (9%; Witwer et al., 2014). Social skills deficits are also common among individuals diagnosed with ID. Children with ID may struggle with interpreting social cues, maintaining eye contact, engaging in reciprocal dialogue, using nonverbal gestures and facial expressions, and inadequate conflict resolution skills (de Bildt et al., 2005).

Given the frequency of behavioral, emotional, and social sequelae among children diagnosed with ID, best practice for conducting a comprehensive multimethod, multisource assessment needs to incorporate valid and reliable assessments to guide treatment planning and service delivery. While direct observation approaches, for example, functional behavioral assessment (Medeiros et al., 2014; Steege et al., 2019), are particularly useful for developing interventions designed to address problem behaviors of youth with ID, the focus of this chapter will be on the use of rating scales and checklists as indirect methods of assessing behavioral, emotional, and social functioning. The use of rating scales and checklists provide a standardized format for assessing symptomatology of comorbid conditions by gathering information from individuals who know the child well. While parents and teachers are generally the first choice for informants, other individuals who are familiar with the child might also be a source for data, including classroom aides, day-care providers, surrogate parents or caregivers, and work supervisors. Using this multisource approach is considered best practice for gathering behavioral, emotional, and social data from different settings and contexts (Merrell & Walker, 2004; McConaughy & Ritter, 2014; Reddy, 2001; Shapiro & Krachowill, 2000; Rush et al., 2004; Stage et al., 2006).

By comparison to direct behavioral observation, the use of behavior rating scales and checklists is considered an indirect method of measuring a child's or adolescent's behavior because the respondent is being asked to provide their perception of behaviors. While useful for conceptualizing presenting problems and making actuarial predictions, the use of rating scales and checklists is susceptible to response bias and error variance (see Martin et al., 1986). Response bias pertains to how informants respond to the items on the scales, while error variance accounts for variability in responding due to subjectivity, situational specificity of behaviors, changes in ratings over time, and differences between instruments. It is also important to note that rating scales and checklists offer several advantages, including their efficiency in collecting data, their ability to provide data on low-frequency behaviors that are difficult to observe directly, and their ability to gather data from a variety of sources (Campbell & Hammond, 2014). While interrater agreement between respondents is frequently low to moderate (Achenbach et al., 1987; Stratis & Lecavalier, 2015), these differences are often beneficial for understanding how different settings or contexts may be influencing the child's behavior.

There are numerous rating scales and checklists available for use with children and adolescents. Rating scales and checklists are differentiated by their format for identifying behavioral problems or symptoms of concern. Rating scales use a Likert scale to allow respondents to provide information on the frequency or intensity of behavior, while checklists require respondents to endorse items as present or absent. Rating scales and checklists are also frequently differentiated based on their intended use. For example, general-purpose rating scales are used to measure a broad array of behavioral, emotional, and social problems in youth. The Achenbach System of Empirically Based Assessment (ASEBA; Achenbach, 2001), the Behavior Assessment System for Children, third edition (BASC-3; Reynolds & Kamphaus, 2015), and the Developmental Behavior Checklist-2 (DBC2; Gray et al., 2018) would be examples of general-purpose or broad-band rating scales. General-purpose rating scales can be contrasted with specific-purpose or narrow-band rating scales that are used to measure a specific constellation of symptoms or behaviors, for example, attention deficit hyperactivity disorders (ADHD). Examples of narrow-band instruments would be the Attention Deficit Disorders Evaluation Scales-Fourth edition (ADDES-4; McCarney& Arthaud, 2013) or the Scale of Attention in Intellectual Disability (SAID; Freeman et al., 2015).

When selecting a rating scale or checklist, it is important to evaluate its technical characteristics and validity for use with children and adolescents with ID. The ASEBA (Achenbach, 2001), BASC-3 (Reynolds & Kamphaus, 2015), and Social Skills Improvement System (SSiS; Gresham & Elliott, 2008) are examples of assessment systems that are commonly used and widely available. An advantage of using these systems is that they include a variety of instruments and forms that are appropriate for a wide range of assessment and treatment settings. Further, given their large sample sizes and strong psychometric characteristics, these systems are considered to be among the gold standards for the assessment of behavioral, emotional, and social problems in children (Campbell & Hammond, 2014). While there are a number of empirical studies supporting the utility of these systems for conceptualizing behavioral, emotional, and social needs of youth with ID (Baker et al., 2007; Baker et al., 2003; Deb et al., 2008; Douma et al., 2006; Embregts, 2000; Emerson, 2005; Hardiman et al., 2009; Miller et al., 2004), emergent empirical attention to how behavioral, emotional, and social conditions manifest in youth with ID has yielded important insights that have given rise to the development of rating scales and checklists specifically designed for use with this population. A review of available general-purpose and specific-purpose instruments designed for use in assessing children and adolescents with ID will be provided in Table 28.4.

Evolution in Assessment Practices

Recent developments in the field of psychological assessment warrant consideration as we review the multimethod, multi-informant approach for the assessment of children with an ID. The most dramatic development has been a movement toward the development and adoption of digital assessments. Digital assessment is a broad term that has been evolving in scope for the past 20 years as the utilization of telehealth services have increased (Reed et al., 2000). For example, digital assessment would include both a remotely administered online instrument and the use of iPads for the administration and scoring of an instrument during a traditional face-to-face assessment (see Daniel et al., 2014). Historically, the forces driving these developments have been associated with technological advances coupled with an increased demand for access to psychological services (Boydell et al., 2014; Elford et al., 2000; Myers et al., 2008).

Evolutionary forces in the field of assessment have been heightened exponentially during the COVID-19 pandemic (Wright et al., 2020). The advancement of assessment practices that adapt performance-based measures, that is, intellectual assessments, for use in online telehealth applications has been particularly challenging. Researchers and practitioners alike have suggested that the need to adapt assessment practices to include remote, digital assessment has outpaced the empirical support for these practices (see Wright, 2020). While preliminary evidence suggests that equivalence exists

Table 28.4 Rating scales and checklists for assessing behavioral, emotional, and social functioning in children and adolescents with intellectual disabilities

	Purpose of assessment		Population assessment is used		
Assessment instruments	General	Specific	Children	Adolescents	Assessment description
Rating Scales					
Aberrant Behavior Checklist (ABC; Aman & Singh, 1986)	✓			✓	The ABC was designed to rate inappropriate and maladaptive behavior for individuals with ID. The ABC subscales include irritability, lethargy/social withdrawal, stereotypic behavior, hyperactivity/noncompliance, and inappropriate speech.
Behavior Flexibility Rating Scale-Revised (BFRS-R; Peters-Scheffer et al., 2008		✓	✓	✓	The BFRS-R assesses the behavioral flexibility to change in the environment for children with intellectual and developmental disabilities. The results may be useful for identifying situations that serve as antecedent or consequent stimuli that can be used in a functional analysis of challenging behavior.
Behavior Problems Inventory-Short Form (BPI-S; Rojahn et al. 2012)		✓	✓	✓	The BPI-S was developed to assess the three most common types of behaviors of concern for individuals with ID, autism, and other developmental disabilities. The BPI-S assesses aggressive/destructive, stereotyped and self-injurious behavior (SIB) in children, adolescents, and adults.
Children's Scale of Hostility and Aggression: Reactive/Proactive (C-SHARP; Farmer & Aman 2009).		✓	✓	✓	The C-SHARP is an instrument for measuring aggressive and hostile behavior in children and adolescents with developmental disabilities. The C-SHARP includes both a Problem Scale and a Provocation Scale that measure verbal aggression, bullying, covert aggression, hostility, and physical aggression in youth.
Children's Social Behavior Questionnaire (CSBQ; Hartman et al.,, 2006)		✓	✓	✓	The CSBQ includes separate norms for individuals with pervasive developmental disabilities and autism. Research has supported the use of the CSBQ for making differential diagnosis among children with ID. The CSBQ subscales include Social, Tuned, Understanding, Orientation, Change, and Stereotypies.
Developmental Behavior Checklist-2 (DBC2; Gray et al., 2018)	✓		✓	✓	The DBC2 was developed to screen for behavioral and emotional problems in children and adolescents with ID. The subscales include Disruptive, Self-Absorbed, Communication Disturbance, Anxiety, Autistic-Related, and Antisocial.
Nisonger Child Behavior Rating Form (NCBRF; Aman et al., 1996; Tassé et al., 1996)	✓		✓	✓	The NCBRF is designed to measure behavioral and emotional problems in young people with developmental disabilities. The NCBRF measures both adaptive and maladaptive behavior. The adaptive scales include Compliant/Calm and Adaptive/Social. Maladaptive subscales assess Conduct Problems, Insecurity, Hyperactivity, Self-Injury, Ritualistic Behaviors, and Sensitivity.
Reiss Scales for Children's Dual Diagnosis (Reiss & Valenti-Hein, 1994)	✓				The Reiss Scales for Children's Dual Diagnosis is intended for use with children with ID. The scale contains 10 subscales including Anger/Self-Control, Anxiety Disorder, Attention Deficit, Autism, Conduct Disorder, Depression, Poor Self-Esteem, Psychosis, Somatoform Behavior, and Withdrawn/Isolated. It also assesses 10 rare behavior problems, for example, hallucinations, pica, enuresis/encopresis.

Reiss Screen for Maladaptive Behavior (RSMB; Reiss, 1988)	✓			✓	The RSMB is designed to assess for significant mental health problems in persons with ID living in institutional and community settings. The instrument is appropriate for use with persons 16 years and older with mild, moderate, severe, and profound intellectual deficits. Domains assessed include Aggressive Behavior, Psychosis, Paranoia, Depression (Behavior Signs), Depression (Physical Signs), Dependent Personality Disorder, Avoidant Personality Disorder, and Autism.
Scale of Attention in Intellectual Disability (SAID; Freeman et al., 2015)		✓	✓	✓	The SAID is designed to measure attentional capacities in children and adolescents with ID. The scales measure hyperactivity/impulsivity, inattention, and aspects of working memory.
Questions about Behavioral Function (QABF; Matson et al., 1999a)		✓	✓	✓	The QABF is a measure designed for use when conducting a functional behavioral assessment for behavior problems in persons with developmental disabilities. The instrument yields five categories reflecting the behavioral functions of Attention, Escape, Physical, Tangible, and Nonsocial.
Checklists					
Functional Assessment for multiple CausaliTy (FACT; Matson et al., 2003a, b)		✓	✓	✓	The FACT is a measure designed to identify the functions of maladaptive behaviors in individuals with Intellectual Disabilities. A forced-choice procedure is used to differentiate between functions for the behavior. The frequency of endorsements is used to guide behavioral planning based upon the hypothesized function of the target behaviors.
Pervasive Developmental Disorder in Mentally Retarded Persons (PDD-MRS; Kraijer, 2006)		✓	✓	✓	PDD-MRS is an instrument designed to screen and classify PDD in individuals, ages 2 to 80, with ID. The PDD-MRS is organized into four categories including social interaction with adults, social interaction with peers, language and speech, and other behavior.
Profile of Toileting Issues (POTI; Matson et al., 2010)		✓	✓	✓	The POTI is a checklist scale designed to assess enuresis or encopresis in individuals with ID. The POTI is organized into four factors that include Toileting, Accidents, Social/Emotional Problems, and Physical Problems.

for a number of test instruments (Brearly et al., 2017), this research base must be considered preliminary and limited in scope (Wright et al., 2020). Among the available options for digital assessments, the use of computer assisted administration and scoring systems, for example, *Q-interactive*, have received more empirical attention exploring the equivalence between digital and traditional paper-and-pencil versions of assessments (Daniel, 2012; Daniel, 2013a,b,c,d; Daniel & Wahlstrom, 2019; Daniel et al., 2014a, b; Gilbert et al., 2021; Raiford et al., 2016; Clark et al., 2017). While questions concerning validity remain (Gilbert et al., 2021), preliminary reports from practitioners using these digital assessments suggest that children and youth are more engaged and motivated during test administrations (Daniel, 2013a). The implications of using digital assessment with ID populations has yet to be explored. Future research will provide additional insight into this opportunity for practitioners to incorporate these digital assessments into their assessment batteries. However, in view of these rapid developments in the field, Table 28.5 provides a brief review of the digital assessments that are currently available for the most frequently used instruments.

Transition Planning Practices

Startling data on unemployment rates indicate that individuals with intellectual disabilities are more than twice as likely to be unemployed compared to the general population. Furthermore, only 44% of adults with intellectual disabilities, between the ages of 21–64, are in the workforce (Siperstein et al., 2013). There are national and state-level programs that have continuously attempted to mediate this issue over several decades with slight advancement; however, successful transition planning can play a pivotal role in addressing this societal quandary. It is well documented in the literature that effective transition involves data-driven planning (Levinson & Palmer, 2005). Thus, an evident approach to combating low employment rates among students with intellectual disabilities is to improve transition planning through the use of comprehensive assessment batteries. This section of the book chapter will briefly highlight resources and tools available to guide the transition planning process. Though, before reviewing assessment considerations, a brief discussion on federal regulations related to transition planning is warranted.

The Individuals with Disabilities Education Act (2004), requires that transition planning be initiated by school districts between the ages of 14 and 16, depending on individual state requirements, for adolescents who qualify for special education services. Federal mandates require the collection of assessment data in the areas of occupational preferences, occupational strengths, and vocational weaknesses to guide the development of transitional goals in a student's individualized educational program (IEP). As a result, psychologists and educational providers, especially school psychologists, have an obligation to assess these above transition planning constructs into their assessment batteries.

As discussed, federal legislation necessitates that student's vocational preferences be assessed when developing a transitional plan. Vocational interest assessments typically are comprised of self-reporting inventories or surveys that congregate information on students' career preferences. Once vocational predilections are identified, psychologists can use this information to assist students in generating realistic transition goals. At times, a student's career interests may not align with his or her skill sets or abilities; therefore, evaluation and consultation with the student may be needed to assist in exploring more suitable occupations (Wheman, 2013).

When a student's occupational interests are identified, a further appraisal of a student's skillsets related to vocational goals is necessary. Levinson and Palmer (2005) discussed that assessments that best measure vocational skills examine a "student's ability to perform specific job tasks and responsibilities in actual and/or contrived work environments" (p. 12). Consequently, vocational skill instru-

Table 28.5 Digital instruments for assessing children and adolescents with intellectual disabilities

Digital platforms	Domain assessed	Assessment instruments
PresenceLearning (https://presencelearning.com) PresenceLearning is an online platform that includes a combination of direct student assessment, standardized assessment tools, and norm-referenced-standardized rating scales via remote testing.	Intellectual Ability and cognitive processing	Comprehensive Test of Nonverbal Intelligence, Second Edition (CTONI-2; Hammill et al., 2009a) Comprehensive Test of Phonological Processing, Second Edition (CTOPP-2; Wagner et al., 2013) Reynolds Intellectual Assessment Scale, Second Edition (RIAS-2; Reynolds & Kamphaus, 2015) Test of Auditory Processing Skills, Third Edition (TAPS-3; Martin & Brownell, 2005) Test of Nonverbal Intelligence, Fourth Edition (TONI-4; Brown et al., 2010a) Wechsler Intelligence Scale for Children – Fifth Edition (WISC-V; Wechsler, 2014) Woodcock-Johnson IV Test of Cognitive Abilities (WJ IV COG; Schrank et al., 2014)
Q-global (https://qglobal.pearsonclinical.com) Q-global is Pearson's web-based platform for their administration, scoring, and reporting of Pearson assessments products.	Vocational planning	Career Assessment Inventory – The Vocational Version (CAI; Johansson, 2003) Campbell Interest and Skill Survey (CISS; Campbell et al., 1992) Pediatric Evaluation of Disability Inventory Computer Adaptive Test (PEDI-CAT; Haley & Coster, 2010) Vineland Adaptive Behavioral Scales, Third Edition (Vineland-3; Sparrow et al., 2016)
	Social, emotional, and Behavioral functioning	Beck Anxiety Inventory (BAI; Beck & Steer, 1993) Beck Hopeless Scale (BHS; Beck & Steer, 1988) Beck Depression Inventory, Second Edition (BDI-II; Beck et al., 1996) Beck Scale for Suicide Ideations (BSS; Beck et al., 1988) Beck Youth Inventories, Second Edition (BYI-2; Beck et al., 2005) Behavioral Assessment System for Children, Third Edition (BASC-3; Reynolds & Kamphaus, 2015) Brief Symptom Inventory (BSI; Derogatis & Spencer, 1982) Millon Adolescent Clinical Inventory (MACI; Millon et al., 1993) Millon Adolescent Personality Inventory (MAPI; Millon et al., 1982) Millon Clinical Multiaxial Inventory-IV (MCMI-IV; Millon et al., 2015) Millon Pre-Adolescent Clinical Inventory (M-PACI; Millon et al., 2005) Minnesota Multiphasic Personality Inventory (MMPI-A; Butcher et al., 1992) Minnesota Multiphasic Personality Inventory – 3 (MMPI-3; Ben-Porath & Tellegen, 2020) Symptom Checklist-90-Revised (SCL-90-R; Derogatis & Lazarus, 1994)
Q-interactive (https://qiactive.com) Q-interactive is a 1:1 iPad-based testing system that helps administer, score, and report direct assessment measures.	Intellectual Ability and cognitive processing	California Verbal Learning Test, Children's Version (CVLT-C; Delis et al., 1994) California Verbal Learning Test, Third Edition (CVLT-3; Delis et al., 2017) Clinical Evaluation of Language Fundamentals, Fifth Edition (CELF-5; Wiig et al., 2013) Delis-Kaplan Executive Function System (D-KEFS; Delis et al., 2001) Expressive Vocabulary Test, Third Edition (EVT-3; Williams, 2018) NEPSY, Second Edition (NEPSY-II; Korkman et al., 1998) Peabody Picture Vocabulary Test, Fifth Edition (PPVT-5; Dunn, 2018) Repeatable Battery for the Assessment of Neuropsychological Status Update (RBANS Update; Randolph, 2009) Wechsler Adult Intelligence Scale, Fourth Edition (WAIS-IV; Wechsler, 2008) Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V; Wechsler, 2014) Wechsler Memory Scale, Fourth Edition (WMS-IV; Wechsler, 2009) Wechsler Preschool and Primary Scales of Intelligence, Fourth Edition (WPPSI; Wechsler, 2012)

ments use direct observation and checklists to gauge performance. Vocational skill assessments coupled with more traditional assessment instruments, highlighted in previous sections of this book chapter, provide an extensive view of areas of strength and weaknesses. Once specific job-related skill strengths and deficits are recognized, transitional aims can be generated to mediate deficiencies through individualized academic and vocational training (Kohler & Field, 2003).

Lastly, self-determination is a construct that is under-evaluated in the transitional process. Self-determination assessments evaluate many traits and characteristics an individual may innately possess, such as one's ability to independently self-advocate, problem-solve, set goals, self-regulate, evaluate one's performance, etc. (Cheney, 2012; Wehmeyer, 1995). Notably, the literature reveals that minimal students engage in a leadership role in their transition planning. Moreover, students with an intellectual disability were significantly less likely than students with other disabilities to take a leadership position during transition planning meetings (Shogren & Plotner, 2012). Without adequate proficiency in this area or properly implemented accommodations to intercede limitations, students will prospectively present with many challenges in the workforce and/or post-secondary education.

Table 28.6 illustrates respected assessment instruments available to guide transition planning during the initial and progress monitoring phases. When transition assessments are specifically selected to provide a holistic perspective of a student's interests, abilities, and needs, adequate transition plans are generated to yield favorable, long-term employment outcomes.

Conclusions

This chapter provided an overview of the multimethod, multisource approach that is typically employed in the comprehensive assessment of children and adolescents with an intellectual disability (ID). Careful consideration of the assessment measures used to evaluate cognitive, adaptive, behavioral, emotional, and social functioning in youth with ID are important when considering diagnostic

Table 28.6 Assessment considerations for selecting transition planning instruments

	Constructs assessed			
Assessment instruments	SD	VI	VS	Assessment description
ARC's Self-Determination Scale, Adolescent Version (Wehmeyer & Kelchner, 1995)	✓			The ARC's Self-Determination Scale, Adolescent Version, is a self-report measure that assesses self-determination skills, that is, autonomy, self-regulation, psychological empowerment, and self-realization (Wehmeyer & Kelchner, 1995).
BRIGANCE® Transition Skills Inventory (Brigance, 2010)	✓	✓	✓	The BRIGANCE® Transition Skills Inventory is designed to assess and support the development of transition skills related to independent living, employment, and post-secondary education (Brigance, 2010).
Picture Interest Career Survey, Second Edition (PICS-2; Brady, 2011)		✓		Picture Interest Career Survey, Second Edition is a language-free self-report inventory used to assess vocational preference (Brady, 2011).
Self-Determination Assessment Internet (Hoffman et al., 2015)	✓			Self-Determination Assessment Internet assesses self-determination traits in the areas of cognition, behavior, and affect via online administration and scoring procedures (Hoffman et al., 2015).
Transition Planning Inventory, Second Edition, (TPI-2; Clark & Patton, 2004)	✓	✓	✓	Transition Planning Inventory, Second Edition assesses an individual's strengths, weaknesses, and preferences associated with independent living, employment, and post-secondary education (Clark & Patton, 2004).

Note. SD self-determination, *VI* vocational interests, *VS* vocational skills and treatment planning. Current diagnostic practice guidelines emphasize the importance of assessing intellectual ability and adaptive functioning to make a differential diagnosis, but practitioners should also take into consideration an investigation of etiology and comorbid mental, emotional, and behavioral disorders. The means for assessing individuals suspected of having an ID has continued to evolve in response to the available research and the demands placed on practitioners. In view of these advancements, continued education for practitioners working with this population is necessary.

Selecting, using, and interpreting assessment instruments is a complex endeavor. As illustrated throughout this chapter, ID evaluations require practitioners to reflect on a number of clinical considerations. These considerations not only assist practitioners in selecting an assessment tool that is likely to yield a valid measure of an individual's functioning but also ensure that the practitioner is using evidence-based decision-making when interpreting the findings. In closing, it is important to keep in mind that the assessment process should seldom rely solely on measurements of intellectual and adaptive functioning alone. Rather, best practice suggests that multiple methods of assessment including background information, developmental history, behavioral observations, academic achievement, and indirect measures should also be considered. By drawing upon multiple sources of information, the likelihood that the results will contribute to accurate diagnostic conclusions and meaningful intervention planning are increased.

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ADHD

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Jack, sit down!

Jack is an 8-year-old boy in grade 3. His teacher notes that Jack is a "ball of energy," continually moving in and out of his desk. Jack struggles to pay attention in class and to complete assignments in a timely manner and the classroom teacher must constantly redirect and refocus him on the task at hand. Academically, Jack struggles to keep up with his peers and finds independent work challenging. With his peers, Jack can be overly intrusive, often interrupting conversations and Jack's parents describe him as "spirited." They note that he loves to run, climb, and jump, particularly on the living room couch. He is a happy and energetic child, although Jack struggles to follow instructions and often forgets what he is supposed to be doing. As well, Jack's parents report that dinner time is a challenge, as Jack is constantly out of his chair and walking around the kitchen table. Jack's room is a mess, his clothes are everywhere, and Jack's parents are very frustrated.

As a result of these concerns, Jack is referred for a psycho-educational assessment. His parents and teachers look to gain a better understanding of Jack's cognitive, academic, social-emotional, and behavioral strengths and weaknesses as well as highlight areas in which he would benefit from targeted support. It is not uncommon for a child of Jack's age and behavioral presentation to be referred for an assessment. Indeed, many children struggle to manage day-to-day expectations. However, those children who demonstrate challenges in attention, focus, hyperactivity, or impulsivity are often assessed for attention-deficit/hyperactivity disorder (ADHD).

This chapter will outline the diagnostic criteria for ADHD, including behavioral presentation, developmental progression, and common comorbidities, followed by a detailed analysis of assessment tools and techniques. Finally, other considerations in the assessment of ADHD, including gender, cultural norms, and age, are discussed.

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Attention-Deficit/Hyperactivity Disorder

ADHD is a neurodevelopmental disorder that presents with developmentally inappropriate levels of impulsivity, hyperactivity, and attention (American Psychiatric Association [APA], 2013). Approximately 5–7% of school-aged children worldwide are diagnosed with ADHD (Brault & Lacourse, 2012; Polanczyk et al., 2007), translating to approximately one to two students (on average) in each classroom having an ADHD diagnosis (APA, 2013). ADHD is more commonly diagnosed in males, but females are more likely to present with predominantly inattentive symptoms (APA, 2013). Functional impairments associated with ADHD symptoms, such as the inability to stay on task or high distractibility, commonly impact all aspects of the individual's life (e.g., home, school, work, and social settings; Barkley, 2014). Individuals with ADHD may experience greater difficulties with emotional dysregulation (Lugo-Candelas et al., 2017; Shaw et al., 2014), frustration tolerance (Seymour et al., 2019), and motivation (Smith & Langberg, 2018). Students with ADHD may underperform on academic tasks and achieve lower overall attainment (APA, 2013). As such, they are less likely to pursue higher education and more likely to be unemployed (APA, 2013). Socially, those diagnosed with ADHD may be described as uncooperative, lazy, or irresponsible (APA, 2013). Negative interactions with peers and family members, such as being stigmatized against, rejected, neglected, or bullied, may be more likely to occur (Varma et al., 2020). However, there are positive characteristics associated with ADHD, including creativity (Healey & Rucklidge, 2006) and hyper-focus (Sedgwick et al., 2019).

Etiology

ADHD is a complex and heterogeneous disorder, with multifactorial etiological risk factors (Costa Dias et al., 2015). Although the factors contributing to ADHD are not fully understood, the development appears to involve combinations of genetic, neurological, and environmental factors (Falvo & Holland, 2018; Nunez-Jaramillo et al., 2021). ADHD is highly heritable, with estimates between 0.76 and 0.90 (Faraone & Larsson, 2019; Larsson et al., 2014). In general, the genetic links of ADHD are unclear and difficult to disentangle, with reports of approximately 304 genetic variants associated with ADHD (Demontis et al., 2019). However, there is no single or common DNA variant that can explain the etiology of ADHD (Faraone & Larsson, 2019). Neurocognitive impairments such as abnormalities in the frontal lobe, thalamus, and striatum are hypothesized to contribute to ADHD symptomatology (Kofler et al., 2019; Shaw et al., 2015; van Lieshout et al., 2017). Further, environmental contributions begin prenatally, where premature birth, malnutrition, high sucrose consumption, pesticide exposure, and heavy metal exposure are also associated with ADHD (Nunez-Jaramillo et al., 2021).

Diagnostic Criteria

To receive an ADHD diagnosis, a child must meet at least six symptoms in one or both of the two major symptom dimensions: Inattention and Impulsivity-Hyperactivity outlined in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; APA, 2013). These two dimensions comprise three major subtypes of ADHD: (1) Predominantly Inattentive (ADHD-I), (2) Predominantly Hyperactive/Impulsive (ADHD-HI), or (3) ADHD Combined (ADHD-C). An ADHD-I presentation is categorized by inattentive thoughts and behaviors, such as high distractibility. Inattentive symptoms

(ADHD-I) may present as a failure to pay close attention to details, difficulty sustaining attention in tasks, making careless mistakes, lack of persistence, difficulty with organization, often losing or forgetting items/activities, or being easily distracted (APA, 2013). An ADHD-HI presentation is categorized by excessive and inappropriate motor movements. Hyperactive/impulsive symptoms (ADHD-HI) may present as fidgeting or tapping hands or feet, difficulty remaining seated or engaging in quiet activities, talking or moving excessively, difficulty waiting for a turn in activities, or interrupting or intruding on others (APA, 2013). ADHD-C is the most prominent type of ADHD presentation and includes a combination of both ADHD-I and ADHD-HI symptoms (APA, 2013). Symptoms must be present prior to the age of 12 and observed in two or more settings (i.e., home and school; APA, 2013). In addition, the presented symptoms need to be clearly interfering, impairing, or reducing the quality of academic, social, or occupational functioning of the child (APA, 2013). Lastly, the symptoms must not only occur during the course of schizophrenia or another psychotic disorder and are not better explained by another mental disorder (e.g., mood, anxiety, and personality disorder; APA, 2013). An ADHD diagnosis is further classified by the severity of symptoms (i.e., mild, moderate, and severe). Mild refers to few symptoms with few impairments, moderate refers to some symptoms and impairments, and severe refers to most/all symptoms with major impairments (APA, 2013). As ADHD symptoms are considered atypical behaviors, it is imperative to determine the severity and chronicity of the symptoms (Akutagava-Martins et al., 2016; Thapar, 2018).

Developmental Progression

Early Life

Although ADHD is typically diagnosed during elementary school years, parents may observe ADHD symptoms much earlier (APA, 2013). ADHD behaviors may be first seen in preschool and are found across both home and school environments (Hinshaw, 2018). Although it may be challenging to discern developmentally appropriate behaviors from ADHD symptoms, it is possible to detect behaviors that are significantly more pronounced than what is expected (Cherkasova et al., 2013). For example, Halperin and Marks (2019) reported excessive hyperactivity as the main indication of ADHD in preschool. Detection in preschool may be beneficial, as reported cognitive deficits apparent in preschool may predict future ADHD symptoms (Aretouli et al., 2019). Other symptoms of ADHD in preschool may include difficulties with self-regulation and reduced cognitive flexibility (Meeuwsen et al., 2019). However, diagnosing ADHD in preschool is controversial and debated due to variability in the severity of symptoms (O'Neill et al., 2017) and a lack of accurate reporting of ADHD symptoms by young children (Aretouli et al., 2019).

Elementary School Years

ADHD is most frequently diagnosed during elementary school due to the symptoms of ADHD becoming more prominent and therefore impairing daily functioning (APA, 2013). Inappropriate behaviors, such as failure to follow instructions, excessive talking, intruding on peers' personal space, daydreaming, or constantly leaving one's seat, become more pronounced in the classroom and begin to impair academic performance (Chang et al., 2020; Cherkasova et al., 2013; Hinshaw, 2018).

One's gender also contributed to the degression of impairment, where boys tended to receive earlier diagnoses and maintain more severe ADHD symptomology into adolescence, while girls received later diagnoses (late childhood and beyond), prominently inattentive, and the severity of symptoms varied (Murray et al., 2019).

Adolescence and Adulthood

APA (2013) describes ADHD in adolescence as a relatively stable stage in the lifespan; however, some adolescents do experience heightened symptoms. Previous research indicates that some ADHD symptomatology may decrease with age (Langberg et al., 2008; Sasser et al., 2016); however, severity and presentation type may influence the degree to which symptoms vary from childhood to adolescence. Specifically, less severe hyperactive and impulsive symptoms were more likely to decline overtime while inattentive symptom trajectories were more variable, as some remained while others declined (Murray et al., 2019). For example, the excessive running or climbing often present in young children may decrease, while feelings of fidgetiness, jitteriness, restlessness, or impatience may appear or increase (APA, 2013). In adolescence, ADHD-I may present with greater academic impairment, social withdrawal, or poor adaptive functioning skills, while ADHD-HI may present with greater peer conflict, disruptive behaviors, or injuries (Leopold et al., 2019). Although research indicates ADHD-HI symptoms may decrease over the lifespan, adult ADHD-HI and ADHD-I symptoms are prevalent in approximately 2.5% of the adult population.

Comorbidities

Comorbidities in children and adolescents with ADHD are highly prevalent (Reale et al., 2017). Comorbidity refers to the presence of one or more additional conditions co-occurring with a primary condition (Jensen & Steinhausen, 2015). Epidemiological and clinical studies suggest that non-comorbid ADHD occurs in only 13–32.3% of cases and that most individuals with ADHD have multiple comorbid disorders (Larson et al., 2011). The prevalence of additional psychiatric disorders or neurodevelopmental conditions is robust in children and adolescents with ADHD and increases its burden and complexity of management (Reale et al., 2017; Verkuijl et al., 2015). The prevalence of comorbid psychiatric disorders concomitant with ADHD range between 40% and 80%, with rates being higher in clinical populations (67–87%) compared to those in the community (Blumberg et al., 2012). The most prevalent comorbidities associated with ADHD are oppositional defiant disorder (ODD; 50–60%), autism spectrum disorder (ASD; 65–80%), learning disability (LD; 46%), conduct disorder (CD; 20–50%), anxiety (10–40%), tic disorder (20%), obsessive-compulsive disorders (OCD; 6–15%), depression (14%), speech problems (11%), and sleep disorders (70%; Larson et al., 2011; Reale et al., 2017). Individuals with comorbid diagnoses may have increased difficulties due to their increased psychopathology, necessitating treatment comprehensiveness for intervention in all impaired domains (Katzman et al., 2017).

Assessment of ADHD

To assess for behavior disorders, the research emphasizes taking a multimethod assessment approach, which incorporates a variety of assessment measures completed by multiple informants across settings that highlight a child's strengths and weaknesses (Barkley, 2014; Sattler, 2014). This comprehensive approach includes: (1) reviewing the child's records (e.g., medical, educational, previous assessments, and supports), (2) interviewing relevant individuals (e.g., child, parents, teachers, and coaches), (3) conducting observations of the child in various settings (e.g., school and recreation), (4) using formal and informal measures, and (5) assessing relevant skill areas (e.g., cognitive, academic, behavioral, and adaptive functioning; Barkley, 2014). The goal of the assessment is to determine the presence or absence of ADHD, differentiate between an ADHD diagnosis and other disorders, and determine the presence of comorbid conditions (Barkley, 2014). A multimethod approach allows the clinician to understand the child from an ecological framework (i.e., taking into consideration the child and the environment around her/him) to identify problem areas and provide a comprehensive, data-informed approach incorporating the child and family's resources (Sattler, 2014). The clinician can begin to identify the types of interventions required to address not only ADHD symptomatology but also potential psychological, academic, adaptive, and social challenges.

Interviews

A crucial component of a psychoeducational assessment is interviews. Whitcomb and Merrell (2013) define the purpose of interviewing as, "gathering information about behavioural, social, and emotional functioning in order to better understand problems in these areas" (p. 11). Interviews are typically conducted with the child's parents/caregivers, but a clinician may also choose to interview other persons involved in the child's life (e.g., grandparents, coaches, and teachers). Interviewing multiple stakeholders, potentially including the child (client) him/herself, improves ecological validity as information is gathered based on everyone's point of view (Hass, 2018). To diagnose ADHD, the DSM-5 requires the presence of ADHD symptoms in more than one setting, meaning stakeholders in different settings must provide information (APA, 2022).

Gathering information from a teacher's perspective is advantageous as it can inform a child's academic, social, and behavioral functioning at school. Moreover, a clinician can compare teacher reports to parent/caregiver reports to understand if symptoms are present across settings including the frequency, severity, and impairment (Sibley et al., 2012). Interviewing the client undergoing an assessment is also beneficial as it can provide information from a first-person perspective. Clients may discuss their symptoms or strengths/weaknesses in an interview, which can provide valuable information and establish a basis of collaboration for developing effective treatment recommendations. Moreover, an interview can also establish what is most relevant to the client for intervention (e.g., a symptom that parents and teachers deem problematic may be less concerning for the client). However, clinicians must also consider bias between raters and the validity of self report (McQuade et al., 2011). Children with ADHD may not provide reliable reports of their behavior and may overestimate their competencies; thus, ratings should be interpreted with caution (Barkley, 2014).

Finally, interviews can also serve to build rapport and promote a collaborative relationship with the parties involved (Horvath et al., 2011). Interviewing stakeholders is a crucial component of a comprehensive assessment as it allows for multiple perspectives and collects in-depth information about the client that cannot be attained from other sources (e.g., questionnaires).

Initial Interview

The initial interview is often conducted with a parent or caregiver of a child. This interview is designed to inform the family of the assessment process, complete informed consent, and allow the clinician to collect in-depth background information on the child. Barkley (2014) suggests that the parent report is the most ecologically valid source of information on the child's difficulties. The gathered information helps the clinician understand the referral question, develop hypotheses about the child, select and administer an appropriate assessment battery, and begin to formulate targeted recommendations and interventions. Moreover, it can provide the clinician an idea of the parent's motivation for assessment and perception of an ADHD diagnosis, which may influence the recommendations provided. Information collected during the interview may include the reason for conducting an assessment, description of the presenting problem(s), developmental history (e.g., developmental milestones of motor, language, intellectual, thinking, academic, emotional, and social functioning), previous medical/psychological diagnoses and treatment, previous assessment history, support and service history, family history (e.g., relationships and parenting style), educational history, history of traumatic or stressful life events, cognitive/behavioral/emotional/social and adaptive functioning, and finally, strengths, interests, and parents/caregivers hopes for the future.

Family and Developmental History Collecting information on the child's family and developmental history is integral to understanding the child as a client. Previous research has established that there is a relationship between family history and an ADHD diagnosis (Breaux et al., 2017; Miller et al., 2020; Waltereit et al., 2019), where children with ADHD have greater rates of previous ADHD diagnoses or general psychopathology in their families. Biologically, ADHD has been thoroughly documented as a disorder that is highly heritable (>70%; Biederman & Faraone, 2005). Further, Breaux et al., (2017) reported maternal and paternal ADHD symptoms predicted their child's ADHD symptoms.

Questions regarding family relationships and parenting style (e.g., caregivers and conflicts), parental history (e.g., socioeconomic status, psychiatric, and medical diseases), developmental history (e.g., prenatal, perinatal, and early-to-late childhood), and previous trauma are important to discuss to get a broad understanding of the child (Waltereit et al., 2019). In the case of ADHD, where neurodevelopmental signs and symptoms are necessary in childhood (for diagnosis), discussing these topics thoroughly allows the clinician to understand the child's psychological and behavioral states longitudinally, in a psychosocial and developmental context (Waltereit et al., 2019) to determine if they meet ADHD symptom criteria. Analyzing ADHD symptoms in a psychosocial context is also imperative as parental or shared risk factors may contribute to parent and child ADHD symptoms (Breaux et al., 2017). Waltereit et al. (2019) found that mothers and fathers having less contact with their parents, fathers being from a broken home, and mothers having a mental illness, were all more highly associated with their child being diagnosed with ADHD. When discussing prenatal history, greater maternal stress during pregnancy was more highly associated with the child having ADHD than lower maternal stress. Parents were also more likely to report that children diagnosed with ADHD cried more often, were less interested in language, displayed greater challenging behaviors, had fewer successful peer interactions, and had difficulty with teachers and schoolwork (Waltereit et al., 2019). Exploring family history can help clinicians compare ADHD symptoms present in the family to potential symptoms (or lack of symptoms) displayed by the child. For example, Miller et al. (2020) reported that infant ADHD behaviors were more prevalent if an older sibling or parent had ADHD than without the diagnosis. Specifically, parents reported more significant behavioral and temperament concerns for children at a higher risk of ADHD diagnoses than children at a lower risk (Miller et al., 2020). Lastly, gathering information about developmental and family history is also important in understanding potential co-occurring disorders when assessing for ADHD, or alternatively, to rule out other disorders that may look like or coincide with ADHD symptoms.

Taken together, this research demonstrates the importance of understanding a child's developmental and family history in an assessment to determine what genetic, developmental, and contextual factors may play a role in, or increase the child's risk of, ADHD and what ADHD symptoms may be present.

Screening Measures

After the initial interview, the clinician may choose to send parents screening measures. The Canadian ADHD Resource Alliance (CADDRA, 2011) recommends rating scales to help screen for ADHD. In the initial screening, scales that focus specifically on the assessment of symptoms of ADHD should be completed by parents. Screening measures are typically short rating scales containing items that either rule in or rule out symptoms of a disorder; they are not to be used diagnostically. Screening measures are beneficial as they help the clinician identify symptoms of ADHD and select an appropriate direction for the assessment (e.g., selection of test measures). Possible screening measures for ADHD include the Swanson, Nolan, and Pelham Questionnaire (SNAP; Swanson et al., 1983), Weiss-Symptom Record (WSR; CADDRA, 2011), Weiss Functional Impairment Rating Scale for Parents (WFIRS-P; CADDRA, 2011), the Disruptive Behavior Disorders Rating Scale (DBDRS; Barkley & Murphy, 1998), and the CADDRA Teacher Assessment Form (CADDRA, 2011).

Assessment Measures

The two types of assessment measures used in the assessment of ADHD fall under two categories: Formal and Informal Assessment Measures.

Formal Assessment Measures

Formal assessment measures have standardized administration, scoring procedures, psychometric information about the standardized sample, and adequate reliability and validity. Formal assessment measures of ability focus on how well the child knows the material being assessed in comparison to others of the same age and/or grade. Responses are either correct or incorrect and numerically scored. Formal ability measures include intelligence tests, aptitude tests, achievement tests, and neuropsychological tests.

Intelligence Tests As ADHD is a neurobiological disorder (Hale et al., 2012), clinicians benefit from examining children with attention problems from a cognitive perspective. Individuals with ADHD often have comorbidities that may complicate the diagnostic picture. To mitigate this challenge, Hale et al. (2012) suggest that clinicians utilize cognitive measures in which intellectual, cognitive, and neuropsychological test performance can help differentiate the various causes of attention problems; this approach may support a clearer diagnostic decision with stronger ecological and treatment validity. It should be noted that cognitive testing is not a diagnostic tool and a specific cognitive profile is not a part of an ADHD diagnosis; however, there are cognitive profiles that are common in individuals with ADHD and may inform recommendations.

Children with ADHD tend to score lower on measures of working memory and processing speed, as commonly measured on Intelligence Quotient (IQ) tests (Moura et al., 2019). Additionally, children with ADHD may score lower on tasks that involve reward sensitive and timing (Jackson & MacKillop, 2016; Patros et al., 2016). Specifically, children with ADHD may be more likely to discount later, bigger rewards, and more likely to choose smaller, immediate rewards. With that said, it is important to note that there is considerable diversity in ADHD, and not every child with ADHD will follow this pattern of performance (van Hulst et al., 2015). It is likely that two children with ADHD will display differences in cognitive profile, symptoms, presentation, and will therefore require different intervention strategies. Understanding a child's cognitive abilities through intelligence testing can inform intervention by relying on areas of strength to bolster areas of weakness.

Neuropsychological Tests Similarly, to intelligence testing, clinicians may consider gathering more cognitive information through neuropsychological testing. Neuropsychological tests may include executive functions, attention, memory, gross and fine motor skills, visual processing, language processing, adaptive skills, sensory and perceptual skills, and socioemotional functioning, which is conducted using a flexible battery of standardized measures and rating forms (Pritchard et al., 2012). Neuropsychological data may be advantageous because attention challenges are ubiquitous in clinical practice and have different causes (Hale et al., 2012). Research suggests there is neurobiological evidence for ADHD (Nunez-Jaramillo et al., 2021), and neurological data provides a broader understanding of an individual's functioning (Rhodes et al., 2009). Specifically, neuropsychological findings can provide a better understanding of a child's etiology which may result in an increased ability to treat an existing problem or prevent future challenges (Rhodes et al., 2009). By incorporating the results of neuropsychological testing, a clinician can increase the validity of diagnosis by increasing triangulation (i.e., gathering proofs from many sources or data to support a hypothesis from varied viewpoints; Wasserman & Wasserman, 2012). Neurological testing ensures accuracy as it allows for better differential and comorbid diagnosis (Pritchard et al., 2012; Wasserman & Wasserman, 2012). Lastly, neurological results may support individualized intervention plans based on the clients' strengths and weaknesses (Rhodes et al., 2009). A key neuropsychological construct often tested in ADHD is executive function.

Executive Function Executive function (EF) impairments are often prominent in individuals with ADHD (Kofler et al., 2019). Individuals with ADHD present with difficulties in the domains of attention and cognitive function, with primary deficits in EF including activation (i.e., initiation, prioritization, organization, and planning), focus (i.e., sustained attention and shifting focus), effort (i.e., alertness, sustained effort, and processing speed), emotions (i.e., emotion regulation), memory (i.e., working memory), and action (i.e., inhibition, monitoring, and self-regulation; Brown & Larson, 2009). These deficits can result in challenges with judgment and decision-making, difficulty initiating tasks, following steps, shifting attention, organization, and inappropriate social behaviors (Strauss et al., 2006).

Assessing EF can support a diagnosis of ADHD, help pinpoint trouble areas, and aims for intervention. The majority of EF measures assess attention, inhibitory control, working memory, organization, planning, concept formation, set shifting, and word/idea generation through either performance-based measures or rating scales. Performance-based measures are standardized, conducted by a clinician, and typically access accuracy or response time. Rating scales are completed by multi-raters and report on challenges with completing daily tasks (Toplak et al., 2013). Both performance-based and rating measures have found lower levels of EF in children with ADHD as compared to controls (Barkley, 2014; Nigg, 2006). Therefore, research suggests these measures can reliability differentiate between children with and without ADHD (Toplak et al., 2013).

However, a review of empirical studies has found that the association between performance and rating measures assess different aspects of cognitive functioning (Toplak et al., 2013). Performance-based measures assess the efficacy of cognitive abilities whereas rating measures assess whether the child is completing daily tasks. Toplak et al. (2013), suggest that both measures provide distinctive types of information for ADHD but should not be interpreted as equivalent or subcategories of one another. Key factors in the difference between these measures are the administration, task demands, and scoring.

EF Rating Scales EF rating scales are designed to identify deficits in EF, which presumably would lead to early detection, support diagnostic criteria, and inform intervention. Unlike performance-based measures, EF rating scales allow clinicians to understand EF impairments described over longer intervals (e.g., within the last month) and understand the individual's performance on tasks in everyday

Table 29.1 Executive functioning rating scales

The Behavior Rating Inventory of Executive Function (BRIEF; Gioia et al., 2015).
Brown Attention-Deficit Disorder Scales for adolescents and adults (Brown, 2001).
Comprehensive Executive Function Inventory (CEFI; Naglieri & Goldstein, 2013).
Childhood Executive Functioning Inventory (CHEXI; Thorell & Nyberg, 2008).
Working Memory Rating Scale (WMRS; Alloway et al., 2008).

life. Moreover, EF rating scales are efficient, low cost, and collect information from multiple raters who can inform frequency, severity, and impairment in different settings. O'Brien et al. (2021) suggest that since a diagnosis of ADHD is considered to include difficulties with EF in daily life, EF rating scales may be more accurate than performance-based EF tests in predicting functional difficulties experienced by these children. EF rating measures can add evidence of deficits around core diagnostic criteria of an ADHD diagnosis (e.g., inattention and hyperactivity). EF rating scales may be used as supplemental information to diagnostic criteria and support targeted intervention. EF rating measures include a wide range of scales that form composite scores (e.g., inhibit, shift, and emotional control scales compose the Behavioral Regulation Index Composite on the Behavior Rating Inventory of Executive Function [BRIEF]; Gioia et al., 2015). See Table 29.1 for EF rating scale measures.

EF Performance Measures EF performance-based measures present a client with a structured set of tasks, that increase in difficulty as each subtest progresses. The value of EF performance-based measures if a clinician is able to observe how a client responds to increasing challenges in a standardized setting (Dawson & Guare, 2010). Performance-based EF subtests such as auditory attention and response set on the NEPSY-II display a client's ability to rapidly shift from one task to another and employ problem-solving strategies which provide insight into their ability to efficiently use a number of executive skills (e.g., sustained attention, inhibition, flexibility, and metacognition) in a controlled environment similar to a classroom (Dawson & Guare, 2010). From a strengths-based lens, EF performance measures may allow a clinician to see what a client is able *to do* in a structured setting (i.e., like school) which may help inform intervention planning. In addition, EF performance-based measures have established norms in which the clinician can use the established norms to determine the clinical significance versus a relative weakness for the individual (Suchy, 2009). EF performance-based measure scores may add to the cognitive and neurological understanding of the client by being another form of evidence to intelligence test scores and rating scale findings. See Table 29.2 for examples of EF performance measures.

Behavior Checklists Collecting child behavior checklists has become standard practice in the assessments of children with behavioral disorders. To date, there is a wide array of behavioral scales with excellent normative data, reliability, and validity (Barkley, 2014). Standardized behavior rating and checklist measures are used to assess overt displays of "positive" and "negative" behaviors. Most measures are designed to be completed by multi-raters who are knowledgeable about the child's behavior (i.e., parents/caregivers, teachers, clinicians); however, they often have a self-report form. Behavior rating forms require informants to make judgment about a child's functioning. Having multi-raters provide information is advantageous as it may help reduce potential biases and provide additional contextual information (De Los Reyes et al., 2015). However, clinicians may find differences in ratings. As such, the credibility and validity of the informant must be considered. Differences in ratings may be due to differences in familiarity with the child, different frames of reference, attribution bias, and unreliability of informants (Barkley, 2014).

Table 29.2 Executive functioning performance-based measures

Tests of attention
Test of Variables of Attention (TOVA; Greenberg, 1991).
Integrated Visual and Auditory CPT (IVA; Sandford & Turner, 1995).
Conners Continuous Performance Test (CPT; Conners, 2014).
Test of working memory
Wechsler Intelligence Test for Children (WISC)—Digit Span (Wechsler, 2003).
The Woodcock-Johnson Tests of Cognitive Abilities Battery—Working Memory tasks (Schrank et al., 2014).
Tests of inhibitory control
Stroop Colour and Word Test (Stroop, 1935).
Delis-Kaplan Executive Function System (D-KEFS)—The Colour-Word Interference subtest (Delis et al., 2001).
Tests of organization, planning, and sequencing
Delis-Kaplan Executive Function System (D-KEFS)—The Tower subtest (Delis et al., 2001).
Tests of set shifting
Wisconsin Card Sorting Test (Heaton et al., 1993).
Delis-Kaplan Executive Function System (D-KEFS)—The Sorting subtest (Delis et al., 2001).
Minnesota Executive Function Scale (MEFS; measures other executive functions as well).
Neuropsychological Assessment (NEPSY)—Trail Making subtest (Korkman et al., 1998).
Tests of word/idea generation
Controlled Oral Word Association Test (COWAT)—Verbal fluency subtest on the Multilingual Aphasia Examination (Benton et al., 1994)
Delis-Kaplan Executive Function System (D-KEFS)—Verbal Fluency subtest (Delis et al., 2001).
Neuropsychological Assessment (NEPSY)-Word Generation subtest (Korkman et al., 1998).

Rating scales can be classified into two main categories: broad-band or targeted. Broad-band rating scales identify a wide range of child psychopathology while targeted scales survey symptoms specific to a disorder.

Broad-Band Rating Scales

Many of the broad-band behavior rating scales have a diagnostic structure that highlights internalizing and externalizing behaviors and the frequency at which these behaviors present. Internalizing behavior scales may include Anxiety, Depression, Somatic Symptoms, and sleep challenges. Externalizing behavior scales may include attention difficulties, hyperactivity, oppositional/defiant behavior, and aggressive behavior. Moreover, various behavior rating scales map on directly to DSM-5 disorder criteria and may be used to support the confirmation of a diagnosis. Such scales include the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 2015), the Child Behavior Checklist (CBCL; Achenbach, 1999), and the Conners Comprehensive Behavior Rating Scales (CBRS; Conners, 2010).

Targeted Rating Scales

Targeted rating scales have a diagnostic structure that captures a disorder of interest. To identify ADHD, most rating scales have a diagnostic structure that maps onto DSM-5 symptom criteria for ADHD and distinguishes the frequency or severity of symptoms, level of functional impairment, and impact on quality of daily life (Kollins & Sparrow, 2010). These measures are useful as they aid in a diagnosis, determine symptom frequency and severity for targeted interventions, and can monitor the improvement of symptoms from intervention (Kollins & Sparrow, 2010). Targeted scales may include the Conners Rating Scale (Conners, 2008). The Conners Rating Scale (Conners, 2008) is a multi-informant (i.e., parent, teacher, and self) rating scale of behavior problems in children and adolescents with a primary focus on identifying externalizing behaviors. The Conners focuses on ADHD symptomology and associated features including commonly co-occurring disruptive behavior disorders, ODD and CD.

Informal Assessment Measures

Informal assessment measures rely on open-ended descriptive information. Informal measures are generally intended to provide additional descriptive evidence to accompany the formal assessment data (Sattler, 2014). Sattler (2014) suggests, informal assessments typically support narrowing down key areas for further assessment using formal measures. Informal assessment measures may include interviews, rating checklists, school observations, and file reviews.

Behavioral Observations

Direct behavioral observations, or directly observing the child in an environment (e.g., school classroom or during the assessment), allows the examiner to identify and record the child's behaviors of interest, observe these behaviors, contrast the child's behaviors with their peers, and examine the contextual factors (e.g., environment) that contribute to the existing behaviors (e.g., physical aspects of the classroom; Whitcomb, 2013). For school psychologists, children are most likely to be observed in their school setting (with additional observations in other settings if possible). Classroom observations may be advantageous over other data gathered, such as rating scales, because the behavior is observed and measured in real time in a natural setting, likely improving ecological validity (Veenman et al., 2017).

For children with ADHD, behavioral observations allow the examiner to directly observe if ADHD symptoms are present in their day-to-day interactions at school. This observation is important as students with ADHD tend to exhibit behaviors that may impact their classroom and academic performance (DuPaul & Jimmerson, 2014). When observing children with ADHD, there are a variety of behaviors to look for in the classroom to determine if inattentive, hyperactive, or impulsive symptoms are present (DuPaul & Stoner, 2014). For example, an inattentive child may be distracted, unable to focus on instruction or work, forget material, has unorganized material, failed to complete homework, or does not study for an exam (Barkley, 2014; DuPaul & Stoner, 2014). Hyperactive/impulsive symptoms may present as frequent fidgeting and out-of-seat behaviors, blurting out answers without being called on, acting in ways that break classroom rules without considering the repercussions, completing assignments as quickly as possible without concerns around accuracy of the work, or making disruptive or inappropriate sounds or noises (APA, 2013; DuPaul & Stoner, 2014).

Additionally, beyond symptoms, students with ADHD may engage in peer and classroom conflict, such as defying the teacher and breaking rules, or being hostile toward peers (DuPaul & Jimmerson, 2014). If it is possible to directly observe both classroom behavior and peer interactions (e.g., such as on the playground or during less structured classroom time), an examiner is better able to gather data that either supports or refutes the referral question and can plan more precise recommendations and interventions for the child.

School File Review

In addition to behavioral observations, a clinician may complete a school file review or ask parents to provide access to previous report cards. School file reviews are only accessible to school clinicians who are employed by a school district; thus, private assessments would rely on parent-provided records. A review of student records provides the clinician with an overview of a student's entire educational history. Educational records include cumulative files that the school maintains for students. Cumulative files typically contain the students' report cards (including number of absences), number of schools attended, suspensions, student health records, academic or behavioral referrals, previous assessment reports, educational placement decisions, individualized education plans ([IEP], including accommodations and modifications), and referrals for internal and external services. Report cards provide valuable data that may pinpoint the start and course of ADHD-related academic challenges as well as the potential age of ADHD onset (DuPaul et al., 2014). Not only do report cards provide information on the grade level and quality of work but teacher comments can give insight into additional classroom behaviors such as poor task initiation and completion, off-task behavior, restlessness, and inappropriate social behaviors (DuPaul et al., 2014). If a student had a previous assessment, educational placement or IPP, the clinician may access documentation of specifically designed instruction, previous interventions, behavioral plans, and progress reports. This documentation is beneficial for intervention planning when considering strategies that were successful versus unsuccessful. Overall, this information allows for comparisons with parental reports in interviews and rating scales (Baron, 2018) and may help inform school-based recommendations.

Additional Considerations in ADHD Assessment

It is important to note that while assessment and diagnosis of ADHD require data-based decision-making, it also requires clinical reasoning. Of note, there are many other considerations that must be incorporated into an ADHD assessment, particularly related to similarly presenting conditions, gender, cultural norm/expectations, and issues related specifically to adolescent assessment. Each of these topics is discussed in detail below.

Conditions That Present Similarly to ADHD

Although ADHD often presents with comorbidities, some conditions and life circumstances can also result in ADHD-like symptoms in children who do not actually have ADHD. Due to overlapping symptoms, many disorders can "mimic" ADHD in children and adolescents. Belanger et al. (2018) suggest that the most common disorders that mimic ADHD are ODD, CD, Autism, LD, Anxiety disorder, intellectual disability, developmental coordination Disorder (DCD), language, mood, and tic disorders. These overlapping symptoms may include disruptive and defiant behavior (e.g., ODD), restlessness, difficulty concentrating, and poor sleep (e.g., anxiety), irritability, poor emotion regulation, and lack of motivation (e.g., depression), social communication and motor challenges (e.g., Autism), and preoccupation with thoughts or actions (OCD). This list is not comprehensive and further exploration of other overlapping symptoms and disorders depending on the child and context are required.

In school, children may struggle to initiate tasks in a timely fashion, finish assignments on time, have difficulty following lectures or instructions, and perform poorly in school. These examples may suggest impairments in attention; however, rather than an ADHD diagnosis they may be due to other factors including slow processing speed, low IQ, or specific learning disorders.

In addition, Baron (2018) suggests that variables in daily life can impact behavior and children may show fluctuations in attention in response to adverse early childhood experiences (e.g., death of a family member or pet, family relocation), parent conflict and/or separation, sibling conflict, and bullying. Furthermore, children who have experienced trauma and poverty (i.e., low socioeconomic status) may exhibit behaviors that look like ADHD. Trauma in children may consist of various forms of abuse, neglect, serious accident or illness, victim/witness to violence, witness of domestic violence, involvement in natural disasters, and forced displacement. Children who have a history of trauma may have difficulties with maintaining attention, remembering and recalling information, and regulating their emotions (Malarbi et al., 2017; Perfect et al., 2016). They may also exhibit various externalizing behaviors such as aggression, hyperactivity, or other disruptive behaviors (Perfect et al., 2016). As such, it is important to use a trauma-informed approach and consider the child and family's potential trauma history, when considering an ADHD diagnosis (Thomas et al., 2019). Lastly, medical conditions and medications may have ADHD-like side effects (APA, 2013). Conditions such as difficulty with hearing or vision, hypoglycemia, thyroid dysfunction, sleep disorders, side-effects from various medications, and many more could result in difficulties with inattention, hyperactivity, or disruptive behavior (Álvarez-Pedrerol et al., 2007; Katz & D'Ambrosio, 2010). As such, a thorough medical exam should always be conducted before diagnosing ADHD. Overall, there are many conditions and circumstances that can look like ADHD, and these should be considered and ruled out when pursuing an ADHD diagnosis.

Gender

There are several sex differences in ADHD presentation and in how symptoms may be perceived by adults. Importantly, these differences often lead to girls being underdiagnosed compared to boys with ADHD (Mowlem et al., 2019). Compared to boys, girls may be less impulsive, present with fewer externalizing symptoms and disruptive behaviors, and may be more likely to present with the primarily inattentive presentation of ADHD (APA, 2013; Gershon & Gershon, 2002; Hasson & Fine, 2012). Notably, the fewer externalizing symptoms, particularly lower levels of aggressive and/or defiant behavior compared to boys with ADHD may lead to girls being less likely to be referred for assessment (DuPaul & Jimmerson, 2014). Similarly, some research suggests that parents might under-rate ADHD symptoms in girls but over-rate symptoms in boys compared to objective assessments (Mowlem et al., 2019). As a result, girls with ADHD are often "missed" in childhood and are more likely to self-refer for a diagnosis later in life (Williamson & Johnston, 2015). These, among other reasons, may contribute to why boys are twice as likely as girls to have an ADHD diagnosis in childhood, but that prevalence rates in adulthood are closer to 1.6:1 (APA, 2013). Therefore, when considering an ADHD diagnosis in girls, it is important to be mindful that girls may present with less disruptive behaviors and that adults may under-rate symptoms in girls compared to boys.

Furthermore, girls with ADHD may also present with more internalizing issues, difficulties with moods and emotions, and a higher risk of suicide and self-harm compared to boys with ADHD or girls without ADHD (Gershon & Gershon, 2002; Hinshaw et al., 2012; Meza et al., 2020). As discussed earlier, internalizing issues, such as anxiety and depression, are highly comorbid with ADHD, but can also "mimic" ADHD symptomology. As a result, when working with girls, it may be particularly important to determine if ADHD is underlining the internalizing issues or if the internalizing issues are resulting in ADHD-like symptoms (Meza et al., 2020).

Cultural and Family Norms

Conducting an assessment requires the examiner to take into consideration the unique diversity and cultural factors of each family. One's culture influences their customs, norms, values, and belief systems as well as how they understand, interpret, and respond to others. Further, it impacts how a person defines ill physical health, wellbeing, and mental illness including how it's supported (Alarcon, 2009). Therefore, culture is often bound to the clinical concerns presented, and thus needs to be taken into consideration (Ecklund & Johnson, 2007).

When working with a client from a diverse or cultural background, the examiner must first be aware of the family or cultural norms. Cultural diversity within these norms may include factors such as language, race/ethnicity, gender, physical ability, socioeconomic status (SES), age, religion/spirituality, subcultural identification, sexual orientation, or education (to name a few; APA, 2013; Ecklund & Johnson, 2007). By acknowledging and understanding these factors, an examiner can gather more rich and meaningful information about their client's cultural background, the role culture plays in the referral for an assessment, and the effect cultural may have on their working relationship (APA, 2013; Ecklund & Johnson, 2007). Further, expressing interest and commitment to incorporating one's culture into the assessment process has implications for rapport with the child and their family (Ecklund & Johnson, 2007), diagnostic understanding, tailored recommendations based on family's access to resources, treatment adherence, and intervention outcomes (Acle et al., 2021; Alarcón, 2009).

Specific to ADHD, understanding the family's attitude toward a diagnosis is crucial for ensuring positive treatment outcomes (Acle et al., 2021). Asking what are the attitudes toward an ADHD diagnosis in that culture (Lee, 2014)? Is there a strong knowledge basis on what ADHD is and how one can support children with ADHD? Pham et al. (2010) analyzed ethnic differences in parental beliefs of ADHD and reported no significant differences in how ADHD was viewed by parents or the acceptability of medication as a treatment of ADHD, but that ethnic minority parents support behavioral treatments more than Caucasian parents. Although this research includes intervention planning post-assessment, it is important the examiner is aware of differing perceptions on ADHD assessment and treatment to ensure their diverse needs and perceptions are incorporated.

A way to increase awareness of cultural diversity is through asking questions and reflecting. Although an examiner cannot know of every possible cultural norm or diverse family factor, it is imperative that they gather sufficient information related to these to ensure the assessment is culturally responsive. See Table 29.3 for reflections on diverse and cultural considerations.

Adolescent Assessment

Working with adolescents can be quite different from working with children. Adolescents are establishing their identities, becoming more cognitively mature, and gaining more independence (Eccleston et al., 2019). Some adolescents may self-refer for assessment and want to seek help, while others may be metaphorically dragged into the room and be unwilling participants in the process (Williamson & Johnston, 2015). It is important to recognize an adolescent's capacity for independence and self-advocacy and to have the adolescent play an active and engaged role in all steps of the process (Eccleston et al., 2019; Srinath et al., 2019). In this regard, establishing rapport may be particularly important for this age group. Additionally, important conversations should take place around the limits of confidentiality, what information will be shared and to who, and the level of involvement from parents. Parent reports can be very helpful when assessing for ADHD in adolescents; however, the age of the adolescent and the nature of the parent-child relationship should be considered when determining parental involvement (Eccleston et al., 2019; Sibley et al., 2012; Srinath et al., 2019). As the adolescent is still considered a minor, parent involvement is required; however, considering the adolescent's preference for parent involvement can help build rapport between them and the clinician.

Adolescents can be a great source of information and insight into themselves (Jones et al., 2019; Robinson et al., 2019). However, observer reports from parents and teachers, where possible, can still be a valuable resource, particularly for externalizing behaviors. When it comes to internalizing behaviors and problems, such as depression or suicidal thoughts, adolescents often have better insight and report more problems compared to parents' reports (Jones et al., 2019; Robinson et al., 2019). Furthermore, adolescents may report their risky behaviors such as alcohol and illicit drug use more than parents, as parents often underestimate or are not aware of their child's use (Robinson et al., 2019).

Table 29.3 Reflective questions for cultural and diversity considerations

Considerations with diverse populations	Sample questions for reflection
Type of culture and diagnoses	Based on the cultural point of view, will the individual see the diagnosis as beneficial or harmful (Dana, 2005)?
Understanding of the source of illness	Are illnesses viewed as spiritual causes (Whittaker et al., 2005)?
Expressing emotion	Is it acceptable in the family's culture to directly convey information and express emotions openly, or is it only acceptable to infer information and withhold emotional expression (Guerra et al., 2011)? If a child is withholding expression, is this a sign of a potential impairment or is this a common behavior within the culture/family (Guerra et al., 2011)?
Familial goals related to short- and long-term orientation and their view of time	Do families value short-term or long-term orientations more (e.g., are they focused on the present or the future), and how does this relate to their conceptualization of time? (Brislin et al., 2003; Guerra et al., 2011)
Value of academic achievement	Is academic achievement valued? Further, it is valued more highly than emotional health/well-being and socialization? (Costigan et al., 2010; Turcios-Cotto et al., 2013)
Supports for academic success	What support (if any) does the child receive to promote greater achievement? Does culture influence the types of supports offered?
Westernized curriculum and culture	Performing well academically in a western-based curriculum considered a positive or negative outcome? Has the family accepted, incorporated, or rejected the dominant culture and how might this impact an assessment? Do cultures understand stages of child development differently?
Tolerance for behaviors	How accepted are a child's behaviors in, for example, the family structure (Guerra et al., 2011)? Are the child's behaviors seen as normal in their native culture but deviant in an alternative culture?
Family structure and gender roles	Who cares for the child and what are the expectations for the child?
Children's strengths and weaknesses	How do parents and/or caregivers attribute their child's strengths and weaknesses? Do they see a weakness in mathematics as a result of lack of effort, or do they view it as a potential neurological disability?
Beliefs about ADHD diagnosis	What are the attitudes toward an ADHD diagnosis in that culture (Lee, 2014)? Is there a strong knowledge basis on what ADHD is and how one can support children with ADHD?

However, parent and teacher reports may be better for externalizing behaviors, such as ADHD symptomatology (Hartung et al., 2005; Sibley et al., 2012). Adolescents with ADHD often underestimate their externalizing symptoms (i.e., hyperactivity and view themselves to be similar to their peers (Sibley et al., 2012). On the other hand, parent and teacher reports are more likely to be comparable and often report higher levels of ADHD symptoms (Sibley et al., 2012). Unfortunately, obtaining teacher reports may be more difficult in adolescence compared to childhood, as adolescents tend to have multiple teachers who instruct a large number of students (Sibley et al., 2012; Wolraich et al., 2019), potentially reducing the amount of detailed information a teacher can provide on a specific student. As such, it may be helpful to obtain teacher reports from at least two teachers when working with an adolescent (Sibley et al., 2012; Wolraich et al., 2019), ideally from a teacher of a subject in which the student is doing well and one from a teacher of a subject in which the student struggles. Overall, self-report from the adolescent and reports from parents and teachers are valuable when assessing for ADHD in adolescents.

When assessing for ADHD in adolescents, it is also important to recognize that the presentation of ADHD symptoms changes with age. Symptoms of ADHD may be the most intense in childhood or around puberty, after which symptoms may decline or present differently (APA, 2013; Murray et al., 2019). For example, instead of running around or leaving one's seat in class, adolescents may instead fidget or feel restless and impatient (APA, 2013). Accordingly, the threshold to meet ADHD criteria in the DSM-5 is reduced by one symptom count in adulthood to account for the change in ADHD symptoms (APA, 2013). As such, when working with an older adolescent, one should consider if the adolescent's ADHD symptoms are elevated compared to peers their age and if their symptoms may be closer to adult criteria (Sibley et al., 2012). Finally, when working with adolescents, it is still important to establish that the symptoms were present in childhood before the diagnostic age cut-off (for DSM-5, this cut-off age is currently 12 years; APA, 2013).

Lastly, it is important to consider that adolescents may engage in more risky behaviors compared to children. Adolescents with ADHD are more likely to engage in risky decision-making and are at a higher risk for risky sexual behavior, substance abuse, reckless driving, self-harm, and suicidal behavior (Dekkers et al., 2016; Groenman et al., 2017; Hinshaw et al., 2012; Rokeach & Wiener, 2014; Vaa, 2014). Although these behaviors are not exclusive to youth with ADHD, some researchers argue that adolescents who exhibit these behaviors should be screened for ADHD due to the high degree of association (Ward & Curran, 2021). Furthermore, the effects of substances like cannabis can lead to ADHD-like signs and symptoms, thereby adding a new consideration for conditions that can mimic ADHD in adolescence (Wolraich et al., 2019). Overall, it is important to be aware of risky behavior when working with adolescents, especially when considering an ADHD diagnosis.

Conclusion

Together, it is apparent that conducting an assessment for ADHD can be a time-intensive and challenging task. It is necessary to understand many components of a child or adolescent's functioning to determine whether their behavior fits within the criteria for ADHD. More specifically, it is necessary to have a detailed family background (usually obtained through interviews), as well as an understanding of the individual's educational and developmental history. Cognitive (intelligence) testing can help clarify areas of strength and weakness and begin to identify areas in need of intervention. Additionally, the presence of ADHD behaviors (e.g., inattention, hyperactivity, and impulsivity) in two or more settings is critical, hence the need to gain insights from both the school and home environments. It is necessary to ensure appropriate rule-in/rule-out of other disorders or conditions that may mimic ADHD so as to ensure diagnostic accuracy. Finally, it is critical to use not only data-based decision-making in evaluating the results of an assessment but also incorporating clinical reasoning skills, especially as they relate to understanding other factors that may impact functioning. While a thorough ADHD assessment may sometimes be time- and labor-intensive, it is necessary to gain a full understanding of a child's abilities and to ensure that a targeted intervention plan can be put in place.

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Early Intensive Behavioral Intervention for Autism Spectrum Disorder

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Early Intensive Behavioral Intervention (EIBI) is sometimes referred to as early behavioral intervention or the Lovaas Model (Green, 1996; Leaf & McEachin, 2016). Regardless of the label, EIBI is an evidence-based and comprehensive treatment for autism spectrum disorder (ASD; Anderson et al., 1987; Birnbrauer & Leach, 1993; Eikeseth et al., 2002; Lovaas, 1987; Sallows & Graupner, 2005; Smith et al., 2000). EIBI is a comprehensive treatment package that utilizes the principles of Applied Behavior Analysis (ABA) to teach a breadth of skills to young children diagnosed with ASD (Reichow et al., 2018). There has been a plethora of research that has evaluated the effect of EIBI (Anderson et al., 1987; Cohen et al., 2006; Eikeseth et al., 2002; Fenske et al., 1985; Kuppens & Onghena, 2012; Lovaas, 1987; McEachin et al., 1993). Despite the myriad of literature published on EIBI, several misconceptions exist (Leaf & McEachin, 2016).

EIBI targets skill development in the areas of communication skills, play skills, social skills, executive functioning skills, and cognitive skills (Eldevik et al., 2009; Howard et al., 2005; Lovaas, 1987; Reichow et al., 2018). EIBI is commonly implemented by highly trained professionals and is individualized to the child by identifying child-specific skill deficits and then breaking down each skill into smaller behavioral units that are achievable for the child (Lovaas, 1987; McEachin et al., 1993; Reichow et al., 2018). Finally, in order to increase learning opportunities and promote generalization of the skills taught, parents/caregivers are trained to carry out EIBI procedures (Larsson, 2003; Lovaas, 1981). It has been concluded that EIBI is most effective when treatment occurs as early as possible (i.e., before the age of four years old) and at a high intensity (i.e., averaging 25–40 h per week; Cohen et al., 2006; Eldevik et al., 2006, 2019; Fenske et al., 1985; Peters-Scheffer et al., 2010).

The purpose of the chapter is to provide a comprehensive review of EIBI. To help outline the evolution of EIBI and resolve misinterpretations, this chapter will afford an overview of the history of EIBI and discuss important seminal articles, as well as contemporary outcomes associated with EIBI. To guide parents and practitioners in practice, this chapter will thoroughly describe the defin-

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ing characteristics of EIBI, components, and methodologies of treatment plans, domains of intervention, and implications for the best outcome. Finally, the chapter will identify populations that benefitted from EIBI.

The History of EIBI

Foundations in Behavioral Science

Principles of EIBI programs are rooted in the science of behavior analysis, and therefore a thorough discussion of EIBI and its history requires a preface to the history of ABA. ABA is the science of behavior, which uses behavioral principles to make effective and socially meaningful changes in the behavior of individuals (Baer et al., 1968; Wolf, 1978). ABA is rooted in the experimental analysis of behavior, with seminal studies evaluating the effect of respondent and operant conditioning on behavior (Jones, 1924; Pavlov, 1927; Watson & Rayner, 1920).

Early studies in behavior analysis discovered what are now known as the principles of behavior (e.g., reinforcement, punishment, and extinction). Later, a series of applied studies were published by pioneers of behavior analysis (Allen et al., 1964; Ayllon, 1963; Ayllon & Azrin, 1965; Ayllon & Haughton, 1962; Baer, 1960, 1961, 1962; Bijou, 1955, 1957, 1958; Isaacs et al., 1960; Lindsley, 1956; Williams, 1959; Wolf et al., 1963) which evaluated the applicability of behavioral principles such as reinforcement, punishment, and extinction to human behavior. For example, Williams (1959) successfully decreased the tantrum behavior of a 21-month-old child. Treatment took place in the child's home during his bedtime routine. Williams (1959) trained the parents to implement extinction by instructing the parents to place the child in his bedroom and to not reenter the room, even if the child engaged in a tantrum. By the tenth instance, the child no longer engaged in tantrums, whined, or cried when he was put to bed. The tantrum behavior spontaneously recovered about a week later but was then extinguished and maintained at zero levels in a two-year follow-up.

Isaacs et al. (1960) used positive reinforcement to increase vocal verbal behavior in one adult diagnosed with schizophrenia and another diagnosed with mutism. Reinforcement in the form of the delivery of gum was provided for behavioral approximations of vocal verbal behavior. Vocal verbal behavior increased for both participants following the implementation of treatment.

Instigated by these seminal applied studies, behavior analysis was first coined as an applied science (i.e., ABA) in 1968 when Baer and colleagues asserted that behavior analysis should target behaviors of interest to society and look at variables that restrain or improve socially important behaviors. Following the publication of Baer et al. (1968) the science of applied behavior analysis was formed, ABA's flagship journal, *The Journal of Applied Behavior Analysis* was created, Skinner began to discuss behaviorism as the philosophy of the science of human behavior (Skinner, 1974), behavioral principles were utilized to promote education (O'Leary & O'Leary, 1977) and the seminal studies on EIBI were completed (i.e., Lovaas, 1987; Lovaas et al., 1973).

Comprehensive ABA-Based Intervention: The Young Autism Project

EIBI was pioneered by the work completed in the UCLA Young Autism Project (YAP; Lovaas, 1977; Lovaas et al., 1973), which was designed to help children with ASD develop socially important language and social skills and replace behavioral excesses (e.g., aggression, self-injury, and stereotyped behavior) with more functional behaviors (e.g., requesting; Leaf & McEachin, 2008). Lovaas et al. (1973) completed a long-term follow-up study that evaluated the effect of a comprehensive ABA intervention on the development of prosocial behaviors (i.e., language, social skills, play skills, executive functioning skills, and cognitive skills) and the reduction of restricted and repetitive behaviors (e.g., stereotypy, aggression, and self-injurious behavior) for 20 children diagnosed with ASD between the ages of three and 10 years old. Lovaas et al. (1973) utilized behavioral principles and ABA procedures such as reinforcement, discrete trial training, shaping, punishment, extinction, and chaining. Assessment and response measures demonstrated substantial decreases in challenging behavior with improvements in prosocial behavior. However, in subsequent follow-up measures which were conducted up to four years following intervention, the participants' maintenance of skills varied largely across participants.

In 1987, Lovaas completed another seminal study that evaluated the effect of EIBI on children diagnosed with ASD. Participants included 38 children under the age of four years old, which were diagnosed with ASD. Participants were quasi-randomly assigned to one of two groups. Nineteen participants were assigned to an EIBI test group which received an average of 40 h of ABA intervention per week. Another 19 participants were assigned to a non-intensive model and received an average of 10 h or less per week of ABA intervention mixed with eclectic approaches. Intervention was employed across groups for a minimum of two years and occurred in the home, clinic, and community settings. Following the intervention, the participants were independently evaluated. An outcome score was assigned to each child based upon their intelligence quotient (IQ), school placement, and diagnosis at the end of treatment. Scores included poor, fair, and best outcomes. Participants who achieved the highest results were categorized as reaching the best outcome, meaning they scored within normal range IQ, attended general education classrooms without support, and presented as indistinguishable from their peers (i.e., did not present with behaviors or characteristics of autism). Participants who demonstrated fair outcomes were categorized as aphasic, and participants who met poor outcomes were categorized as autistic. Of the 19 participants in the intensive ABA group, 2 participants met poor outcomes (i.e., 10%), 8 participants met fair outcomes (i.e., 42%), and 9 participants achieved best outcomes (i.e., 47%). The results of the control groups were not as promising. Of participants in the non-intensive and eclectic group, 11 of the children achieved poor outcomes (i.e., 58%). The other eight children achieved fair outcomes (i.e., 42%), and none of the participants achieved the best outcome (i.e., 0%). With this study, Lovaas (1987) provided the first demonstration of the promising outcomes EIBI can achieve.

Early Replications

To further evaluate the effect of EIBI, Anderson et al. (1987) completed a partial replication of Lovaas (1987) in a study that included 14 children, 65 months or younger. Participants received a less intensive model of the Lovaas (1987) intervention, receiving an average of 20 h per week of ABA. Five of these hours were allocated to parent training, and intervention was provided between one and two years. Additionally, instead of treatment occurring across a variety of settings (as in Lovaas, 1987) treatment occurred only in the home. Data demonstrated that four of the 14 participants achieved an IQ score of over 80. Additionally, these four participants were successful in a general education classroom but required some support. Many other replications followed, which demonstrated the effectiveness of EIBI (Birnbrauer & Leach, 1993; Eikeseth et al., 2002; McEachin et al., 1993; Sallows & Graupner, 2005; Smith et al., 1997, 2000).

For example, Birnbrauer and Leach (1993) observed IQ improvements in four out of nine of their participants after the participants received 19 h per week of EIBI for 1.5–2 years. However, the less intensive intervention model did not target all skill areas and as a result, the participants displayed limited play skills and engaged in self-stimulatory behavior. In replications that more closely resembled the intensity of the Lovaas (1987) model, Smith et al. (2000) provided participants with 25 h per week of EIBI for 33 months and Eikeseth et al. (2002) provided participants with 28 h per week of EIBI for one year. Smith et al. (2000) and Eikeseth et al. (2002) reported an improved IQ score of over 85 or greater in 26% and 54% of participants, respectively. Additionally, the 26% and 54% of participants that showed improvements in IQ scores were all successful in the general education classroom, with some support or no support at all.

Studies have also evaluated the impact of EIBI on participants with varying baseline IQ scores (Harris et al., 1991; Smith et al., 1997). The results of a review completed by Harris and colleagues (1991) showed increases in IQ scores and language assessment scores for nine participants with baseline IQ scores of 70 or above, and who were all under the age of 62 months. Whereas Smith et al. (1997) evaluated the effect of EIBI for participants with lower mean IQ scores in baseline and who were diagnosed with intellectual disabilities. Data indicated increased participant IQ scores following 30 h of EIBI for two or more years. The results of Harris et al. (1991) and Smith et al. (1997) suggested promising outcomes following EIBI across participants with varying IQs at the onset of treatment.

McEachin et al. (1993) provided an evaluation of the long-term outcomes associated with EIBI (i.e., follow-up on the Lovaas, 1987 study). McEachin et al. (1993) examined participant IQ measures and outcome categorization (as defined in Lovaas, 1987) on six-year follow-up assessments. An intensive EIBI test group was compared to a non-intensive and eclectic treatment control group. Follow-up measures indicated significantly greater IQ increases in the EIBI group compared to the control group. Eight of the nine participants in the EIBI group also maintained the best outcome categorization. Following the publication of studies such as those completed by Harris et al. (1991), Eikeseth et al. (2002), and McEachin et al. (1993), a breadth of research on the efficacy and long-term outcomes of EIBI for individuals with ASD was completed (Cohen et al., 2006; Eldevik et al., 2006; Healy & Lydon, 2013; Kuppens & Onghena, 2012; Lechago & Carr, 2008; Peters-Scheffer et al., 2010).

Critiques and Clarifications: Evolution of Practice Across the Model

Lovaas' body of work has often been interpreted as a prescriptive and standardized approach, wherein all children receive 40 h of discrete trial teaching in a restrictive setting (Leaf & McEachin, 2016). However, the minimum weekly hours of intervention administered within the Lovaas model were determined based on the child's progress (Eikeseth, 2001; Leaf & McEachin, 2016). While the intensive treatment group received an average of 40 h, some children received a minimum of 20 h weekly (Leaf & McEachin, 2008, 2016). Parents were trained in the therapist role and treatment was flexible and relied on reinforcement and the clinical judgment of highly trained therapists and parents (Eikeseth, 2001; Leaf et al., 2021; Leaf & McEachin, 2008, 2016). Additionally, to promote generalization as the child progressed, treatment was transferred from the one-to-one format to the group instruction format, and treatment was conducted across a variety of settings, some that imposed natural distractions (Leaf & McEachin, 2008, 2016). Treatment occurred at home, at school, and within the community and targeted the development of language skills, self-help skills, social skills, and play skills (Leaf & McEachin, 2008). Today, there have been many applications of the "Lovaas Model" (Leaf & McEachin, 2016). However, due to the complexity of the Lovaas model, modifications are commonly made, and exact replications have rarely occurred (Leaf et al., 2021; Leaf & McEachin, 2008, 2016).

Associated Methodologies and Treatment Components of EIBI

Because applications and models of EIBI vary, based on the evolution of practice and interpretations of procedure in replication, it is useful to identify critical components and conceptual underpinnings of practice categorized as EIBI. To support this aim, the following sections identify key dimensions of the theoretical underpinnings of EIBI (i.e., Applied Behavior Analysis), common teaching procedures represented in the literature (as well as a critique of the specificity of those representations and interpretations), and critical characteristics of successful EIBI programs.

Defining Dimensions of Applied Behavior Analysis

In their seminal work in 1968, Baer and colleagues outlined key defining dimensions of ABA. These are applicable to the study of early and intensive behavioral intervention, and the framework offered by Baer, Wolf, and Risley is particularly important in providing an overview of outcomes within the literature. This is because, as highlighted by Lechago and Carr (2008), not all literature demonstrating the efficacy of ABA-based interventions is sufficiently procedural to make easy analysis of which articles should or shouldn't be included in a review of the evidence base. Rather, by using a set of defining dimensions, the reader is able to make a determination whether a given set of procedures belongs within the "ABA-based" literature base.

Of note, the title of these seminal works includes the words "some" and "current." By titling the work "Some Current Dimensions…," the dimensions offered here may be interpreted as inexhaustive, as well as unapologetically temporal. That is to say, these dimensions may be interpreted, as all scientific premises are, as applicable as best knowledge at the time of publication, and fully acknowledged to be subject to the same course of continuously evolving study that applies to all works of science. It is therefore appropriate to both hold these dimensions as seminal, while also holding space for shaping philosophy and procedure over time, in order to fully serve the populations that stand to benefit from (or be made further vulnerable by) its application. In this spirit of philosophic doubt, the following evolutions, frameworks, and procedures that follow are balanced gently with established critiques, clarifications, and recommendations for future focus.

The dimensions offered by Baer, Wolf, and Risley (1968) include applied, behavioral, analytic, technological, conceptually systematic, effective, and generalizable. Applied refers to selection of a target problem that is of social significance. Behavior encompasses anything an organism does that is observable, measurable, and objectively defined. Analytic refers to the ability to demonstrate experimental control between a dependent variable (or in the case of EIBI programs, a procedure or intervention) and an independent variable (to be discussed below). Technology indicates that procedures are written with precision, such that a reasonably trained professional would be able to replicate the procedure with fidelity. Conceptually systematic is a dimension that requires interventions used to align with the science of behavior analysis. Procedures must effectively lead to the intended outcomes in order to demonstrate efficacy. Generality indicates a learned repertoire is durable across multiple exemplars of settings/routines, people, and materials.

A Further Dimension: Social Validity

In a further extension of this work, Wolf (1978) makes the case for incorporating social validity measures as part of common practice of research in ABA. That is, procedures should be rated as acceptable and meaningful to the various stakeholders involved in the intervention, most notably the client receiving direct services. Articles have since been produced (Ferguson et al., 2019; Kennedy, 1992; Schwartz & Baer, 1991) that discuss the extent to which this aim has been accomplished, and where the field has underdelivered on Wolf's vision. While beyond the scope of this chapter, it is notable that social validity is not a consistent independent variable reported in many of the excellent articles referenced throughout. Especially within current common funding contingencies (e.g., the medical model of care, funded by insurance plans), consumer preference is a key component to secure ongoing legislative support of and funding for autism treatment. Additionally, literature shows that treatments that are highly accepted by patients result in improved treatment adherence and in improved health outcomes overall (Martin et al., 2005). Therefore, social validity is a critically important aim of applied treatments such as ABA-based treatments for ASD, including EIBI.

Toward Procedural Descriptions of Program Components

As discussed, some outcome studies in EIBI literature have been inconsistent in technological description of independent variables of the study. This becomes problematic conceptually, as ABA is in part defined via technological description (Baer et al., 1968). This is also problematic practically, presenting challenges to high-integrity replication and directive interpretation.

In their 2008 review of available EIBI outcome studies, Lechago and Carr offer a critique of the level of procedural specificity offered in much of the literature up to that point. They identified that critical components were presented in much of the seminal literature without sufficient detail for replication. In this evaluation, they viewed both components of the treatment package and a specific view of curricular targets as independent variables in the reviewed studies. They found that authors of both the original Lovaas studies (1973, 1987) and subsequent replications provided summary information regarding these variables, positing that this may have been in the interest of a concise manuscript, but resulting in outcomes that may be ultimately difficult to interpret or further replicate. Particularly relevant to the evolution of Lovaas' practices over his decades of publishing, a detailed account of the procedure at each point of inflection is useful for accurate replication and effective dissemination.

Lechago and Carr (2008) highlighted the following as areas of particular interest. First were variables related to the treatment team (both the behavior analysts as well as the direct interventionists). These variables included the background of the treatment team members, training of the treatment team members, how long they had been working in the field, and the frequency of interactions between members of the treatment team and caregivers. Additionally, caregiver involvement was positively correlated with outcomes.

After the demographic, educational, and involvement level of the treatment team, Lechago and Carr (2008) explored the methodologies of the treatment provided. They included in their list of potential treatment components: ratio of discrete trials to naturalistic teaching components, consequence procedures, trial arrangements, prompting procedures, and maintenance, generalization, and data collection protocols. This chapter offers a brief overview of several of these components in order to orient the reader to common applications of EIBI procedures, because without details of the precise procedures (and modifications of those procedures), studies written then (Lovaas, 1987) and since have potentially resulted in piecemeal replication, wherein researchers cobble together strategies from multiple successful case descriptions and combine them in new ways. While this may be an effective strategy for continuously testing, innovating, and evaluating practice, it poses a challenge in making statements about overall outcomes of EIBI treatment. This is because, based on similarly described outcomes within group design research, it is difficult to determine the extent to which any given study was truly replicated by the next. A notable exception to this critique was Green and colleagues' work (2002), which was described in detail in the manuscript; however, due to the study design (i.e., single subject), Lechago and Carr recommend a cautious interpretation. Therefore, the critique still stands that few group designs present the necessary information on independent variables necessary to generate full external support for the outcomes and claims made. Mindful of and in response to this critique, the following treatment components are outlined to orient the reader to potential independent variables common to EIBI studies. Additional variables related to overall program characteristics, such as treatment intensity and duration, are outlined further in the chapter.

Commonly Used Evidence-Based Practices in EIBI

A helpful orientation to commonly used procedures is provided by Leaf et al. (2018). In this chapter, the authors provide a summary of commonly used ABA-based procedures: discrete trial teaching (Lovaas, 1981, 1987), prompting (Grow & LeBlanc, 2013; MacDuff et al., 2001), incidental teaching (Hart & Risley, 1968, 1975), token economies (Ayllon & Azrin, 1965; Charlop-Christy & Haymes, 1998), differential reinforcement (Vladescu & Kodak, 2010), response cost (Phillips et al., 1971), time out (Donaldson & Vollmer, 2011), shaping (Ricciardi et al., 2006), behavioral skills training (Parsons et al., 2012), functional analysis (Iwata et al., 1982, 1994), functional communication training (Carr & Durand, 1985), and chaining (Spooner & Spooner, 1984). In the section that follows, select strategies are briefly described. This is not intended to be an exhaustive list of methodology, nor is it intended to be a detailed training resource for implementation, but rather an introductory resource of techniques that are conceptually systematic to a behavior analytic framework of instruction and commonly incorporated into EIBI programs.

Discrete Trial Teaching Discrete Trial Teaching (DTT; Lovaas, 1981, 1987) is one of the most common teaching methodologies within EIBI programs (Leaf et al., 2018). In DTT, complex skills are broken down into smaller teaching steps. The key components of a discrete trial include a discriminative stimulus (i.e., a cue from the instructor that indicates reinforcement is available following a given response), a response (i.e., a behavior emitted by the child, in response to the discriminative stimulus), and a contingent consequence (i.e., a stimulus, referred to in behavior analytic literature as a reinforcer or punisher, intended to increase or decrease the future likelihood of the emitted response). DTT is typically a highly structured method of teaching and is directed by the instructor. A common critique of DTT is that it may lead to rote or inflexible responding that is tightly controlled by a very specific set of contingencies that mimic the original stimulus situation (Luiselli et al., 2008), and therefore, special care for establishing generality is important when teaching with this methodology. In order to establish generality, discrete trial teaching programs typically include specific teaching steps to incorporate additional materials, instructors, and teaching settings, in order to improve the likelihood of the learner emitting the repertoire in novel and naturalistic settings.

Incidental Teaching/Natural Environment Teaching Another common strategy described by Leaf et al. (2018), this approach developed to teach naturalistic language and play skills goes by multiple names, so a description of core components is useful. Incidental teaching requires that the environment be arranged in a way to encourage responding (i.e., manipulation of motivating operations), an initiation by the child, an elaboration or expanded model by the instructor, and reinforcement for attempted responding (McGee et al., 1999). As an example, an instructor may reserve highly preferred toys for teaching expanded play repertoires (i.e., environment); as the child reaches for the toy train (i.e., initiation), the instructor models train sounds (i.e., elaboration), and the child imitates the instructor; the instructor then allows the child to take a turn with the toy train (reinforcement). A distinction between the first two procedures described (DTT and incidental teaching) is the nature of the reinforcer, which in the second procedure is integral to the play activity itself; that is, the teaching materials (or the instructor's playful or expanded manipulation of the materials) also serve as the reinforcers. This method of teaching is inherently more child-led or may be described as incorporating shared control between the instructor and child. This method also potentially leads to more efficient generalization of repertoires and may be more acceptable to caregivers, as the procedures mimic naturalistic routines more closely than DTT. It is important, however, that each client's needs be assessed in order to determine under which contingencies they are able to best attend and respond to teaching interactions.

Differential Reinforcement Differential reinforcement may be defined as providing reinforcement for one [desired or target] behavior or response, while withholding reinforcement for a response targeted for reduction (Cooper et al., 2019); alternatively, differential reinforcement may be used to define a procedure wherein the highest quality reinforcement is reserved for higher quality responses (i.e., independent, correct responses), and a lower potency reinforcing stimulus is delivered for more prompted responses. Differential reinforcement is used across multiple applications, with the most common being differential reinforcement of an alternative behavior (DRA) and differential reinforcement of other behavior (DRO) (Chowdhury & Benson, 2011).

Differential Reinforcement of Alternative Behavior (DRA) DRA is a procedure wherein the instructor delivers reinforcement contingent upon emitting a prescribed behavior, identified as an alternative to a challenging behavior targeted for reduction (Deitz & Repp, 1983). A common application of DRA is functional communication training (outlined below), in which the alternative response is a communication response that is functionally equivalent to the challenging behavior. However, this approach does not dictate that the alternative approach be a functionally equivalent communicative response. For example, a child may be taught to select another toy to play with when denied access to a preferred activity (e.g., when a friend is using a desired toy), in place of engaging in aggressive behavior. In this case, the instructor would provide reinforcement contingent upon the desired replacement behavior (i.e., choosing a different toy).

Differential Reinforcement of Other Behavior (DRO) Another common procedure is DRO or differential reinforcement of other behavior. This procedure involves providing reinforcement contingent upon the absence of the challenging behavior that has been targeted for reduction (Reynolds, 1961; Weiher & Harman, 1975). This procedure may include providing reinforcement on an interval schedule, where a child receives reinforcement for engaging in any behavior other than the problem behavior targeted for reduction. For this reason, this procedure is somewhat of a broad category. In the absence of the specific challenging behavior targeted for reduction, the child may engage in any other behavior and still contact reinforcement. This is typically used when a challenging behavior is very severe. For example, if a child engages in aggression toward peers, they may receive reinforcement for any interval in which they do not engage in aggression, even if the behaviors they emit during that interval are less than desirable (e.g., swearing).

DRO has been shown to be highly effective in the literature as a procedure for reducing challenging behavior (Repp et al., 1976; Homer & Peterson, 1980; Conyers et al., 2003; Jessel et al., 2016). Notably, however, this is not a procedure that teaches an adaptive alternative to meet a functional need. The premise of behavioral interventions is built upon the functions of behavior (socially mediated positive or negative reinforcement, automatic reinforcement); that is to say, organisms engage in responses to their environment in order to meet a need. These needs may include the need for attention, tangible items/activities, escape from aversive stimuli, or automatic reinforcement (also referenced as sensory input and pain attenuation). Because DRO does not teach a replacement behavior to help a child meet these needs, challenging behavior may reemerge, especially when predictable DRO contingencies are not in place (i.e., unplanned/unavoidable variation of the schedule, thinning a schedule of reinforcement too quickly, inconsistent reinforcement). For this reason, teaching a specific alternative behavior to replace the challenging behavior (DRA) is often a preferred approach. In some instances, both procedures may be implemented within a single program; a child will contact reinforcement for the absence of challenging behavior, as well as high potency reinforcement for use of alternative responses.

Prompting

Prompting is a procedure wherein the instructor delivers assistance to increase correct responses from the learner. There are many antecedent modifications and actions that constitute prompting. Examples include gesturing to the correct response (Soluaga et al., 2008), providing a verbal model of the correct response (Leaf et al., 2010), physically assisting the child in completing a correct response (Leaf et al., 2010), positioning the correct response closer to the learner (Soluaga et al., 2008).

Leaf et al. (2018) point out that a key challenge in successful prompting procedures is related to clinical judgment; that is, implementers benefit from a structured approach to prompt delivery and prompt fading. A common approach is to structure available prompts into a hierarchy, either organized as least-to-most intrusive or most-to-least intrusive. Selection of the hierarchy (least-to-most versus most-to-least) depends upon the needs, strengths, and assent of the child. Several studies have demonstrated effects of learning efficiency with both approaches; similarly, research approaches differ in a rigid versus flexible approach to implementing prompting procedures (i.e., structured as strict rules or flexible guidelines).

Extinction

Extinction is a procedure in which a given reinforcer is withheld in response to challenging behaviors that have historically resulted in the delivery of that stimulus (Lerman et al., 1996). This procedure allows the child to establish a maintaining consequence (i.e., learning history) with new, more appropriate, and/or adaptive responses. For example, a client may receive caregiver attention by initiating a communicative response, rather than engaging in harmful challenging behavior that would otherwise draw the caregiver’s attention.

Recent literature has recommended ethical considerations to be weighed when choosing whether or not to implement extinction (Geiger et al., 2010; Rajaraman et al., 2021). While much of the current body of literature demonstrates that extinction procedures are highly effective at reducing challenging behavior, emerging literature has also demonstrated that challenging behavior may be reduced without extinction procedures (Piazza et al., 1996; Rajaraman et al., 2021; Worsdell et al., 2000). Discussion persists in comparing the potential short-term effects related to efficiency with longer-term effects, particularly those associated with extinction burst and repeated behavioral escalation. Geiger et al. (2010) offered a concise framework for examining the ethics of extinction procedures in their decision model for behavior intervention plans. They guide the behavior analyst to consider whether extinction procedures are ethical, safe, and feasible; they further ask the question of whether the family, client, and environment can tolerate an extinction burst. This is based on conventional literature demonstrating stronger treatment effects when extinction is implemented consistently (Hagopian et al., 1998; Shirley et al., 1997), although emerging literature suggests treatment gains are achievable even with the inconsistent implementation of extinction, so long as a treatment package includes positive reinforcement for functionally equivalent replacement behaviors (Worsdell et al., 2000).

Functional Communication Training Functional communication training (Carr & Durand, 1985) is a procedure aimed at reducing challenging behavior, by teaching a replacement communication response that is functionally equivalent (Carr & Durand, 1985). Functional communication training is often paired with the extinction of the challenging behavior targeted for reduction (Shirley et al., 1997), though emerging literature suggests that extinction may not be necessary to eliminate the challenging behavior, so long as the alternative communicative response contacts reinforcement contingencies (Landa et al., in press; Worsdell et al., 2000). FCT programs typically require differential reinforcement procedures, wherein an independent response results in higher potency reinforcement than a prompted response, in order to quickly increase independent responding while quickly decreasing instances of challenging behavior (Tiger et al., 2008). Additional common features of individualized programming relate to the selection of the communication modality and systematic approaches to thin and generalize reinforcement contingencies. These and other problem-solving approaches are addressed by Tiger et al. (2008). Per Tiger and colleagues, instructors should choose a communication response that can be prompted and quickly acquired; this may indicate choosing a simpler form of communication initially than the client may be able to exhibit when not escalated, to increase the likelihood that the client will select the replacement response rather than engaging in challenging behavior. For example, the client may speak in short utterances throughout the day but may require a prompted symbol exchange initially in order to quickly acquire the replacement response, with lower response effort than engaging in challenging behavior. Tiger and colleagues also recommend that thinning the schedule of reinforcement (initially beginning with a dense 1:1 schedule for each communicative response, and systematically thinning to a more naturalistic, variable schedule of reinforcement) might be well underway before introducing caregivers as communication partners. This work has been expanded in recent years to incorporate an alternative communicative response, a "tolerance response" when mands are not honored (Ghaemmaghami et al., 2016).

The Key Characteristics of an Effective EIBI Program

This myriad of literature identified several important, and perhaps critical components of an EIBI program (Cohen et al., 2006; Eldevik et al., 2006; Kuppens & Onghena, 2012; Peters-Scheffer et al., 2010). Studies examining the effects of EIBI have suggested that EIBI should occur at an early age and before the age of four years old (Cohen et al., 2006; Harris & Handleman, 2000). The intensity of treatment is also an integral component of an EIBI program (Eldevik et al., 2006, 2019; Peters-Scheffer et al., 2010). Finally, EIBI interventions should refrain from using eclectic approaches (Eikeseth et al., 2002; Eldevik et al., 2006; Howard et al., 2005, 2014; Lovaas, 1987; McEachin et al., 1993).

Early Intervention

The onset of behavioral intervention should occur at an early age (Cohen et al., 2006; Fenske et al., 1985; Harris & Handleman, 2000). Several articles have evaluated the effect of age of onset on outcomes for EIBI (Cohen et al., 2006; Eikeseth et al., 2002; Fenske et al., 1985; Granpeesheh et al., 2009; Harris & Handleman, 2000; Kuppens & Onghena, 2012). For example, Fenske et al. (1985) compared outcomes for a group of children who began intervention before 60 months of age to a group of children after 60 months of age. Fenske and colleagues found that earlier onset of intervention was associated with a positive outcome (i.e., the child was able to remain living at home with parent and was enrolled in a full-time public school). Eikeseth et al. (2002) employed a comparison-controlled study which evaluated the effectiveness of an EIBI program for slightly older children (i.e., 4- to 7-year-olds). A group of 13 children who received the intensive intervention was compared to a group of 12 children who received intensive, eclectic treatment (Eikeseth et al., 2002). While behavior intervention is effective for individuals older than four (Eikeseth et al., 2002; Fenske et al., 1985; Lovaas et al., 1973), data demonstrate that outcome gains (e.g., general education placement, increased intellectual functioning, and skill development) decrease the more treatment is delayed (Fenske et al., 1985; Granpeesheh et al., 2009). Additionally, young children may have more neural plasticity than older children (Borman & Fletcher, 1999), as well as less complex learning history which may result in more positive outcomes in response to treatment. Granpeesheh et al. (2009) demonstrated a relationship between the number of treatment hours and the age of the child, suggesting that maximizing the treatment hours before the age of seven might lead to larger treatment gains. Therefore, EIBI should be provided as early as possible.

Intensive Intervention

Studies suggest greater outcomes for individuals diagnosed with ASD with more intensive behavioral intervention (Eldevik et al., 2006, 2019; Peters-Scheffer et al., 2010). Eldevik et al. (2006) retrospectively compared two groups of children that received low-intensity (i.e., 12 h) behavioral treatment. One group received behavioral intervention while the other group received eclectic intervention. Results showed that the behavioral group made larger gains than the eclectic group. However, Eldevik et al. (2006) reported that these gains were minimal when compared to the gains reported in studies that provided a more intensive treatment (i.e., 20–40 h per week; Lovaas, 1987; McEachin et al., 1993; Smith et al., 2000) dosage. In another study, Eldevik et al. (2019) evaluated the effect of EIBI provided in a low-intensity dosage (i.e., 11.1 h per week) compared to EIBI provided in a higher-intensity dosage (i.e., 18.1 h per week). Groups of 21 and 26 children were assigned to each group, respectively. The low-intensity and high-intensity groups were also compared to an additional group of 17 children who received eclectic special education. While the lower-intensity group did better than the special education group on outcome measures on adaptive behavior, ASD severity, and intellectual functioning after one year, the higher-intensity behavioral group performed better than both groups on these same outcome measures. Furthermore, gains in both the low-intensity and higher-intensity groups were less than gains reported in studies that provided a more intensive delivery model.

The National Research Council (2001) recommended a minimum of 25 h per week of EIBI, whereas Green et al. (2002) recommended a dosage of 20–30 h per week. While recommendations regarding dosage differ slightly, most professionals recommend a dosage between 25 and 40 h per week (Cohen et al., 2006; Roane et al., 2016). Additionally, current research provides evidence that a more intensive EIBI dosage yields more promising outcomes (Eldevik et al., 2006, 2019; Peters-Scheffer et al., 2010) and should typically be provided between 25 and 40 h of intervention per week (Reichow et al., 2012, 2018).

Behavioral Approach

An EIBI program that includes elements from diverse intervention approaches lessens the effectiveness of the intervention (Eikeseth et al., 2002; Eldevik et al., 2006; Howard et al., 2005, 2014; Lovaas, 1987; McEachin et al., 1993). Several studies have examined the effect of eclectic approaches on treatment gains (Eikeseth et al., 2002; Howard et al., 2014; Lovaas, 1987; McEachin et al., 1993). In a seminal EIBI study (i.e., Lovaas, 1987), an EIBI test group received non-eclectic ABA-only intervention and was compared to an eclectic and non-intensive treatment group. The EIBI group achieved significantly higher gains than the eclectic group (i.e., 47% and 0% achieved the best outcome, respectively). In a later study completed by Eikeseth et al. (2002) wherein a group of 13 children who received behavioral treatment were compared to a group of 12 children who received an eclectic approach, data showed greater improvements (i.e., improved intellectual functioning and greater skill development) for all 13 children who received behavioral treatment compared to the group of 12 children who had received eclectic intervention. Howard et al. (2014) published similar findings in another comparison of behavior analytic and eclectic early interventions. Therefore, an EIBI program should only use principles and procedures derived from ABA.

Other Factors for Success

Other components have been suggested as critical factors of an EIBI program (Eldevik et al., 2012; Jacobson et al., 1998; Larsson, 2003). While these components have not yet been thoroughly evaluated and further research is needed to understand the importance of these components, many professionals agree that parent involvement, treatment duration, treatment quality, and treatment setting are critical features of an effective EIBI program (Caron et al., 2017; Larsson, 2003; Lovaas, 1981; Moore & Shook, 2001).

Parent Involvement

Parent involvement has been suggested as an important component of EIBI (Larsson, 2003; Lovaas, 1981). Professionals have claimed that parent involvement in treatment is associated with better outcomes of ABA treatment (Benson et al., 2008; Burrell & Borrego, 2012; Solish & Perry, 2008). Since EIBI is based on the principles and procedures of ABA, it is likely better treatment outcomes in EIBI are also associated with parental involvement. Parent involvement should begin at intake because parents play a valuable role in the development of treatment goals (Leaf & McEachin, 2008). Parents often know their child better than anyone, therefore the parent is more likely to identify goals that are most meaningful to the client. The development of meaningful goals may be correlated with more positive behavior change (Gore et al., 2019). Parents should then be trained to implement the strategies carried out by the EIBI provider so that treatment may occur throughout the child's daily life (Leaf & McEachin, 2008; Lovaas, 1987). Several studies have demonstrated the ability to successfully train parents to implement formal EIBI with their children (e.g., Hastings & Johnson, 2001; McConachie & Diggle, 2007). Additionally, research has shown that parent involvement serves a vital role in generalization and maintenance of treatment (Green, 1996; Lovaas, 1987; Lovaas et al., 1973; McEachin et al., 1993). Therefore, parents should be trained in ABA procedures and involved throughout the duration of their child's EIBI program.

Duration

While the suggested duration of EIBI varies, a period of one to two years is most commonly recommended (Caron et al., 2017; Jacobson et al., 1998; Makrygianni & Reed, 2010). Since EIBI is comprehensive, adequate time must be provided in order to allow for the development of all skill areas (e.g., social, adaptive, and language). Makrygianni and Reed (2010) conducted a meta-analysis to evaluate the effectiveness of EIBI programs for children with ASD. Makrygianni and Reed (2010) assessed the duration of EIBI as a predictor of outcome and reported on one statistically significant correlation ($r = 0.898$) which showed that EIBI programs were more effective the longer they occurred, when compared to eclectic programs. However, extended treatment duration was not correlated with significant pre-post differences in child-specific measures. Makrygianni and Reed (2010) concluded that the child progress rate is not necessarily maintained throughout the duration of EIBI and the effectiveness of the program may not be dependent on the EIBI program's duration. However, Makrygianni and Reed (2010) noted methodological inconsistencies across studies (i.e., inconsistencies of when follow-up measures occurred, and in some studies, children had been receiving treatment while others just started treatment). Further research on the impact of duration on the effectiveness of EIBI is needed (Makrygianni & Reed, 2010).

Treatment Quality

Quality of treatment is an important factor for any behavioral intervention (Moore & Shook, 2001). Treatment quality can be impacted by parent and provider training (Eikeseth, 2010; Fava & Strauss, 2011; Makrygianni & Reed, 2010), the comprehensiveness of the program (Eikeseth, 2010; Makrygianni & Reed, 2010), and the extent to which the EIBI program is individualized to the learner (Stahmer et al., 2011).

Instructors and parents should be trained on the theoretical understanding of behavior analysis as well as be clinically trained in intervention procedures (Eikeseth, 2010). Eikeseth (2010) suggested, "A competent EIBI-professional must be able to carry out clinically all of the principles and methods mentioned above, across several children with different levels of learning disabilities" (pp. 241–242). If the individual implementing the intervention is not well-trained the treatment integrity may decrease (Digennaro-Reed et al., 2010). As treatment integrity decreases, the effectiveness (Fryling et al., 2012), and therefore the quality, of treatment may also decrease. Instructor training can be achieved through graduate programming, by achieving board certification in behavior analysis (BCBA; www.bacb.com), or by working in an apprenticeship model under a competent EIBI professional (Eikeseth, 2010; Fava & Strauss, 2011). Parent training can be achieved by using training tools such as manuals and curriculums (e.g., The RUBI curriculum; Bearss et al., 2018) and videos, as well as live training by a competent EIBI professional (Fava & Strauss, 2011).

A quality EIBI program should also target skills across many different domains (i.e., communication, adaptive skills, social and play skills, and motor skills) such as joint attention, manding, responding to social stimuli, matching, and identifying, playing with a variety of items with peers, and initiating and successfully sustaining social interactions, and these skills should be more complex as the child masters earlier skills (Eikeseth, 2010; Fava & Strauss, 2011). The program should also be individualized for the learner and interventions should be tailored to meet the needs of the child (Reichow et al., 2018). This might mean identifying the child's specific areas of strengths and weaknesses and selecting goals, objectives, and teaching strategies based on these strengths and weaknesses as well as ongoing in-the-moment assessment and the use of clinical judgment (Leaf et al., 2016).

Treatment Across Settings

Finally, EIBI should occur across environments (Eldevik et al., 2012, 2019; Fava & Strauss, 2011). Treatment may start in a center-based setting where training is provided in one-to-one, free play, and group formats (Fava & Strauss, 2011). In their review, Fava and Strauss (2011) found that center-based EIBI programs typically follow a rotation between free play, guided group play, and an intensive one-to-one format. Intervention is then transitioned to the home and implemented by a trained parent (Fava & Strauss, 2011). This structure promotes rapid skill acquisition while also increasing opportunities for generalization (Fava & Strauss, 2011). Some models have effectively provided EIBI in other settings such as the school (Eldevik et al., 2012) and the community (Eldevik et al., 2019). Eldevik et al. (2012) and (2019) provided data that treatment gains can be made when EIBI is delivered in settings other than the center or home but additional staff training and environmental modifications (e.g., space for one-to-one teaching) may be necessary.

Populations Represented in the Literature

EIBI is most commonly employed with children with ASD (Cohen et al., 2006; Eikeseth et al., 2002, 2012; Fenske et al., 1985; Lovaas, 1987; McEachin et al., 1993). However, EIBI has been demonstrated to be effective for children diagnosed with pervasive developmental disorders-not-otherwise-specified (PDD-NOS; Matson et al., 2008) and intellectual disability (Smith et al., 1997). Further research is needed to determine the effectiveness of EIBI for other populations such as language disorders, Down syndrome, Prader–Willi syndrome, Fetal Alcohol syndrome, abusive head trauma, and behavioral disorders.

In the area of ASD, EIBI has been evaluated across children of different ages, IQ scores, skill sets, and severity of ASD (Ben-Itzchak & Zachor, 2007; Eikeseth, 2009; Harris & Handelman, 2000). Each of these child characteristics has been demonstrated to be a potential predictor of child outcomes (Ben-Itzchak & Zachor, 2007; Matson & Smith, 2008; Perry et al., 2013). Age of onset of treatment is a predictor of EIBI success (Eikeseth, 2009; Eldevik et al., 2009; Makrygianni & Reed, 2010; Reichow, 2012; Virues-Ortega, 2010). Though marked improvements have been observed across a variety of ages (Eikeseth et al., 2002; Fenske et al., 1985), the amount of treatment gain is closely associated with younger age at the onset of treatment and treatment is likely most effective when started before the age of four-years-old (Granpeesheh et al., 2009; Perry et al., 2013). Another predictor of EIBI success is IQ at onset of treatment (Ben-Itzchak & Zachor, 2007; Harris & Handelman, 2000; Makrygianni & Reed, 2010; Matson & Smith, 2008). While data demonstrate children with varying IQ scores at treatment onset make treatment gains, children with an IQ score of 50 or higher at the onset of treatment achieve greater outcomes as a result of treatment (Matson & Smith, 2008). A final demographic that has been studied and found to be a potential predictor of treatment outcome is a child’s ASD severity at the onset of treatment (Ben-Itzchak & Zachor, 2007; Smith et al., 2015). Children who display lower levels of restrictive and repetitive behavior and fewer skill deficits at the onset of treatment may achieve better outcomes (Ben-Itzchak & Zachor, 2007; Smith et al., 2015).

Contemporary Outcomes Associated with EIBI

EIBI Outcomes Summary by Decade

Healy and Lydon (2013) summarized decade-by-decade outcomes associated with EIBI, across numerous group studies. The studies summarized by Healy and Lydon each used a group design, and therefore represent some of the larger sample sizes in applied behavior analytic literature. The summary included key components of the participant’s demographic, clinical, and treatment profile, such as ranges for age at intake, intake assessment scores (such as the norm-referenced Vineland-2 and/or IQ scores), dosage of treatment (i.e., hours per week of EIBI or control therapy), and total duration of treatment. Clinical outcomes were reported in skill acquisition across multiple domains of treatment (i.e., communication, adaptive skills, social and play skills, and motor skills), improvement in composite scores of the Vineland-2 or other norm-referenced skills assessment, and/or IQ scores. Absent from the demographic profiles were references to racial or cultural identity, diagnostic criteria outside of ASD (i.e., comorbidities), or indications of socioeconomic status. Also absent from outcome measures were overall indications of social validity/acceptability and quality of life measures.

Many of the studies included in the Healy and Lydon work are described throughout this chapter. In summary, the 21 studies overviewed by Healy and Lydon included participants ranging in mean age from 30 to 79 months old at intake, a mean range of service dosage between 12.5 and 40 h per week (with all but one study averaging a minimum of 15 h per week), and with treatment delivered for a range from 6 months to 3 years. Summary recommendations included beginning EIBI programs prior to 4 years of age and receiving a minimum of 25 h per week for at least 2 years.

Of these studies included in the review, two published follow-up results post-2013 (Howard et al., 2014; Smith et al., 2019). This is particularly significant given that most studies in the behavior analytic literature base examine the efficacy of goals across a relatively short maintenance period (sessions, days, or weeks), and there is a paucity of longitudinal analysis of the effects of early intervention at the individual and group level.

Critique of Research Design and Call for Analysis of Predictive Variables

Matson and Smith (2008) offered a critical review of the emerging outcomes of EIBI, including favorable client progress, shortcomings in the experimental design in the literature, and opportunity for identification of predictive features of favorable outcomes (i.e., which treatment variables were most effective, and for whom). This review highlighted an opportunity to evolve the literature base to explore, through increasingly rigorous research, variables related to successful outcomes in the treatment of ASD. These variables included age at intake, intake severity level, communication skills, strategies and methodologies used within treatment packages, dosage (i.e., hours per week of service delivered), duration of services, and characteristics of the service provider (e.g., years of experience, training, etc.) (Matson & Smith, 2008). This focus on client and provider characteristics was a particular contribution to the growth of aggregate outcomes work in ABA. Matson and Smith hypothesized the strongest correlations between characteristics and outcomes would be the severity of ASD symptoms, IQ scores, and comorbidities.

Symptom Severity

Regarding symptom severity, the authors posited that milder symptoms (i.e., lower severity) would be correlated positively with improved outcomes following treatment; this was based on pre-post test data gathered from research subjects who did not receive services. At the time (2008), there was little data to confirm this hypothesis. In studies since published, “no treatment” control is often captured through a randomly assigned waitlist control; that is, a group is randomly assigned to receive treatment at a later date, once the study concludes. There is an opportunity to evaluate the hypothesis posed by Matson and Smith by exploring the statistical analysis of the waitlist control group in these studies, to determine if there was in fact a relationship between lower severity at intake and more favorable developmental trajectory in the control group.

IQ Scores

Intellectual ability, as measured by IQ scores at intake, was also highlighted as a critical variable correlated to treatment outcomes (Matson & Smith, 2008). The cut-off of 50 points is offered from the studies included in the analysis, with higher intake IQ scores correlated with higher final outcomes at end of treatment (Eaves & Ho, 1996). The lower IQ scores were correlated with “aloofness,” or what may be defined as poor attendance. While it stands to reason that poor attending would function as an initial barrier to progress in short-term EIBI studies, it also begs the question of to what extent intellectual capacity can accurately be assessed, when the client is unable to attend to the assessor. At any rate, the authors noted that lower IQ and higher symptom severity at intake are generally correlated and that it is difficult to determine from the existing literature which characteristics particularly affect treatment outcomes.

Comorbidities

Comorbidities is the third area identified as highly relevant to treatment outcomes. Comorbid psychopathology is high in those diagnosed with ASD, particularly diagnoses of anxiety, depression, and ADHD. However, these are largely unexamined in young children, and symptoms typically emerge later in life. Therefore, the authors conceded that more research is needed to understand the relationship between comorbidities and treatment outcomes in young children.

Research Design

Finally, Matson and Smith (2008) make a compelling case for the necessity of improved methodological rigor in reporting treatment outcomes in the EIBI literature. The article notes that several of the group studies lacked an exhibition of experimental control, due to having no control group (i.e., quasi-experimental design), while several other group designs used control groups that were not randomly assigned. While more rigorous than simple case studies, Matson and Smith maintain that the advancement of the field should rely upon the inclusion of randomized control in future research.

Along with the study design, the authors highlight that the literature base in EIBI does not frequently define precisely the intervention being delivered, and rather describes the services as being "ABA-based," but without a detailed presentation of specific or manualized methodology, which, the authors assert, was an essential merit of the 1973 Lovaas study. That is to say, the merit was not in the particular strategies used, but in the effect of measuring their efficacy as a defined package, compared to the vast array of studies evaluating a single package component. This is a significant point, as modern practitioners often claim to implement practices based on their understanding of the literature, as they piece together strategies demonstrated as effective across multiple disparate clients in the literature and combine them into a "package" which is not - as a whole - vetted for use with particular client characteristics. This is consistent with the Lechago and Carr commentary and continues to be an opportunity and need for future study.

Statistical Analysis and Meta-analysis: Dosage and Duration

Consistent with literature (Reichow & Wolery, 2009) recommending intensive service levels (i.e., hours of service delivered weekly, or treatment dosage), Linstead and colleagues (2017) conducted a multiple regression analysis of program dosage for a curriculum-supported ABA-based autism intervention across 1468 participants, ages 18 months to 12 years. Linstead's findings were summarized as providing support for significant treatment effects related to dosage and duration, with the strongest dosage-response relationship in the language and academic learning domains. Similarly, in a meta-analysis of 22 ABA-based studies, Virues-Ortega (2010) analyzed clinical outcomes for 323 participants receiving ABA-based intervention. The authors echoed challenges in interpretation based on a variety of study methods and treatment procedures used, but various statistical analyses of the included studies allowed for interpretation beyond examination of each article in isolation; namely, meta-regression analysis of dosage showed that dosage and duration affect treatment outcomes, with the strongest impact to receptive and expressive language gains. Notably, Virues-Ortega also indicated that the total duration of services was likely a predictive variable of successful outcomes, but stopped short of making a recommendation for a program's total duration, based on available evidence. These studies offer support for recommendations of intensive intervention for individuals with comprehensive needs.

Conclusion

Founded by Lovaas et al. (1973) and the UCLA YAP, EIBI is an effective and empirically validated treatment package for achieving promising outcomes for young children with ASD (Cohen et al., 2006; Harris & Handleman, 2000; Harris et al., 1991; Jacobson et al., 1998; Lovaas, 1987). Early EIBI studies were groundbreaking in that they provided an approach that resulted in freedom from restrictive environments (Anderson et al., 1987; Birnbrauer & Leach, 1993; Harris et al., 1991; Lovaas, 1987; McEachin et al., 1993; Smith et al., 1997). Following these early studies, many replications followed, and these replications provided valuable information pertaining to the benefits of early intervention and factors for success such as age and IQ at treatment onset and recommended treatment intensity (Jacobson et al., 1998). However, precise replication and interpretation remain challenging due to vague summaries of group research and a large body of single-subject design, which results in significant variability of treatment packages (Lechago & Carr, 2008; Virues-Ortega, 2010). As a result, research has yet to offer definitive conclusions regarding factors such as the duration of treatment, the impact of parent involvement, and the level of training of instructors and parents. Continued evaluation is also needed across participant demographics such as diagnosis, age, cognitive level, culture, and gender. Additionally, outcome measures that may be more meaningful for the family and the child are needed.

Professionals should continue to evolve EIBI research and practice. Future research may include more group studies, including randomized controlled trials (e.g., waitlist control) that compare packaged approaches. These future studies should include the combinations of evidence-based procedures and the key characteristics outlined in this chapter, in order to build upon the continued success of early studies. In addition, future research should incorporate an ongoing evolution of practice, which includes a focus on topics such as improving cultural responsiveness (Fong et al., 2016; Mathur & Rodriguez, 2021; Miller et al., 2019) and operationalizing assent-based procedures (Morris et al., 2021).

Finally, ongoing evolution in the areas of outcome measurement and individualized treatment selection procedures are recommended. In addition to the clinical outcomes included in many of the studies presented here (e.g., IQ, Vineland Adaptive Scales), researchers should explore expanded measures to reflect the overall impact on quality of life and social validity. As a guiding example, an introductory standard set has been developed by an international working group (International Consortium for Health Outcomes Measurement, n.d.); this set of outcome measures for autism treatments is a compilation of norm-referenced assessments, skills assessments, challenging behavior indexes, and quality of life assessments and serves as a foundational battery of outcomes measures to further demonstrate the value of autism services such as EIBI. Future efforts may also endeavor to expand upon existing knowledge by developing, based on the literature, systematic approaches to identifying key variables in a child's profile in order to guide treatment selection and deliver optimized treatment outcomes.

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Part VI

Treatment of Neurodevelopmental Disorders in Children

31

Treatment of Autism Spectrum Disorders

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Major advances in the treatment of Autism Spectrum Disorder (ASD) have been made since the earliest manifestations of the condition were identified in the 1940s. This chapter provides an overview of evidence-based treatment practices by detailing primary treatment targets and approaches across the lifespan and exploring the diverse contexts in which these treatments can be effectively delivered.

ASD is a neurodevelopmental disorder characterized by deficits in social communication and interaction, as well as the presence of restricted and repetitive patterns of behavior or interest. According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders [DSM-5] (APA, 2013), individuals with ASD exhibit social and communicative deficits in the areas of social relationships, nonverbal communicative behavior, and social-emotional reciprocity. In addition, individuals with ASD may engage in varying degrees of ritualistic and stereotyped behaviors and may have strong sensory interests or aversions, which also can have an impact on the ability to learn and interact with others. While the exact cause of ASD remains unknown and there is no single identified "cure", these core symptoms can be important targets for treatment. The way in which symptoms are best treated will vary based on an individual's age and functional abilities.

ASD is phenotypically heterogeneous resulting in a diverse presentation across the population of individuals with autism (Bauminger-Zviely, 2014). Variations in social understanding, intellectual ability, adaptive behavior, language, academic ability, and vocational skills are expressed differently across development, and cause a differential impact on a person's overall level of functioning and quality of life (Hughes & Leekam, 2004). Due to this variability in autism symptoms, individualized treatment where functioning level drives treatment approach, is pivotal in promoting skill development across multiple domains.

For instance, some individuals with ASD may remain nonverbal and/or profoundly disabled and may need substantial support throughout life. Other individuals with the same diagnosis may need

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more limited accommodations and can advocate for their own needs. Notably, given that many autistic self-advocates and advocacy groups prefer the use of identify-first language like “autistic adult”, for the portion of this chapter focused on adulthood, we have chosen to use identify-first terminology in order to respect the efforts of these stakeholders and advocacy groups (Brown, 2011).

Treatment Aims

Across the ability spectrum, the most important goals for treatment are typically those that support independence and promote quality of life for the individual with ASD and their family. Therefore, effective treatments often aim to incorporate a person-centered, strengths-based approach to support the development of functional skills. Varying perceptions of disability across cultures must also be considered in the development of person-centered approaches to the treatment of ASD. Therefore, targeted skills should be culturally relevant to promote dignity and encourage participation from family members and other stakeholders (Zhang & Bennett, 2001). In addition, treatment goals should be developmentally- and age-appropriate, and areas of focus typically change during critical periods across the life span. For example, developing early communication and play skills are often a focus of treatment in toddlers, and supporting academic participation and forming peer relationships are often a focus later in childhood. Further academic, social, and pre-vocational interventions are often necessary as individuals enter into adolescence, and autistic adults may benefit from support in developing skills related to independent living, employment, and financial management (Volkmar et al., 2014).

One way that the many existing treatment approaches in ASD have historically been categorized is by differentiating those models which are comprehensive (Comprehensive Treatment Models; CTMs) from those that are focused (Focused Intervention Practices; FIPs). CTMs include sets of practices that are aimed at achieving a broad learning or developmental impact on the core features of autism. In 2010, Odom and colleagues identified 30 CTMs operating within the US characterized by organization around a conceptual framework, operationalization, intensity, longevity, and focused outcomes (Odom et al., 2010; Wong et al., 2015). On the other hand, FIPs aim to address a single skill or goal of a learner with ASD. These practices are typically operationalized, target specific learning outcomes, and occur over a shorter duration of time compared to CTMs. Some well-known examples include discrete trial teaching, visual supports, various levels of prompting, peer-based intervention, and video modeling. Oftentimes, FIPs are considered the foundational blocks of the educational programs for individuals with ASD and are often highly salient in CTMs.

Our particular focus in this chapter is on evidence-based practices (EBPs) which have been demonstrated through research to lead to positive outcomes for individuals with ASD. While there are many ways to define EBPs, we rely in particular on several of the most recent comprehensive reviews of FIPs in autism including the National Standards Project, Part 2 (NSP2; National Autism Center [NAC], 2015) and the National Clearinghouse on Autism Evidence and Practice Review (Hume et al., 2021; Steinbrenner et al., 2020). We also draw from other systematic reviews and meta-analyses when available to inform what has been well researched and supported through robust evaluation.

In addition, given the importance of meaningful generalizable skills that will improve quality of life long-term, we place particular emphasis on treatments that incorporate positive behavior supports (PBS) and are delivered in natural environments. The PBS framework takes a proactive approach in considering necessary antecedent accommodations to support effective learning and prevent challenging behavior, with an overall focus in promoting dignity and respect on an individual level (Harris & Weiss, 2007).

We hope this combined approach will allow teachers, parents, and other service providers to select from research-supported interventions when creating individualized education or intervention programs for individuals with ASD. It must be noted, however, that the literature base for some types of treatments (especially for young children with ASD) is immense, while the body of EBPs for adolescents and adults with ASD is emerging but considerably smaller at present.

General Trends in Treatment Delivery

In addition to ASD-specific treatments provided by ASD specialists, the pervasive nature of ASD symptoms and the complex comorbidities experienced by many individuals on the spectrum mean that multidisciplinary collaboration is often required for optimal care. For instance, children or teens with ASD may receive both behavioral and educational interventions, as well as speech therapy, occupational therapy, and sometimes physical therapy. Psychiatric medications prescribed by a primary care physician or psychiatrist can also be used to treat associated psychiatric symptoms.

Active parent and caregiver involvement is also considered an essential component of quality care and many treatments include parent training or other types of stakeholder involvement to enhance effectiveness and ecological validity (National Research Council, 2001; Steinbrenner et al., 2020). Families may face many barriers which can limit their ability to participate in intervention (such as child-care, language barriers, transportation challenges, or lack of flexibility in their work schedules), as such, it is critical that family-centered care principles and cultural considerations are incorporated when considering selection of evidence-based practices. Health disparities in access to evidence-based treatment and shortages of trained providers have also contributed to recent scientific interest in scalability of treatment models and incorporation of technology into treatment. For instance, group models of parent training have been investigated (e.g., Hardan et al., 2015) and group-based interventions to teach social skills are common for youth with ASD (Gates et al., 2017). Emerging research on technology-based intervention practices has focused on studying the effectiveness and usability of technology with children (Mazon et al., 2019). Current trends reflect that technology-based interventions are appealing to individuals with ASD, most target emotional or social skills, and generally have promising levels of evidence for effectiveness and usability (Mazon et al., 2019). For instance, emerging research has shown that the use of social robots can promote social behaviors, spontaneous language, and decreased repetitive and stereotyped behaviors in individuals with ASD (Pennisi et al., 2015).

The remainder of this chapter is organized into four sections covering important phases of life for individuals with ASD: early childhood, school-age, adolescence, and adulthood. Within each section, we review key skills typically targeted in treatment and provide an overview of common treatment approaches used for individuals in that age group. While there are many more available treatment approaches than we can cover in a single chapter, our intention is to provide a broad overview of behavioral, developmental, academic, and vocational interventions commonly used for individuals with ASD and provide examples of well-known treatment types with empirical support. We also briefly reference the settings and contexts where treatment is provided, as these also change over development. Additionally, we review treatments for core ASD symptoms, as well as commonly associated conditions. These interventions may assist in reducing symptoms, improving cognitive abilities and executive functioning, increasing independence in daily living skills, and maximizing an individual's ability to function and participate in the community (Centers for Disease Control and Prevention, 2019).

Early Childhood Treatment

Early Intervention is a general term that refers to services for young children with disabilities and varied developmental delays. In the United States, early intervention programs are offered to children under 3 years of age under Part C, Infants and Toddlers, of the Individuals with Disabilities Education Act (IDEA, 2004). Criteria for receiving early intervention services for toddlers with atypical development vary by state. Children with ASD in this age group often receive a variety of services including behavioral intervention, speech therapy, occupational therapy, physical therapy, and other state-supported services (Stahmer & Mandell, 2007; Williams et al., 2021). Young children may also receive medically necessary therapies often provided through their medical insurance.

Early intervention for young children with autism requires collaboration and coordination across multiple disciplines. Further, caregiver involvement is pertinent and should be considered throughout the process of coordinating goals and treatment. Services for very young children are often implemented in the home setting to maximize family involvement and caregiver training (Rogers & Dawson, 2020; Thompson, 2011). Prioritizing caregiver involvement from the onset of training allows for parents to feel emotionally supported and empowered in the treatment of their children. Some early intervention services can also be delivered in community settings such as early intervention centers, daycares, or preschools (Thompson, 2011).

The importance of early developmental and behavioral treatment for children with autism has been increasingly recognized and is supported by a large body of research documenting the impact of early intervention on developmental outcomes (Frazier et al., 2021; NAC, 2015; National Research Council, 2001; Stahmer & Mandell, 2007; Steinbrenner et al., 2020; Wong et al., 2015). While it remains difficult to predict which children will respond best to intervention based on current scientific evidence, there are many factors that may influence a child's response to intervention including individual child characteristics, such as language levels, cognitive ability, and social interest. In addition, the specific type of intervention, the intensity and duration of intervention, and the setting in which treatment is delivered likely influence outcomes (Parker-McGowan et al., 2014; Thompson, 2011). While factors may vary across treatment modalities, the general recommendation is for young children with autism to receive a minimum of 25 hours of intensive treatment per week in order to support positive outcomes (Dimian et al., 2020; National Research Council, 2001).

The most effective interventions for young children target key skill areas related to autism-specific traits (NAC, 2015; Thompson, 2011; Wong et al., 2015). Relevant areas of focus include social communication skills, adaptive skills, cognitive development, and restricted and repetitive behaviors. Key social communication domains include pre-linguistic skills, joint attention, early language, social referencing, social initiation and reciprocity, and play. Adaptive skills to be targeted in early childhood include participation in activities of daily living, sleep, and feeding. Finally, cognitive and developmental areas most relevant for children with ASD include representational and symbolic play, emotional self-regulation, and imitation skills.

ABA-Based Interventions

The largest body of evidence related to the treatment of young children comes from treatment models based on the principles of Applied Behavior Analysis (ABA). Many of the focused intervention practices identified as evidence-based in recent comprehensive reviews are based on ABA including antecedent-based interventions, behavioral momentum intervention, differential reinforcement, discrete trial training (DTT), extinction, functional behavior assessment (FBA), functional communication training (FCT), modeling, prompting, reinforcement, and task analysis (Hume et al., 2021; NAC, 2015; Steinbrenner et al., 2020).

The traditional ABA model is based on the early research of B.F. Skinner (1938) and uses a structured, adult-directed approach based on operant learning and conditioning to promote the acquisition of functional skills. Less desired behaviors can be treated through extinction and reinforcement of functional alternative behaviors (Cooper et al., 2007; Frazier et al., 2021). In this model, learning is often achieved through discrete trials (e.g., DTT), during which an instruction, or discriminative stimulus, is presented and child responses are prompted and reinforced. Prompts are faded in subsequent trials and independent responses are reinforced, often through the provision of tangible rewards. DTT can be implemented to target skills in multiple domains, including prelinguistic behaviors, social communication, play, joint attention, cognitive task performance, and school readiness (NAC, 2015; Roane et al., 2016; Steinbrenner et al., 2020). Adaptive living skills and play routines are often taught using chaining procedures, in which tasks are broken down into a series of discrete behaviors taught systematically (Cooper et al., 2007).

Early Intensive Behavioral Intervention (EIBI) has been acknowledged as an effective ABA-based treatment model for children under the age of five (Frazier et al., 2021; National Research Council, 2001; Steinbrenner et al., 2020). EIBI, based on work by Ivar Lovaas (1987), is an intensive treatment that involves 20–40 hours per week of behavioral intervention using the principles of ABA. Individualized assessment determines the identification of treatment goals and specific targets. Progress is measured through the collection and analysis of behavioral data collection and measurement. Treatment is typically delivered by clinicians trained in the implementation of ABA. EIBI is most commonly implemented in home settings, but can also be implemented in center-based programs or specialized preschool environments. EIBI has been identified as an effective treatment for improving skills in the areas of cognitive functioning, academic readiness, independent living skills, and play (NAC, 2015).

EIBI can also target the verbal communication deficits commonly seen in young children with ASD (NAC, 2015). For minimally verbal children, communication targets often include the acquisition of first sounds and words. DTT can be implemented as part of an EIBI program, for instance, to teach children to imitate or echo sounds, and subsequently to make requests to gain access to preferred items or activities. Nonverbal children who are learning to imitate sounds often receive training in the use of augmentative communication systems. Visual communication systems, such as The Picture Exchange Communication System (PECS), are commonly used to teach children to point to or to exchange pictures in order to make requests (Bondy & Frost, 2011). Later phases of PECS teach sentence structure and commenting functions using picture cards. Emerging evidence supports the use of these systems as a stepping stone to verbal communication and the use of augmentative communication may aid in decreasing challenging behaviors that serve communicative functions (Kasari et al., 2014; NAC, 2009; Wong et al., 2015). ABA principles can also be applied to enhance the communication of children with higher verbal ability within EIBI programs by targeting verbal conversation skills and supporting peer interactions.

Developmental Social Pragmatic Interventions

Another type of early intervention historically used with young children with autism is based on developmental social pragmatic (DSP) principles. DSP interventions are based on an understanding of the key developmental role of early social communication skills and the developmental sequence and critical relationship contexts in which these skills emerge in typically developing children. DSP interventions are designed to help children develop increased social and cognitive capacities through play. These approaches attempt to mirror the order of skill acquisition seen in typical development, with an emphasis on social-emotional development. DSP interventions are designed to help children develop increased social and cognitive capacities through play. The relationship between the child and adult (i.e., parent or therapist) is also considered an essential active ingredient in the treatment. Caregivers are encouraged to join in their children's play and to respond and attend to all forms of child communication (Binns & Oram, 2019). Adults are encouraged to imitate the child's behavior and to attend to the sensory needs of the child by creating predictable play routines and enhancing the child's feelings of control (Gengoux et al., 2019a, b). DSP interventions often place attention on non-verbal methods of communication, including social engagement, communicative intent, and the meaningful use of symbols during child-directed play interactions. Reviews of the effects of DSP interventions have been mixed, likely due to varying treatment definitions, outcome measures, and inclusion or exclusion criteria; however, emerging evidence suggests that some DSP interventions, such as the Developmental, Individual Difference, Relationship-based (DIR)/Floortime Approach, Relationship Development Intervention (RDI), The Son-Rise program, and the Focused Playtime Intervention (FPI) may be effective in treating young children with ASD (NAC, 2015; Binns & Oram, 2019).

Naturalistic Developmental Behavioral Interventions

Naturalistic Developmental Behavioral Interventions (NDBI) are a category of interventions for young children with ASD that each incorporate a developmental and child-directed approach to implementing established principles of ABA in naturalistic settings (Landa, 2018; NAC, 2015; Schreibman et al., 2015; Steinbrenner et al., 2020). There is a growing evidence-base for these hybrid approaches to early intervention (NAC, 2015; Sandbank et al., 2020; Schreibman et al., 2015; Steinbrenner et al., 2020). Common characteristics of NDBI include developmental sequencing of treatment goals, child-initiated teaching opportunities during daily routines and play activities, and ongoing individualized assessment and measurement of developmental progress. Further, many of these practices are manualized and fidelity of treatment implementation is often measured for both parents and clinicians (Schreibman et al., 2015). Project AIM, a recent meta-analysis of interventions for young children with autism, identified key benefits to NDBI including generalized learning in natural environments, reduced prompt dependence, acquisition of natural-sounding meaningful language, and increased family involvement (Sandbank et al., 2020).

Pivotal Response Treatment (PRT), which focuses on targeting "pivotal" behaviors, is one evidence-based NDBI that has been repeatedly shown to improve autism symptomatology in children (National Research Council, 2001; NAC, 2015; Sandback, 2020; Steinbrenner et al., 2020; Tiede & Walton, 2019). In PRT, motivation is encouraged through following the child's lead, providing choices, interspersing easy tasks, reinforcing child's attempts, and building natural relationships between the child's behavior and the reinforcer. Additional pivotal areas of focus include child initiations, responding to multiple cues, and self-management (Koegel & Koegel, 2006). Evidence indicates that parents can be trained to implement PRT with fidelity, resulting in improvements in child communication skills and aspects of social development (Gengoux et al., 2019a, b; Hardan et al., 2015).

The Early Start Denver Model (ESDM; Dawson et al., 2009) is another NDBI with evidence supporting its efficacy in the treatment of young children with ASD. The approach applies ABA- and PRT-based teaching techniques in a play-based context to teach skills in a developmentally sequenced curriculum. In the first randomized controlled trial of this approach, significant improvements in IQ, adaptive behavior, and autistic symptoms were documented following two years of intervention in toddlers with ASD (Dawson et al., 2009). In a recent meta-analysis of 12 ESDM trials, Fuller et al. (2020) found that children in the ESDM groups demonstrated improvements in language and cognition compared to those in control groups. However, significant differences were not observed for changes in adaptive behavior, social communication, repetitive behavior and restricted interests, or general measures of autism symptomology.

NDBIs continue to receive attention for their potential to improve interpersonal, social communication, joint attention, imitation, and play skills through taking a developmental approach to targeting behaviors related to social motivation (NAC, 2015; Steinbrenner et al., 2020; Tiede & Walton, 2019). The Joint Attention, Symbolic Play, Emotion, and Regulation model (JASPER; Kasari et al., 2021) and Incidental Teaching/Milieu Training model (Kaiser & Roberts, 2013) are additional examples of NDBI considered evidence-based treatment for young children with autism (Schreibman et al., 2015; Steinbrenner et al., 2020). Like PRT and ESDM, these treatments incorporate characteristics of NDBI including environmental arrangements and child interests to prompt target behaviors in natural environments and have been shown to result in improvements in the areas of social communication, play, cognitive ability, joint attention, and the reduction of challenging behavior in toddlers and preschoolers with ASD (Steinbrenner et al., 2020).

While much of the support for NDBI is found in studies of clinician-delivered service models, parent training is a critical component of many NDBIs and there is also evidence that these treatments can be effective when adapted to structured group models (NAC, 2015; Steinbrenner et al., 2020). For example, recent investigations have evaluated the efficacy and feasibility of parent- and teacher-implemented models of ESDM delivery (Eapen et al., 2013; Fuller et al., 2020; Vivanti et al., 2014). Enhanced Milieu Teaching (EMT; Kaiser, 1993), Social ABCs (Brian et al., 2016), Preschool Autism Communication Trial (PACT; Green et al., 2017), Early Social Interaction (ESI; Wetherby et al., 2014), and Project ImPACT (Stadnick et al., 2015) are other examples of naturalistic treatments primarily implemented by parents in home and community settings.

While initial results show the promise of NDBI for treating young children with ASD, further scientific evidence focused on study quality indicators, randomized controlled trial designs, and detection bias is necessary to better understand the specific predictors of treatment response for individual children (Sandbank et al., 2020). For instance, a multi-site trial of 87 toddlers with ASD comparing NDBI with DTT at two intensity levels (15 h versus 25 h per week) found no overall difference in outcomes for either intensity or intervention approach, demonstrating the challenge clinicians and parents still must face in making decisions about the best evidence-based approach for an individual child (Rogers et al., 2021).

Group Interventions for Preschool Children

Daycare or preschool environments present opportunities to facilitate social communication and peer interactions for young children in a group setting. Thus, recent studies of ASD interventions in early childhood have evaluated the efficacy of adapting or creating behavioral interventions designed for implementation in group settings. These interventions are typically derived from evidence-based behavioral interventions and employ strategies such as facilitated peer interactions, peer-mediated instruction, evidence-based instructional methods, and behavior management systems (Chang et al., 2016; Schwartz et al., 2013; Strain & Bovey, 2011).

Project LEAP (Strain & Bovey, 2011) evaluated the implementation of a teacher and peer-mediated behavioral intervention package for young children with ASD in inclusive preschool classrooms. Findings suggested that children in the LEAP classrooms showed significant improvements in autism symptoms, cognitive performance, and social communication skills. Project DATA (Developmentally

Appropriate Treatment for Autism) implemented a comprehensive treatment model consisting of explicit instruction and facilitated peer interactions delivered in inclusive educational settings (Schwartz et al., 2013). This treatment focused on training parents and teachers to implement evidence-based techniques during the school day. Findings suggested that children who participated in Project DATA demonstrated increases in social communication skills and parents reported improvements in ASD symptoms.

Chang et al. (2016) investigated the application of the JASPER model in a preschool classroom and found that children in the treatment group demonstrated significant improvements in joint attention and play skills compared to those in the delayed treatment group. Recent studies have also evaluated the application of the ESDM model in classroom and community-based child care settings; preliminary findings suggest positive outcomes characterized by improvements in receptive and expressive language, joint attention, cognitive skills, adaptive functioning, and social communication (Eapen et al., 2013; Fuller et al., 2020; Vivanti et al., 2014). While the preliminary findings of group-based interventions for young children are promising, further research is needed to understand the optimal delivery models, expected outcomes, and feasibility of widespread implementation in early education environments.

Treatments for School-Age Children

Treatment Settings

As children with ASD reach school age, school settings provide new opportunities for therapeutic intervention. At the same time, children may also continue to receive services in home, clinic-based, and community settings. During this developmental period, it is particularly important that children develop and practice interpersonal skills necessary for learning in group environments and for engaging in appropriate interactions with peers. Parents continue to play a critical role in supporting learning at home, including setting up playdates with other children to increase social interaction opportunities and taking their children on community outings to expand independence.

Many children with ASD may be eligible for special education services or associated accommodations within their public school system. In the United States, the Individuals with Disabilities Education Act (IDEA) was passed in 1975 to ensure that children with disabilities have access to free and appropriate support as part of their public education (IDEA, 1997). A process for Individualized Education Plans (IEPs) was established under IDEA and designed to provide a unique plan of action and set of goals to support each eligible child's academic performance (IDEA, 1997). Alongside educators, parents are expected to participate in the formation of the child's IEP and to play an active role in determining whether the child's needs are being met by the IEP (IDEA, 1997). The purpose of the IEP is to allow the child access to accommodations and services necessary to support education in the "least restrictive environment" (IDEA, 1997). If a child is determined by the IEP team to be eligible, school districts may provide services including Occupational Therapy, which can address fine motor and sensory regulation challenges, Speech Therapy, which can focus on verbal, nonverbal, and social pragmatic communication, and in some cases other behavioral supports, social skills groups, or mental health counseling.

Key Skills

As in early childhood, social communication skills remain a primary focus of ASD treatment in school-age children, often with expanded emphasis on skills for classroom-based learning and for building and maintaining peer relationships. During the school-age years, ABA therapy and Social Skills Training (SST) are often used to build on skills learned in early childhood (e.g., joint attention, functional play, language, and communication skills), while strengthening skills important for peer interaction, such as sharing, turn-taking, initiating and symbolic play skills. Cognitive therapies at this age often aim to introduce basic thinking and feeling concepts, as well as theory of mind skills, in order to improve emotional regulation and perspective-taking (Baron-Cohen, 2000).

Restricted interests can be another important treatment target for school-age children with ASD and may become more salient as expectations for independence increase. For example, children with ASD may display restricted interests in play activities, which can make peer interaction difficult. Children with ASD commonly fixate or "get stuck" on perseverative thoughts, making it difficult to flexibly engage in topics of interest to others (Keenan et al., 2017). This insistence on sameness or ritualistic behavior can also pose a challenge for children who are expected to conform to classroom behavioral expectations. Therefore, behavioral management, coping skills instruction, and cognitive therapies can be used to increase the flexibility of children with ASD at this age.

Evidence-Based Treatments

The large-scale "National Standards Project, Phase 2" (NSP2) is a comprehensive evidence review published in 2015 that outlined 14 "established" interventions for individuals under 22 years old (NAC, 2015). Many of these interventions are routinely used to target the core deficits of ASD in the school-age population, including behavioral interventions (ages 3–21), cognitive behavioral intervention packages (ages 6–14), modeling (ages 3–18), peer training package (ages 3–14), schedules (ages 3–9), scripting (ages 3–14), language training (ages 3–9), and story-based interventions (ages 3–14) (NAC, 2015). Other established interventions for this age range that include the involvement of educators and parents are Naturalistic Teaching Strategies (ages 0–9), Pivotal Response Treatment (ages 3–9), and Parent Training Package (ages 0–18).

Several other treatment packages identified by the NSP2 target a range of essential skills beyond the core deficits of ASD. For instance, Comprehensive Behavioral Treatment for Young Children (CBTYC) (ages 0–9) includes interventions such as Early Intensive Behavioral Intervention (EIBI) and ABA therapy, as well as inclusive behavioral programs. CBTYC is established by the NSP2 to decrease problem behaviors and increase academic and learning readiness, motor skills, cognitive functioning, and personal responsibility (NAC, 2015). Similarly, Behavioral Interventions (ages 3–21) have been established by the NSP2 to not only improve core ASD deficits such as communication, interpersonal skills, sensory and regulation, and restricted repetitive behaviors and interests, but they are also aimed to improve skills such as cognitive functioning, academic skills, learning readiness, personal responsibility, problem behaviors, emotion regulation, and play (NAC, 2015).

Visual Supports (VS) are an additional EBP for school-age children with ASD, often applied to cue or alert children to prepare to transition to upcoming activities (NAC, 2015). VS are used to aid children in learning desired behaviors and skills by providing a visual illustration combined with external prompting and reinforcement. In another comprehensive review of ASD intervention techniques, VS were found to help children ages 6–11 to improve core ASD target areas such as social, play, communication, and joint attention skills (Steinbrenner et al., 2020). Visible schedules, graphic organizers, work systems, and scripts are examples of VS that are useful for school-age children with ASD

(Steinbrenner et al., 2020). They also are evidenced to improve motor and vocational skills, challenging behaviors, and adaptive and self-help skills. Finally, they are particularly useful for school-age children to aid in school readiness, academic, and cognitive skills (Steinbrenner et al., 2020). VS are also commonly part of structured teaching packages. Treatment and Education of Autistic and related Communication-handicapped CHildren (TEACCH) is a manualized intervention that relies on multiple VS methods to create an adaptive environment for children with ASD and is often applied within school systems (NAC, 2009).

Applied Behavioral Analysis Strategies

ABA treatment targets often expand during the school-age years to reflect the increasing demands of the school environment. At this age, children with ASD may receive ABA therapy at home, in a clinic, and/or at school. Attending and focus are key developmental skills that are often emphasized by ABA therapists at this developmental level often for the purpose of maximizing engagement and learning in educational settings. Target outcome areas that ABA has been shown effective for in elementary children aged 6–11 include social and communication skills, behavioral management, and academic and school readiness skills (Steinbrenner et al., 2020). ABA therapy can also be used to help manage potentially disruptive behaviors, by replacing these behaviors with more adaptive, functionally-equivalent skills and communication strategies (Shenoy et al., 2017; Steinbrenner et al., 2020). Finally, ABA therapists often help school-age children practice behaviors that will increase compliance with adult instructions both at home and in the classroom (Young et al., 2010).

A substantial proportion of the focused intervention practices identified as EBPs for school-age children with ASD are ABA-based intervention practices (Hume et al., 2021; Steinbrenner et al., 2020). For instance, Antecedent-Based Interventions (ABIs) are evidence-based practices that involve the intentional moving of events or circumstances prior to a desired activity or request in order to increase the likelihood of the behavior in the future, or to decrease the occurrence of challenging/interfering behaviors. Prompting involves the use of words, gestures, or physical guidance to help learners gain new skills or engage in desired behaviors. Reinforcement involves the use of consequences to guide a learner’s response or skill in order to increase the likelihood of that behavior in the future. Extinction is a technique that focuses on removing reinforcing consequences of challenging behaviors to decrease the likelihood of future occurrence of that behavior (Hume et al., 2021). Differential Reinforcement is another EBP that falls within the framework of ABA and is defined as a systematic process with goals of increasing desirable behavior through the use of positive consequences for demonstrating that behavior (Hume et al., 2021). The positive consequences can be delivered upon engagement in a desired behavior, engagement in an incompatible behavior to the undesired behavior, or when not engaging in the undesired behavior (Hume et al., 2021).

As discussed in the Early Childhood section, Discrete Trial Training (DTT), is also an evidence-based approach to instruction that includes massed or repeated trials with instruction and presentation, an individual’s response, a planned consequence, and a pause before the next instruction (Hume et al., 2021). Functional Behavioral Analysis (FBA) is a systematic method to understand the hidden or underlying function or reason for a behavior in order to develop an effective plan of intervention. Functional Communication Training can also be used with school-age children to replace challenging behavior with an effective form of communication that is more functional and appropriate (Hume et al., 2021).

Modeling is another well-established behavioral intervention for children with ASD (NAC, 2015). Video Modeling (VM) is a type of social modeling that utilizes video technology and is evidence-based for school-age children ages 6–11 with ASD. Similar to live modeling, behaviors and skills are displayed through pre-recorded demonstrations that depict examples of how to engage in desired behaviors or skills (Steinbrenner et al., 2020). Skills may be demonstrated by utilizing peers or adult models, point-of-view modeling, video self-modeling, video feedback, and video prompting (Steinbrenner et al., 2020). Children with ASD can be more engaged by playing a participatory role as the "model" by performing the skill and watching the video of themselves after (NAC, 2015). There is evidence that this strategy can improve core ASD target outcome areas such as communication, social, joint attention, and play skills (Steinbrenner et al., 2020). Additionally, VM is shown to aid in improving motor skills, vocational skills, challenging and interfering behaviors, and adaptive skills (Steinbrenner et al., 2020). There is also evidence that VMs supports non-core ASD target areas such as cognitive, school readiness, and academic/pre-academic skills (Steinbrenner et al., 2020). VM is thought to be a particularly engaging option for children who prefer visual-processing and enjoy electronic screen-related activities such as television, tablets, and phones (NAC, 2015).

School-Wide Positive Behavior Supports

Building on the evidence-base from ABA and incorporating principles of inclusion, self-determination, and person-centered planning, the field of Positive Behavior Support (PBS) has emerged as a comprehensive intervention approach for the prevention of severe problem behaviors sometimes displayed by individuals with ASD (Bambara & Kern, 2021). PBS can be applied at the individual level or within larger systems, as in the case of School-wide Positive Behavior Support, which provides a three-tiered prevention framework to guide academic, social, behavioral, and emotional support, and has been found effective in improving student outcomes (SWPBS; Horner et al., 2010; Solomon et al., 2012). PBS universally implements non-aversive behavioral strategies to reduce and prevent undesirable problem behaviors in the classroom without necessitating a punitive approach (Solomon et al., 2012). Behavioral expectations are presented in a simple, straightforward, and consistent manner to students (Solomon et al., 2012). A longitudinal randomized controlled trial of 12,344 elementary school children found that children who fell into an at-risk or high-risk category for social-emotional skills and behavior problems were significantly less likely to receive an office disciplinary referral when their schools implemented School-wide Positive Behavioral Interventions and Support (SWPBIS) compared to their peers in comparison schools (Bradshaw et al., 2015). At a four-year follow-up, teachers reported lower rates of bullying and peer rejection for those children who attended schools with SWPBIS compared to those who did not, suggesting that SWPBIS may improve the school climate regardless of risk level (Waasdorp et al., 2012).

Social Skills Training (SST)

Friendship skills such as maintaining reciprocal interactions with peers at school, in the home, and in the community become a primary treatment target for children with ASD entering their school years. Peer meditated interventions have been consistently shown to have positive outcomes for social, communication, and play skills for children with ASD (Gunning et al., 2019). Evidence also supports the use of Social Skills Training (SST) as an important modality of treatment for many school-age children who display core social deficits (Hume et al., 2021; Steinbrenner et al., 2020). SST have many models of delivery, but generally utilize group sessions with behavioral modeling of social situations and practice through role-play with facilitator feedback and reinforcement. Specific social skills such as making social eye-contact, demonstrating and recognizing facial expressions and emotions, posture, and social distance are often encouraged by facilitators (Hume et al., 2021; NAC, 2015). SSTs protocols often emphasize social cognitive skills, pragmatic language, and nonverbal communication skills. SSTs have also been found effective at improving school readiness, play skills, and adaptive and self-help skills in children between the ages of 6 and 14 years old (Steinbrenner et al., 2020). Higher-level social cognitive skills necessary for children with ASD can also be developed with SSTs, including Theory of Mind, problem-solving abilities, cognitive flexibility, social perception, and perspective-taking (Wong et al., 2015; NAC, 2015). Some of the manualized SSTs for children in this age range include Adapted skills streaming (McGinnes-Smith, 2012), Children's friendship training (CFT) (Frankel & Myatt, 2003), Superheroes Social Skills Program (Jenson et al., 2011), and KONTAKT (Herbrecht et al., 2009).

Cognitive Behavioral/Instructional Strategies (CBIS)

Cognitive Behavioral/Instructional Strategies (CBIS) are another EBP for school-age children with ASD designed to challenge maladaptive thought patterns and behaviors (Steinbrenner et al., 2020). CBIS provide instruction on how to control or manage cognitive processes with the aim to elicit social, behavioral, or academic improvements (Hume et al., 2021; Wong et al., 2015). When delivered in clinic-based settings, parents often attend weekly therapy sessions in conjunction with their children in order to learn strategies to help their children at home and in the community (NAC, 2015). According to the NSP2, the Cognitive Behavioral Intervention Package (CBIP), which is evidence-based for children and adolescents with ASD between the ages of 6–14, is shown to increase personal responsibility and interpersonal skills (NAC, 2015). These types of therapies are also evidenced to increase cognitive functioning as well as decrease problem behaviors and challenges with sensory or emotional regulation (NAC, 2015). Evidence-based manualized CBIS for children in this age range include Exploring Feelings (Exploring Feelings; Attwood, 2009), and The Coping Cat Program (The Coping Cat Program; Kendall et al., 2002) (NAC, 2015). Randomized controlled trials have also shown evidence for the program Unstuck and On Target (UOT; Kenworthy et al., 2014), which can be implemented in classrooms and supports executive functioning weaknesses by using techniques from Cognitive Behavioral Therapy (CBT), a well-established evidence-based type of therapy that focuses on changing both thoughts and behaviors, to teach skills such as flexibility, planning, goal setting, and self-regulatory scripts. UOT in elementary school-age children with ASD has also been associated with greater improvements in classroom behavior compared to those who received Social Skills training (Kenworthy et al., 2014).

Existing evidence also suggests that CBIS can be effectively used to address some of the comorbid symptoms and conditions often observed in school-age children with ASD. For instance, clinically elevated symptoms of separation, social, or generalized anxiety can be addressed in individuals with ASD by implementing treatments specifically designed to reduce anxiety symptoms in children with ASD, such as the Facing Your Fears (FYF) program (Reaven et al., 2012). This program consists of separate manuals for children and adolescents and is conducted in small groups and has been shown to be effective in the reduction of anxiety symptoms when delivered by trained clinicians (Reaven et al., 2018). Additional evidence that modified CBT programs are useful in decreasing anxiety and autism symptoms in school-age children comes from studies of programs like Behavioral Interventions for Anxiety in Children with Autism (BIACA), an adapted version of The Building Confidence Program, created specifically for school-age children and emerging adolescents with Autism with comorbid clinical anxiety (Danial & Wood, 2013; Wood et al., 2009, 2015).

Treatments in Adolescence

Adolescence is a time of hormonal changes in the body, structural and functional changes in the brain, and heightened learning in social and emotional domains leading to a need for increased emotional regulation and social comprehension (Tseng et al., 2020). Due to the increased demand during this stage of life, some of the social deficits that an individual with ASD might have, may become more pronounced in adolescence such that 30% of individuals with ASD experience functional setbacks in this stage (Picci & Scherf, 2015). Being that ASD is a lifelong disorder, outcomes vary widely across individuals such that those with average or above average intellectual and language abilities tend to have better long-term outcomes and show a greater level of improvement symptom presentation and function compared to those with a comorbid intellectual disability (Ratto & Mesibov, 2015). Furthermore, it has been found that individuals who struggle in navigating complex social interactions may suffer bullying and victimization and these rates are much higher for those on the autism spectrum compared to typically developing individuals (Miller et al., 2014). Mental health treatment in adolescence can also become increasingly important as this is a time when other comorbid psychiatric disorders like anxiety and depression may arise (Miller et al., 2014).

Key Skills

Social situations targeted for skill development in adolescents with ASD may include making friends, navigating romantic relationships, and engaging in social gatherings. Improved conversational skills can be important building blocks for these interactions; therefore, focusing on reciprocity, and both understanding and using non-verbal language, can have important implications for skill development (Schall & McDonough, 2010). Due to increased independence in this stage, adaptive and practical skills generally related to independent living skills (NAC, 2015) possibly in the home (e.g., cooking, cleaning, and chores) and community (e.g., budgeting, shopping, and taking transportation) as well as personal care (e.g., dressing, hygiene) may be target skills. Furthermore, vocational skills (i.e., related to employment, preparation for employment, or specific skills for a job), cognitive skills (e.g., executive functioning, problem-solving, information processing, reasoning, memory), and academic skills like planning and organization can also be key areas of focus at this stage of development (NAC, 2015).

Evidence-Based Treatments

Evidence-based treatments, or established interventions, that are commonly used in adolescence include ABA-based strategies like modeling and self-management interventions, as well as social-cognitive interventions and CBT. Some additional emerging interventions include mindfulness-based interventions and computer-assisted interventions.

Applied Behavioral Analysis and Related Strategies

When used in adolescence, ABA-based treatments are often used for the management of challenging behaviors with the goal of reducing inappropriate or self-injurious behavior (NAC, 2015). ABA services can be delivered in school settings and at home by a service provider or delivered by parents. ABA may be particularly useful for adolescents with more severe ASD in order to teach alternative behaviors and skills (Ratto & Mesibov, 2015).

Similar to the school-age period of childhood, many established EBPs for teens utilize behavioral strategies underlying ABA, like antecedent-based interventions, differential reinforcement, extinction, prompting, reinforcement, functional behavioral analysis, functional communication training, and discrete trial training (Steinbrenner et al., 2020). These strategies are commonly used to target self-help and adaptive skills, academic skills, vocational skills, social and communication skills and decrease challenging and interfering behaviors (Hume et al., 2021). The development of self-help and adaptive skills can be particularly important in adolescence due to the growing developmental importance of independence during this period of the lifespan.

For instance, modeling interventions have been demonstrated to be effective ways to teach adolescents with ASD new skills. In adolescents, these interventions aim to increase higher cognitive functions, academic skills, communication skills, interpersonal skills, personal responsibility and decrease problem behaviors and sensory or emotional regulation problems (NAC, 2015). Similar to earlier in childhood, modeling interventions can be delivered live or via video and potentially through peer-based instruction (Hume et al., 2021). This form of intervention can be especially helpful for those with an affinity to technology and can promote the continued development of independence.

Self-management interventions for adolescents have also been demonstrated to be effective and may focus on increasing academic skills, interpersonal skills, self-regulation, and communication skills as well as decreasing restrictive, repetitive nonfunctional behavioral patterns, and restricted interests or activities (NAC, 2015). Self-management interventions can be especially important in adolescence due to a new capacity to think abstractly and an increased capacity for independence. Self-management entails building skills in self-awareness and self-regulation in order to develop self-evaluation and self-correction skills. Potential benefits of these interventions include awareness of behavior, accountability for completing tasks, direct and immediate feedback, skills in multi-tasking, and decreased stigma due to greater independence (NAC, 2015; Crutchfield et al., 2015; Finn et al., 2015).

Social Cognitive Interventions

Social cognitive interventions may focus on the domains of emotional processing, social perceptions, theory of mind, and attributional style all of which play a role in navigating the social world (Tseng et al., 2020). These interventions could target and build social skills, emotional regulation skills, academic skills, change behavior, or even develop cognitive skills in adolescents. Interventions that fall within this category can include both behavioral and cognitive strategies to teach these skills. For instance, peer-based instruction and interventions (PBII) can be used with adolescents to target appropriate social skills. PBII is an intervention in which peers promote social interactions or other individual learning goals (Hume et al., 2021). Social narratives (SN) are another evidenced-based intervention where various social situations are described to highlight important aspects of a target behavior or skill with the purpose of providing examples of appropriate responding (Hume et al., 2021). It is important to note that many evidence-based social cognitive interventions incorporate cognitive and behavioral principles for teaching social skills or addressing other core deficits. Cognitive Behavioral Therapy is also a stand-alone treatment that can be directly used to address co-morbid mental health issues like anxiety or depression (see below).

Social Skills Training Social skills treatment for adolescents can be delivered in a one-on-one setting, dyad, or group setting and can vary from clinical settings to school settings, the individual's home, or through the community (Miller et al., 2014). These interventions, mainly based on behavioral and cognitive-behavioral principles, focus on improving the social skills of the individual through teaching skills, practicing skills with peers, and learning through modeling (NAC, 2015). Some of these interventions are manualized and group-based including programs like Multimodal Anxiety and Social Skills Intervention (MASSI; S. White et al., 2012), Social Skills Group Training (SSGT; "KONTAKT"; Herbrecht et al., 2009), and PEERS (Program for the Education and Enrichment of Relationship Skills; Laugeson et al., 2011). Social skills treatment can focus on a range of targets delivered via didactic lesson planning or group interventions like conversational skills, emotional knowledge, problem-solving, social and emotional perspective taking, social awareness, empathy building, theory of mind, emotional expressiveness, self-determination, and sometimes reduction of specific anxiety symptoms (Miller et al., 2014; Ratto & Mesibov, 2015). Although SST has been found to result in improvements in emotional regulation, social knowledge, and satisfaction, individuals with ASD may have difficulty generalizing skills into daily life. Parents can play an important role in the generalization and maintenance of skills through being involved, informed, and assisting with accurate use of the skills outside of the group (Miller et al., 2014).

Cognitive Behavioral/Instructional Strategies (CBIS) There are a wide variety of cognitive behavioral/instructional strategies (CBIS) documented to be effective for the treatment of adolescents with ASD (NAC, 2015; Steinbrenner et al., 2020). Cognitive behavior therapy (CBT) is a specific modality of EBP that has been repeatedly applied in treatment of individuals with higher functioning ASD and co-morbid psychiatric disorders like anxiety. This therapy is based on the idea that thoughts, behaviors, and feelings are related and that unhelpful or maladaptive thoughts can maintain negative feelings. CBT-based programs are often manualized and typically include psychoeducation (e.g., information about the presenting problem like symptom presentation and impact on thoughts, behaviors, and feelings), cognitive restructuring (e.g., identifying automatic thoughts and working to challenge and change them) and behavioral activation (e.g., engaging in positive activities through structured scheduling into their daily routine). CBT can be delivered individually or in groups, typically involves homework for practice outside of sessions, and can include the involvement of caregivers or other family members. CBT treatments are characterized by their structured interventions, clearly identified expectations and duration, and consistent session formats and thus would typically only require a few modifications for an individual with ASD. Common modifications include materials with more visual cues, utilizing role-play, potentially adjusting the structure of sessions, and focus on a specific purpose like addressing anger management (NAC, 2015). CBT interventions often aim to increase skills related to higher cognitive functions, interpersonal skills and responsibility and decrease problem behaviors and sensory or emotional regulation difficulties (NAC, 2015).

Emerging Interventions

There are many emerging interventions that may have additional promise for adolescents with ASD. For instance, mindfulness-based interventions have been identified as a promising approach for targeting issues related to attention and executive functioning and may include yoga interventions, mindfulness-based psychological interventions, and traditional mediation training (Mak et al., 2018). Another distinct area where significant progress is expected in the coming years is in the application of technology to enhance treatment delivery and efficacy. Many computer-assisted and other technology-aided approaches have already been tried to supplement existing therapies or as the primary form of delivery for treatment (Soares et al., 2021; Crutchfield et al., 2015; Finn et al., 2015). While these have varied in their level of efficacy and generalizability, technology-based interventions have the potential to greatly benefit individuals with ASD due to the technology's ability to limit distractions (i.e., sensory stimuli), be consistent and predictable, and communicate clear expectations (Tseng et al., 2020).

Emerging Adulthood

The period of development spanning from ages 18 to 25 and encompassing social and economic changes prolonging entry into adulthood is now typically referred to as emerging adulthood. This period of development can be qualitatively different from both adolescence and adulthood due to differing roles, developmental challenges, and unique opportunities to explore identities (Arnett, 2000). For autistic individuals and their families, this time can be characterized by particular uncertainty, loss of previous support and services, and a transition into adult-appropriate resources for either career, education, or long-term care (Wood et al., 2018).

The transition to adulthood is often particularly challenging for autistic individuals, due to expectations related to independent decision-making and participation in the community. Independence requires the performance of cognitive and physical skills in the areas of self-care, personal safety, financial management, employment, and interpersonal relationships which, while feasible for some autistic adults, may be challenging for other individuals without substantial support (Loomis, 2014). Because of this, the emerging adulthood period may require skill development for self-sufficiency, mature relationships, adult roles, responsibility, and education and training for work during adulthood (Wood et al., 2018). The best practices in emerging adulthood for transition-age autistic individuals include continuity and coordination in social and institutional support from adolescence into adulthood that are strengths-based, provide career development and work opportunities, involve collaboration across agencies, include support for the family, foster self-determination and independence, develops social and employment skills, and provides job-related support (Wood et al., 2018). For example, the Stepped Transition in Education Program for Students with ASD (STEPS) is a program aimed to address psychosocial and transition-related needs of emerging adults and has been found to be feasible and acceptable by young people with ASD and their parents (White et al., 2021). This program displayed positive effects for secondary school students in the transition from high school and for students enrolled in postsecondary education, and there were increased rates of student adaptation to college (White et al., 2021).

Treatments in Adulthood

Research suggests that autistic adults have fewer opportunities to form meaningful social relationships, obtain employment, participate in education beyond high school, and live independently when compared to neurotypical adults (Seltzer et al., 2004). Despite the known challenges that autistic adults face, reviews of EBPs demonstrate gaps in the identification of vocational and mental health services for autistic individuals in adulthood (Wong et al., 2015; NAC, 2015). While the evidence for established interventions for autistic adults is not as robust, research in this area to date has focused on supporting these individuals in the areas of social relationships, independent living skills, higher education, and vocational skills.

One of the established interventions for adults 22 and older is behavioral intervention which include principles of learning, conditioning, and behavioral analysis that have been reviewed in previous sections. Similar to their application in adolescence, behavior intervention with autistic adults often aims to increase skills like communication, personal responsibility, and self-regulation and to decrease problem behaviors (NAC, 2015). Given the pervasiveness of the core symptoms of ASD that could intensify in adulthood, it will be helpful for future research to further explore psychosocial interventions that target communication, social interaction, and flexibility of thinking and behavior for adults (Bishop-Fitzpatrick et al., 2013). Furthermore, person-centered planning and universal design are especially important in considering how to best support autistic adults in enrolling in postsecondary education, obtaining meaningful employment, accessing adult services, and establishing appropriate housing.

Social, Psychosocial, and Emerging Interventions

Social functioning remains an important focus of treatment in adulthood as it has been found to be positively related to quality of life. Autistic individuals who have higher levels of social functioning might experience less stigma and prejudice and thus increase their ability to achieve milestones associated with adulthood and independence like getting and maintaining a job or developing and maintaining meaningful relationships (Kim et al., 2019).

Psychosocial interventions, which focus on social cognition in order to improve attention to social cues and improve social functioning, have been a focus of treatment for autistic adults and have been shown to have positive effects (Bishop-Fitzpatrick et al., 2013). Social skills training in adulthood often draws on cognitive-behavioral or social-cognitive principles with variations in structure and educational curricula, from programs like PEERS (Laugeson et al., 2015) to more open-ended and experiential-based content (Lorenc et al., 2017). These trainings and psychoeducation program target core autism symptoms, empathy, social support, social isolation or loneliness communication, social interaction, and flexibility of thinking and behavior (Bishop-Fitzpatrick et al., 2013; Cunningham, 2014; Gantman et al., 2012; Hillier et al., 2007, 2011; Laugeson et al., 2015; Lorenc et al., 2017; McVey et al., 2016). Although there is a need for further research, overall, social skill trainings have been found to have positive outcomes (Cunningham, 2014; Gantman et al., 2012; Laugeson et al., 2015; McVey et al., 2016). Furthermore, Lorenc et al. (2017) identify an additional gap in the research on emotional support, advocacy, and mentoring interventions for adults.

Other emerging interventions, in which one or more studies indicate potentially positive outcomes, are also important to consider for the treatment of autistic adults given the small number of established practices. However, additional high-quality research needs to be conducted with adult populations to grow the evidence-base of effective treatments (NAC, 2015). Similar to adolescents, there is an emerging trend of computer-based interventions for adults that target deficits in communication and social interaction, and which have been found to be enjoyable and acceptable by autistic individuals (Bishop-Fitzpatrick et al., 2013). There has been some emerging data indicating how computer-based interventions compare in efficacy with in-person treatment and whether any of these interventions are more effective than non-computer-based interventions (Bishop-Fitzpatrick et al., 2013; Bölte et al., 2002; Golan & Baron-Cohen, 2006; Trepagnier et al., 2011).

Supports for Young Adults in Post-secondary Education

There has been a recent trend toward supporting autistic individuals in accessing postsecondary education (Wood et al., 2018; White et al., 2021). Many individuals with ASD are capable of enrolling in higher education programs, with approximately 66% of the autistic population scoring in the average or above average range on intellectual ability measures (Centers for Disease Control and Prevention, 2020). Barriers to successful enrollment and participation in postsecondary education programs include challenges in participating in social activities (i.e., living in dorms, extracurricular activities), managing time and changing schedules, and maintaining organizational skills, flexibility, and academic motivation (White et al., 2016; Hillier et al., 2021). While disability services are available on many college campuses, many individuals express hesitance to make use of these services due to stigma and fear of judgment from their neurotypical peers or professors (Kuder & Accardo, 2018; White et al., 2016; Hillier et al., 2021). Further, many autistic college students who have enrolled in support through disability services express that these supports are not tailored to the unique needs of autistic students (Barnhill, 2016; Kuder & Accardo, 2018).

Barnhill (2016) found that in an investigation of universities in the United States, 45 universities provided services specific to the autistic population. In a review of survey responses from 30 of those institutions, 15 (50%) universities reported providing social skills groups for college students with ASD, 5 (17%) offered group therapy, and 13 (43%) offered individual therapy specifically tailored to ASD. In their review of effective support for autistic college students, Kuder and Accardo (2018) identified eight intervention studies that were shown to have positive outcomes for autistic college students. Effective practices included three studies of cognitive-behavioral interventions, one college transition program, three interventions focused on social communication skills, and one comprehensive overview of commonly used accommodations (Kuder & Accardo, 2018). Student-to-student mentoring/peer mentoring outcomes from several studies suggest peer mentoring programs not only help to support autistic college students socially and academically but also educate peers through first-hand experience interacting with autistic students, potentially breaking down stigma and biases (White et al., 2016; Hillier et al., 2021).

Vocational Training and Supported Employment

Many autistic adults have the desire to obtain meaningful employment, and those who are successful in doing so report lower anxiety, improved well-being, financial gain, independence, and feelings of acceptance and purpose (Hurlbutt & Chalmers, 2004). While many individuals with ASD receive intensive services throughout their lifespan, employment rates for the autistic adult population remain very low (Wehmatin et al., 2014). Despite the fact that over 50% of autistic adults have average or above-average IQ and possess the cognitive ability to contribute meaningfully in many vocational settings, impairments in social communication skills often create barriers to employment (Johnson et al., 2020).

The Rehabilitation Act of 1973 was created in order to promote governmental support for sustained employment for individuals with disabilities. As a result, state and federally funded vocational rehabilitation (VR) services are available to adults with disabilities in the United States. In their review of VR outcomes for adults with ASD, Alverson and Yamamoto (2018) found that the number of VR services received was the primary predictor of positive employment outcomes. Vocational training, which typically involves the use of self-management and behavioral skills training, has been identified as an emerging intervention for adults with ASD which involves the use of self-management in mastering tasks related to employment and monitoring performance (NAC, 2015).

The Treatment and Education of Autistic and related Communication-handicapped Children supported employment program (TEACCH; Keel et al., 1997) is an evidence-based professional training program that places specific emphasis on individual strengths and areas of interest in securing and maintaining employment. Through this program, individuals receive facilitated job placement and long-term behavioral support and supervision from an on-site job coach. Preliminary evaluations of the Project SEARCH plus ASD support model (Wehmatin et al., 2014) also suggest promising results for securing employment for autistic individuals. In this model, individuals receive 9-months of employer-based vocational training during their final year of high school. The treatment package includes systematic instruction based on the principles of ABA, on-site support from a behavioral expert, and intensive staff and organizational training. Randomized controlled trials of Project SEARCH have indicated higher employment rates and higher wages for those in Project SEARCH compared to control groups (Wehmatin et al., 2014; Smith et al., 2020a, b). While intensive on-site employment support programs have been shown to be effective in improving employment outcomes for autistic adults, the feasibility of implementation of these interventions may be compromised due to the needs for staffing and financial resources.

The Interview Skills Curriculum (ISC; Morgan et al., 2014) was developed in order to address social communication deficits that may impede autistic adults during the interview process. This 12-week treatment model targets social-pragmatic skills necessary for performance during interviews (e.g., non-verbal communication, small talk, interview skills) through role-play, modeling, and in-vivo feedback. Preliminary findings suggest that this may be an effective model, with participants in the immediate treatment group showing greater improvements in interview skills compared to IQ-matched control group participants. Other researchers have built on the original ISC methodology. For example, the Virtual Reality Job Interview Training curriculum (VR-JIT) is an electronic interview training program that shows promise in teaching individuals with ASD to acquire and practice interview skills, both immediately after treatment and at follow-up (M. Smith et al., 2015; Smith et al., 2020a, b). The Job-Based Social Skills Program (JOBSS; Gorenstein et al., 2020) is a manualized intervention aimed to promote social and pragmatic skills in order to improve employment outcomes in autistic adults. This 15-week intervention incorporates foundational CBT and ISC methods and interview skills training in a clinician-led group-based setting. Results from preliminary trials of JOBBS indicated that those in the treatment group reported higher increases in employment compared to those in the waitlist control groups. Further, both individuals and their family members reported improvements in social-cognitive skills.

Importance of Systems in Supporting Adults

Collaboration and input from organizations result in the best employment outcomes for autistic adults; thus many researchers have taken a systems-level approach to evaluate support for autistic adults in the workplace (Hurlbutt & Chalmers, 2004; Johnson et al., 2020; Phillips et al., 2016). Human Resources Departments may collaborate with educational organizations and other agencies in order to evaluate the skill sets of individuals and maximize opportunities for internships and training programs to promote the successful employment of autistic adults (Johnson et al., 2020). Diversity training and collaboration with psychology and medical professionals may also be useful in facilitating workplace acceptance and addressing employer bias (Alhejji et al., 2016; Johnson et al., 2020; Phillips et al., 2016). Taking a combined approach to facilitating organizational-level support and promoting individual vocational skill development may be beneficial in reducing the need for extraneous resources and improving the feasibility of widespread vocational support.

Autistic adults also live in many different contexts, which must be taken into account when considering treatment delivery models and settings. A recent study by Dudley et al. (2019) found that in a sample of 274 caregivers of autistic adults, living with the family was the main predictor for less service use, higher unmet need, and more obstacles to accessing services. While autistic adults may experience many other benefits from living with family members, the barriers to service utilization described in the study may imply a significant scaffolding effect that has major implications for public policy for autistic individuals in adulthood (Dudley et al., 2019). Lorenc et al. (2017) discuss how supportive adult services should be encouraged but also require further research and financial support to have a widespread impact. Furthermore, the authors highlight that many existing policies are directive and top-down models that focus on mitigating deficits of an individual versus individualized care that addresses the diverse needs of each autistic adult (Lorenc et al., 2017).

Taken in summary, autistic adults can be expected to have varying trajectories and therefore interventions optimizing contextual support and individual skills training are necessary to support the overall quality of life and autonomy for this population. Further development of psychosocial, vocational, and educational supports like those discussed above is strongly needed. While attention to the need for ASD-specific supports is increasing, the establishment of these systems is substantially delayed when compared to interventions delivered in early childhood and adolescence. Continued research in the area of both individual and systemic interventions is necessary in order to inform policies that may better support autistic adults.

Conclusion

The chapter has reviewed a range of approaches commonly used in the treatment of ASD with an emphasis on EBPs across the lifespan. Particularly for young children, there is a growing consensus regarding best practices that combine intervention techniques from multiple theoretical frameworks and include stakeholder engagement and intervention across meaningful environments (Bruinsma et al., 2020). There remains a substantial need for intervention development and research into community effectiveness and scalability of innovative treatment models, particularly for treatments in older individuals where the evidence-base is less well-established.

In looking toward the future, the growing field of implementation science provides promising new tools for overcoming contextual barriers and cultivating a wide range of facilitators to support community uptake of EBPs (Stahmer et al., 2019). Additionally, concerns about significant health disparities for racial and ethnic minority groups and for low-income populations exist and continue to deserve serious scientific attention (Bilaver et al., 2020; Smith et al., 2020a, b). Consequently, community-based participatory research will continue to be necessary to bring meaningful, culturally effective practices to families who need them and to ensure that treatment development efforts are informed by and responsive to a diverse set of stakeholders.

Finally, while evidence is emerging that technology-based treatments may in many cases show similar efficacy to face-to-face treatments, their full potential as a scalable solution for widespread dissemination is not yet fully realized. Furthermore, the worldwide effects of the COVID-19 pandemic on the delivery of educational, behavioral, and mental health services have already had transformational effects on the field of ASD treatment and can be expected to continue to have a lasting influence on practice and research for many years to come.

In conclusion, the wide range of established evidence-based practices for the treatment of ASD and the rapid acceleration of treatment development over the last few decades provides substantial hope for individuals with autism and their loved ones. In particular, the emphasis on research into naturalistic, community-based interventions is inspiring and promises meaningful advances in inclusion and quality of life for individuals with ASD in the future.

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Part VII

Assessment and Treatment of Pediatric Disorders

32

Toilet Training

Jean-Jacques Wyndaele
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Introduction

Toilet training has come to public attention in the last decades. Press, Internet, local events, and even parliamentary interactions have dealt with the subject. The reasons for this are multiple and explained in this chapter. Toilet training, as the way to voluntary control of the mostly autonomous lower urinary tract (LUT), is not always successful. Some children will become dry within days, almost as if spontaneous, while others need much more time and do not always succeed. Toilet training is multifactorial with influence from the related viscera, the child's mental development, the availability and skills of trainers, the overall psychological and emotional factors of child and family, daycare providers, and teacher's general health, and the drinking and eating habits. The consequences of difficult or unsuccessful training are also multifactorial, with a psychological impact on the children, those who train them, and the environment, finances, social integration, and school results. All these will be dealt with consecutively. We will restrict us to TT for healthy children.

Primary Physiological Data of Lower Urinary Tract (LUT) and Lower Bowel Tract (LBT) (Bourdelat et al., 1992; Abrams et al., 2003; Wyndaele, 1998)

The urinary system takes care of urine production by the kidneys, its active transport towards the bladder where it is stored for several hours until signals are given to the brain to invite the voiding to start.

By 14–15 weeks of gestation, a definite muscularization of the sphincter is present. Simultaneously the bladder develops a rich nervous network for the detrusor muscles and the sensory innervation.

The innervation of the LUT is very elaborate and located at different levels of the central innervation: cerebral cortex, thalamus, hypothalamus, limbic system, basal ganglia, brain stem with pontine filling and voiding centres, periaqueductal grey, the spinal cord with ascending and descending pathways. Autonomic and somatic peripheral nerve plexuses (hypogastric, pelvic and pudendal) are involved and afferent pathways in the dorsal roots and the dorsal spine column towards the brain, and

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descending pathways towards the bladder and urethral sphincter. In normal conditions, the brainstem regulates the synergic action of urethral sphincter relaxation and bladder contraction.

Bladder filling continues through the day and night, but less quantity is produced during the night, as discussed under enuresis nocturna.

The LBT has similar neurologic structures, uses the same peripheral nerves and spinal pathways, with brainstem control.

The muscles in LUT and LBT are smooth and thus not directly under voluntary control, except those of the urethral and anal sphincters that are striated and can voluntarily be contracted or relaxed. In normal conditions, voluntary actions often occur without conscious attention, regulated by customs and by training.

The bladder and bowel are of endodermal and mesodermal origin, formed from the splitting of the cloaca. Both are first identifiable as separate structures at 8 weeks of gestation. More information on embryology is available in the literature.

In ideal circumstances, the process of micturition starts with a desire to void. This sensation happens in healthy people as the first desire to void at around 60–75% of the bladder capacity. If ignored, it evolves into a strong desire to void, which incites to look urgently or a proper place to empty. When voiding can start in the right place and at the right time, different steps come into action: first, a voluntary relaxation of the urethral sphincter and pelvic floor muscles, which is an invitation to start the process, followed by detrusor muscle contraction and the start of the expulsion of the urine, normally continuing till the bladder is empty. A sensation warns about this, while the contraction of the detrusor stops, the sphincters regain their normal tone and the sequence restarts.

The ideal bowel emptying process is similar: a sensation of desire to evacuate, going to a proper place to relax the puborectalis sling and the anal sphincter, descending of faeces in the anal canal and evacuation with little or more straining. An empty lower bowel is felt, the sling and the sphincter contract, and the toileting is completed until the next time. The emptying process is the easiest and most physiological if done when desire occurs, indicating that the faeces are pushed into the rectum by autonomic bowel contraction.

The Normal Development of the Voiding Process in Children (Sillén, 2001; Gladh et al., 2000)

Voiding happens already in the uterus. It occurs during the last 3 months of the pregnancy to around 30 voids per 24 h. After delivery, voiding is often rare for one or a few days. This low frequency increases again quickly, and emptying may happen every hour when the child is 2–4 weeks old. At 16 weeks, the number of voids become less and the quantity of urine per void increases. At 28 weeks, the diapers start to be soaking wet, and the interval between emptying becomes longer. Around 6 months, the number comes down to 10–15 times a day, and this lowers further to 8–10 times a day at age 1. The volume voided has by that age become four times bigger. When growing up, the number of voids decreases to 3–7 at age 7 and 4–6 at age 12 on average.

Shortly after birth, the baby will rarely void during the night. At first, there is a phase of waking up by voiding and wetting. The baby may start crying suddenly during his sleep, a sign that attention to the process begins. Movements of arms and legs are followed by awakening, and then the voiding starts. After voiding, the baby will fall asleep again.

Below 3 years old, voiding happens in several streams, but this phenomenon disappears at a higher age. Desire to void is present at age 1–2 and becomes stronger during growing up, while the control of voiding or holding improves. In and between children in the number of voids and the quantity of urine expelled vary. Speed of ripening, gender, habits, body length and weight are of influence. Training, social norms and negative feeling about leaking and wetting are further discussed.

One can put the process of getting bladder control in a memo: first, there is the knowledge that miction has happened, then follows the awareness during voiding. In the next step, the child knows that voiding is going to happen. Finally, the desire to void is communicated to parents and trainers.

For a long time, the infant's bladder was thought to be overactive, empty automatically at regular intervals through simple spinal reflexes without control of higher centres. Development was believed to be a maturational process, usually functional at the age of 4 years. But in the last two decades have become clear that the pathways involved must be much more extended and influenced by behaviour and arousal.

A phase with incomplete coordination between detrusor contraction and sphincter relaxation may be present.

The Normal Development of the Defecation (den Hertog et al., 2012; Çamurdan et al., 2014; Gulati et al., 2018; Van Aggelpoel et al., 2020)

The process of control of defecation runs similar to that of the voiding process. But easy defecation needs faeces autonomically pushed in the anal canal by peristalsis. The frequency of defecation varies one time a day, every 2–3 days or several times a day. The consistency of the faeces can vary. An excellent way to describe this is the use of the Bristol bowel scale.

Children may get a well-balanced rhythm in the defecation process, emptying during or shortly after a meal, not seldom after breakfast. It relates to the gastrocolic reflex. When the stomach fills, the bowel muscles start contracting and the propulsion of faeces happens by peristalsis. Desire to defecate occurs. The importance of the gastrocolic reflex for TT is discussed later.

Bladder and Bowel Interactions (Largo et al., 1978; Malykhina et al., 2012; De Wachter & Wyndaele, 2003a; Panayi et al., 2011; Burgers et al., 2010; Loening-Baucke, 1997; De Wachter et al., 2007; Ambartsumyan et al., 2016)

The interaction between LUT and LBT is more crucial than often thought and evaluating this is part of TT. A similar sequence as given for the bladder exists for the bowel, with bowel maturation preceding bladder maturation. Being able to postpone is necessary to allow micturition and defaecation to occur in a socially acceptable site.

The bladder and bowel should not be taken as two completely different organs. They are linked in many ways both in health and in pathology.

Embryologically bladder and rectum originate from the same basic structure, the cloaca. Anatomically both viscera lay in close communication and share muscular structures of the pelvic floor.

The innervation of both systems depends on the same autonomic and somatic nerves.

Very generally LUT and LBT act quite similar, and the voluntary control depends on accurate sensation. Continence relates to the automatic contraction of smooth closing structures (bladder neck and internal bowel sphincter) and voluntary contraction of striated urethral and anal sphincters. An inhibitory effect on detrusor and lower rectum resulting from contraction of the pelvic floor and anal or urethral sphincter has been named a "procontinence" reaction. Micturition and defaecation need a proper relaxation of these latter structures to permit a physiological reflex evacuation of urine or faeces.

There is a distinct role of dichotomizing afferents. New animal studies show that rectal distension has an inhibiting effect on afferent signals related to bladder filling.

When the bladder is full, sensation of rectal filling is decreased. When the rectum is distended, sensations of bladder filling are reported at smaller volumes.

This shows that the state of the rectum significantly influences the handling of sensory information from the lower urinary tract and vice versa.

Also in children with LUT symptoms rectal distention significantly but unpredictably affects bladder capacity, sensation and overactivity regardless of whether the children have constipation, and independent of clinical features and baseline urodynamic findings. Urodynamics and management protocols for LUT symptoms that fail to recognize the effects of rectal distention may lead to unpredictable outcomes. When healthy people visit the toilet to defecate, the initiation of micturition most often precedes that of defecation, even if both organs are considered equally full. Only if the bladder is empty or the desire to defecate is urgent, defecation will proceed to eventual voiding. The reason for this is unclear but one can hypothesize that bladder emptying needs to be more timely in order to keep the balance in the lower urinary tract and so takes precedence while the evacuation of the bowel is less critical.

A recent review showed that several studies in children documented that constipation is linked to urinary tract problems, including infections, enuresis, vesicoureteral reflux and upper renal tract dilatation. The underlying pathophysiology of these findings has not yet been clearly defined. Therapeutic action in one system can improve or worsen symptoms in the other. Treatment of constipation in children can lead to a resolution of urinary incontinence and can prevent further recurrence of urinary tract infections. On the other hand, treatment of overactive bladder with bladder-relaxing drugs can cause constipation.

When to Start TT?

There is no clear answer as yet to that question. But several studies are available that may lead to a clinically practical guideline.

How Is the Outcome When TT Starts During the First Year of Life? (Rugolotto et al., 2008)

Such study has been done in an international population of children ($n = 286$) who started TT in the first year of life. For those who completed TT at the time of survey mean completion ages for daytime dryness and bowel control were 17.4 and 15.0 months, respectively; those who initiated TT during the first 6 months completed the training earlier than those who started later; those who showed stool refusal at the beginning of the training completed bowel training later than those who did not; those who exhibited elimination signals for voiding or bowel movements completed day-dryness and bowel training earlier than those who did not. The literature does not mention the negative side effects of starting training so early. But as described below starting TT when the child is not ready must be avoided.

Postponement of the TT Age (Bakker & Wyndaele, 2000; Barone et al., 2009; Blum et al., 2004; Jansson et al., 2005; Berk & Friman, 1990; Horn et al., 2006; Horstmanshoff et al., 2003; Rogers, 2002) [19–26]

In the past 60 years, the Western world saw an evolution towards a later start of TT and a shift from a very structured to a highly unstructured approach. Most parents of three to four generations ago started TT in the first year of life and latest when the child reached the age of 18 months. Nowadays children start between 21 and 36 months on average. The duration of the TT has not changed. In the 1950s children had daytime continence when they were on average 24 months, but over the years this age increased towards 36–39 months at the end of the twentieth century. One may perhaps accept that since Brazelton initiated the child-oriented method (see under methods for TT), and suggested postponing to 18–24 months, several social changes caused a further increase in this postponement. Most are social causes as no big change has been shown in the normal development of children during these decades.

Why the parents started early half a century ago is not known. Suggestions have been tradition, and the use of linen diapers with a lot of washing to be done.

Frequently mentioned as a cause of postponement is the introduction of the disposable diaper. The ease of its use may have parents not to feel hurried to get their child trained. The diaper gives the child a dry and comfortable feeling, but at the same time eliminates the impact of signs of wetting and its relation to a desire to void. More efficient washing facilities are also mentioned as a cause. Moreover, parents seem to dedicate less time to TT their children. This might be a consequence of the lack of time of the parents have available, mainly as both parents are working outside the home. Also, a changed attitude of the parents is raised as a possible cause, as parents would be using different approaches, would be less consistent and authoritarian and more liberal with respect to education. Moreover, also the parents' confusion about when their child is ready to start TT or the perception that their child is too young to train, especially as the child-oriented approach is promoted, are contributing factors. In many parts of the world, daycare has taken over a large part of the TT. We will discuss further the consequences of this.

Consequences of Postponement [19, 21, 23, 27–51] (Bakker & Wyndaele, 2000; Blum et al., 2004; Berk & Friman, 1990; Schum et al., 2001; AAP, 1999; Bakker et al., 2001; Hadler & Mc Farland, 1986; Hellstrom, 2000; Joinson et al., 2009; Mota & Barros, 2008a; Taubman, 1997a; Pickering et al., 1986; Sullivan et al., 1984; Luxem & Christophersen, 1994; Shaikh, 2004; Jansson et al., 2000; Krugman, 1983; Lehburger, 1988; Largo & Stutzle, 1977; Brazelton et al., 1999; Christophersen, 2003; KlInservik & Friedhoff, 2000; Brazelton, 1962)

There are an increasing number of studies which prove that the postponement of TT causes health, social, economic and environmental problems.

Postponing the onset of TT after 18 months of age and using certain methods to provoke voiding increases the risk of problems with bladder control in later life. Compared with children whose TT was initiated between 15 and 24 months, initiation of TT after 24 months was shown to be associated with problems attaining and maintaining bladder control. Starting TT at a later age is associated with an increased risk for urge incontinence and voiding dysfunction. Moreover, a link exists between later TT and the refusal of the child to have bowel movements on the potty and to hiding when defecating. This stool toileting refusal may be related to the later development of stool withholding, severe constipation and, if not resolved, primary encopresis. Another consequence may be irritated skin caused by wearing a diaper for a long time (diaper dermatitis).

In addition, the increased number of not toilet-trained children in daycare centres increases the risk of hygiene problems and the spread of diseases such as infectious diarrhoea and hepatitis A, buttock and perineal skin problems. The incidence of diarrhoea among children in daycare centres is highest for those under 3 years of age. An association between higher rates of diarrhoea and selected characteristics of centres – the most important of which is the presence of non-toilet-trained children – has been shown. Childcare workers should take into account strict rules to improve hygiene, such as washing hands after changing diapers. Not only is there an increased risk for hygiene problems, but there is also more pressure and less job satisfaction for nursery teachers who have large classes with more not toilet-trained children. In some nursery schools toddlers who are not yet toilet-trained are not allowed to subscribe.

When TT is postponed, children and parents face problems with hygiene and social embarrassment when the child grows older but is not yet toilet-trained, rendering the child very dependent on the parents. Also stress, frustration and tension for the child and parents may be a consequence. Moreover, not starting TT when the child is ready to be trained, may cause the child's interest to fade away and can delay the TT process.

The postponement of TT implies that children wear diapers for a longer period. On average, a child uses around 5000 disposable diapers before being toilet trained, which means around 1 ton of diaper waste per child. One can only be frightened by the thousands of diaper waste per year, which has to be handled. Disposable diapers may represent 8.5% or more of the total garbage waste. The increased production of diapers and handling the 'diaper mountain' means more energy, water and raw material cost, and is harmful for the environment. Moreover, parents have to buy diapers for a longer period, which is financially disadvantageous: the cost of diapers, calculated based on a period of 2.5–3 years, varies between 770 and 1770 euro (figures 2019), depending on the brand and the number of diaper changes per day.

On the contrary, studies that examined starting potty training earlier did not find negative effects, such as delayed development of bowel and bladder control, more relapses in the following years, constipation, stool withholding or toileting refusal. The TT was completed at an earlier age, yet the training duration increased.

The Concept of Toilet Readiness and the Use of Developmental Signs (DS) [28, 39, 52–62] (AAP, 1999; Pickering et al., 1986; Spock, 1946; Schuster et al., 2000; Wyndaele et al., 2020; Kaerts et al., 2012a; Kaerts, 2012; Carruth & Skinner, 2002; WHO, 2006; Simons, 2004; Sterling, 1992; Vermeiren et al., 2008; Zerin et al., 1993)

As every child has an individual development, age alone is not a good criterion to decide on the moment to start TT. It is important that TT starts at the moment the child is ready to be toilet trained. Starting TT in a child that is not yet ready can cause fear, frustration and stress for the child and the family, can extend the training duration and can make the child feel like losing control.

When the child is not yet ready to start the training and the parents put too much pressure, the child may begin to withhold urine or stool. Prolonged withholding leads to constipation and may compromise rectal tone or may progress to urinary dysfunction that manifests as urgency, frequency, diurnal enuresis, voiding infrequency, voiding intermittence or urinary infection.

Starting too late creates time loss, can cause the interest of the child to fade away and can generate physical, social and psychological problems, which have been described before.

Since using a fixed age as the only criterion to start TT seems not correct, it is advised to wait with TT until the child shows signs of toilet readiness (certain characteristics or skills related to the child's development), a concept that gained popularity when Brazelton (1962) proposed his child-oriented approach. At that time it was thought that early TT (starting in the first year of life or before 18 months of age) caused psychological and physical problems and that by postponing the TT age until the child showed readiness, such problems would disappear. Before starting TT, the child should have a certain toilet readiness: the child has to be physically and psychologically capable to become toilet trained and the parents must have the right attitude and involvement, as discussed before.

Currently, most methods of TT follow, in one way or another, the concept of toilet readiness before initiating TT. This is for most children from 20 months of age onwards. Others claim that a healthy child would be having assessable signs at 18 months, at 24 months or later than 2 years going to 30 months. The optimal time to start is not the same for all cultures, some start very early, and others at 18–24 months.

Not only are there differences in the suggested age at which DS would appear, but the literature also shows that there is uncertainty on which of them should be used. Former generations of parents toilet-trained their children by putting them on a potty-chair during meals. TT started more or less from the age at which the child was able to sit properly. This habit has mostly disappeared. The signs used to start TT have changed over the last century. Sixty years ago, signs to start were 'able to sit alone' and 'occasionally dry during the afternoon nap', while nowadays 'it is summer time', 'school is about to start' or 'the child asks for it', are more often mentioned. Till today a consensus on when to start TT and based on which or how many DS is lacking. But there have been studies that try to eliminate the confusion.

Crucial: Is the Child Ready? [19–21, 26, 28, 33–34, 46, 50, 54, 56, 62–69] (Bakker & Wyndaele, 2000; Barone et al., 2009; Blum et al., 2004; Rogers, 2002; AAP, 1999; Joinson et al., 2009; Mota & Barros, 2008b; Largo & Stutzle, 1977; Wyndaele et al., 2020; Kaerts, 2012; Zerin et al., 1993; Kaerts et al., 2012b; Choby & George, 2008; Doleys & Dolce, 1982; Schum et al., 2002; Largo et al., 1996, 1999; Taubman, 1997a)

Description of Published TT-Related DS in Young Healthy Children

In the literature of the past signs of development, probably in relation to TT in healthy children have been studied by different groups. The listing below connects them to the age intervals in which the average child shows them.

For the Western Society following data have been proposed in a review part of the PhD of N. Kaerts at The University of Antwerp (Kaerts, 2012) [**ref 56**].

Twenty-one signs of development related to TT were found, but further study on the ease to detect them did limit this number to 19:

Sign 1: Child can imitate behaviour;
Sign 2: Child is capable of sitting stable and without help;
Sign 3: Child can walk without help;
Sign 4: Child is able to pick up small objects;
Sign 5: Child can say NO as sign of independence;
Sign 6: Child understands and can respond to directions, questions or explanations and can follow simple commands;

Sign 7: Child expresses a need to evacuate by non-verbal communication (such as mimicry, posture or gestures, going to the toilet or grabbing the potty) or by words. The child indicates most of the time by himself/herself that he/she has wet/dirty pants;
Sign 8: Child enjoys putting objects in containers;
Sign 9: Child evacuates on the potty when he/she has the urge to pee or to have a bowel movement;
Sign 10: Child understands potty-related words and has an adequate vocabulary of his own;
Sign 11: Child has a broader vocabulary;
Sign 12: Child wants to participate in, wants to cooperate with the TT and shows interest in TT;
Sign 13: Child is dry after the midday nap;
Sign 14: Child insists on completing tasks without help and is proud of new skills;
Sign 15: Child wants to be clean and is distressed by wet or soiled diapers; The child indicates most of the time self that it has wet/dirty pants;
Sign 16: Child is able to pull clothes up and down in a TT-related content;
Sign 17: Child begins to put things where they belong;
Sign 18: Child can sit still on the potty for 5–10 min without being forced;
Sign 19: Child stays bowel movement-free overnight.

Chronologically, the first readiness sign is the ability to imitate behaviour, which develops between 1.5 and 24 months. A child from 6 to 20 weeks has the ability to imitate facial expressions, a child of 9 months can actively participate in interaction games and at the end of the first and the beginning of the second year of life the child is a completely matured imitator. Related to potty training this ability links to understanding of and reacting to external feedback.

Between 4 and 16 months the average child masters the ability to sit steadily without help. A child can sit without support between 4 and 9 months of age (1st and 99th percentiles), can sit in a lap without help at a mean age of 5.5 months and can sit straight without help between average of 8 and 10 months of age.

A child learns to walk on average between 8 and 18 months and is able to run without falling at a mean age of 15 months. Sitting stable on and walking to and from the toilet can be easily accepted as important in toilet control.

The ability to pick up small objects occurs on average between 9 and 18 months. A child of 9 months can grasp a small object between the thumb and the index finger. Between 13 and 15 months children are able to bend through their knees when standing to pick up an object and at 18 months children can sit on their heels to pick up an object. This is an indicator of fine motor coordination in the fingers and hands, which is useful when the children need to pull their pants up or down or wipe themselves after urinating.

Between 9 and 24 months the average child can say ‘NO’, which is seen as a sign of independence. A child of 9–10 months can express dissatisfaction and discomfort with a situation by the use of certain vocalizations combined with shaking ‘NO’ with their head. During the second year of life, these vocalizations develop to normal words.

Understanding and responding to directions or questions and being able to follow simple commands occur between 9 and 26 months. Between 9 and 12 months the behaviour of the child becomes purpose-oriented. The child is able to participate actively in games and in conversations, mutuality emerges. Between 12 and 18 months the child is able to understand and respond to familiar parental directions and react to external feedback and between 14 and 18 months to understand instructions. But it takes 22 and 26 months before it can fulfil most requests.

Between 9 and 36 months children will on average express a need to evacuate by non-verbal communication (such as mimicry, posture or gestures, going to the toilet or grabbing the potty) or by words. Children will indicate most of the time by themselves that they have wet/dirty pants. Around the age of 1–2 years, the child will demonstrate awareness of bladder fullness. On average, children of 12–36 months will let the parent or caregiver know that they have voided (earliest ability), that they are voiding (appears at the same age or later than the previous one) or that they have to void (this ability is most of the time the last acquired). There is almost no consensus found between the authors about the age at which these three last-mentioned abilities appear. Girls will indicate a need to go to the bathroom at a mean age of 26 months and boys at a mean age of 29 months. Children between the mean of 31 and 37 months old tell before they have to urinate.

'The child enjoys putting things in containers' is acquired between 10 or 12 or 18 months and 26 months.

To gain bladder control children have to be aware of bladder sensations, of their need to void. Most authors agree that the ability to be aware of a full bladder occurs when the child is between 1 and 2 years old.

Children need to understand potty-related words and need an adequate vocabulary of their own. These abilities develop between 12 and 26 months. When children are about 12–15 months old they can say two to three words and they understand the meaning of words. Also, children's passive word knowledge is bigger than their active knowledge. Between 1 and 2 years the child's proto-words develop into normal words and potty-related words are normally understood between 21 and 26 months old.

That the child wants to participate in (e.g. views the experience as positive), shows interest in (e.g. following the parents to the bathroom and being curious about others' toileting behaviours) and wants to cooperate with the TT occurs on average between 12 and 28 months of age.

When the child is between 12 and 31.5 months old the bladder capacity has increased, and larger amounts are voided at a time. At that age children usually remain dry for several hours and are dry during the afternoon nap.

Between 12 and 36 months the child insists on completing tasks without help and is proud of new skills. From 12 months onward the child's behaviour is intentional and purpose-oriented, between 18 and 24 months the child is proud of new skills, and between 18 and 36 months children want to do many things by themselves without help.

The child wants to be clean and is distressed by wet or soiled diapers appears between 18 and 24 months. At this age, they will develop a tendency for personal hygiene.

Children are able to pull clothes up and down in relation to TT between 18 and 36 months. A child of 3 years is usually able to dress oneself without help.

That the child begins to put things where they belong is also considered a DS that may relate to TT: pee belongs in the potty like toys belong in the proper closet. From around 2 years of age, a child will begin to clean up and put things where they belong.

The child can sit still on the potty for 5–10 min without being asked to do so, which is mentioned by only a few authors who put it between 25 and 33 months old.

Staying bowel movement-free overnight is also mentioned as a DS, and is seen between 21 and 25.5 months.

A DS rarely mentioned is that the child is asking for the potty. It was observed at age 1 in 5%, at age 1.5 in 33%, at age 2 in 71% and at age 3 in 97%. Children who asked for the potty were more likely to be clean and dry by day and night.

Also rarely mentioned is the sign 'the child wants to wear grown-up clothes and often asks to wear normal underpants without a diaper', what occurs between 18 and 24 months.

Summing up all the published development signs in TT literature is a first step. But more questions arise: can they all be easily observed by most and finally how can they best be used to guide TT by parents and caregivers. This is not an easy task as the overview given above shows that the literature on signs of toilet readiness is complex, unclear and divided. The ages when DS should be present have a very wide variation, making age itself of limited value in deciding that the child is ready based on that specific sign. It also remains unclear how many of the development signs should be present before it is advisable to start TT and if all the signs are equally important. Additionally, it may be that instead of considering development signs as expressions of spontaneous development, parents can influence some signs and TT can speed up the process of developing these signs.

Can All DS Easily Been Detected? (Kaerts, 2012; Choby & George, 2008) [56, 64]

It was shown that not all signs for toileting readiness can be easily detected and those signs are impossible to use in TT. It also became clear that if the observation was done during a period of 8 h by two observers, the reliability was high, but the identity of the observers was important. Between parents and trained observers, between caregivers and parents, and between caregivers and observers the % agreement is different for different development signs and can go from a total to a fairly strong agreement. Some signs are observed much easier if previous training for observation has been given, and the results of trained observers confirm highly.

Can DS Help Define Readiness for TT and Probability of Success, Forming RS? [54] (Wyndaele et al., 2020)

Age, though important as being related to development signs and the age of completion of TT, cannot be a strict stand-alone criterion to start TT, as every child has its own pace of development. Sitting stable, picking up small objects, and spontaneously putting objects in containers are present in all children of these ages and thus cannot have a predictive value. The same goes for walking without help and imitating others. Understanding and following instructions, and having a broader vocabulary are significantly more present when TT has already started. Dry during midday nap has been thought related to the development of enough bladder capacity, and for previous generations, this DS was even one of the most important reasons to start TT. But more recent data do not find much predictive value of this DS in the majority of children.

It is an interesting observation that in children who have not started TT yet ±30% understand potty-related words and that a few show interest in TT, indicate wet/dirty pants and pull clothes up and down as if being under TT. It probably indicates that spending a large part of the day with other children under TT in daycare may arouse interest and stimulate imitation before TT is properly started.

Four psychological/cognitive DS: ‘understanding and following instructions, using potty-related words, having a broader vocabulary and participation and interest in TT’, are found more present when TT has been started. Almost all children who have completed TT take a stand by saying ‘NO’, can complete skills alone and are proud of new skills. This is in contrast with children who have not started yet or are still having TT, where less than half of the children show these DS. The high prevalence of expressing a need and showing awareness to evacuate, voiding on potty related to desire to empty, participation and interest in TT, wanting to be clean and indicating wet or dirty pants, pulling clothes up and down related to TT, indicate that TT is a learning process and that toileting specific DS appear and develop during its course. As expected children who have started or completed TT use more potty-related words and can better sit still on the potty for some time. They also significantly begin to put things where they belong, indicating a growth in behaviour.

A proposal of a model to predict TT success based on RS and covariates is presented in the following table.

Table: most significant predictors of success in TT taking into account covariates number of days per week in daycare, age and gender:

Best predictor >	Child expresses a need to evacuate and shows awareness of the need to void or to have a bowel movement
Very good predictor >	Age
Good predictor >	Child can pull clothes up and down in a TT-related context
Good predictor >	Child insists on completing tasks without help and is proud of new skills

Does the Start of TT Have an Influence on the RS?

The TT has an influence on some RS which becomes evident when TT is being given

- Understanding and following instructions.
- Understanding potty-related words.
- Having a broader vocabulary.
- Participation and interest in TT.

It remains unclear how the different RS relate to each other.

As already mentioned above, being dry after a midday nap is not considered a good predictive sign anymore, though it is still used as a sign of readiness by parents, with some success.

TT Guidelines: Parents, Daycare and Nursery Schools

The TT process is a complex phase that every child has to go through and is inevitable in the development to comply with the norms of society. Becoming toilet trained is an important milestone in the life of every child, and a substantial part of the population is involved in giving and receiving TT. Because children are still very young when TT is mostly done, they depend on parents, family, caregivers (for example in daycare settings) and sometimes nursery teachers.

Parents (Bakker & Wyndaele, 2000; Barone et al., 2009; Berk & Friman, 1990; Horn et al., 2006; Horstmanshoff et al., 2003; AAP, 1999; Bakker et al., 2001, 2002; Mota & Barros, 2008b; Vermandel et al., 2008a; Brazelton et al., 1999; Wyndaele et al., 2020) [19–20, 23–25, 28–29, 34, 36–37, 47, 54]

At a certain point in time, all parents will have to guide their child through the important developmental phase of TT. As it is important that TT starts at the moment the child is ready to be toilet trained, many researchers suggest waiting until the child shows RS. This seems easy, but as explained above the DS are not all reflecting TT readiness signs and are not all easy to detect.

Most parents look for a method of TT that is child friendly, is not complicated, needs a limited time to apply, has a good success rate and induces no conflicts while avoiding unnecessary and fruitless work. It is of utmost importance to realize that TT of a child is most of all an assignment for the parents. But unsuccessful attempts are not to be interpreted as a direct failure of their competence or authority, nor as directly reflecting their parenting skills. At a certain point in time, they must give guidance to their children about toileting. The parents thus need to be ready, they need to free the time to guide their child, with patience and consistency, providing direction, motivation and reinforcement. It is no small task for the parents to create the right conditions and environment for the child to successfully complete the TT process, gaining self-esteem, confidence and autonomy along the way.

As explained above, nowadays many parents report being confused and uncertain as there is no consensus about when to start TT, when their child is ready to start TT, how to proceed and which method to use. Parents may over- or underestimate the skills required to successfully complete TT, which can lead to too early or delayed TT and stress, anxiety, emotional or physical problems. If they decide to wait until the child is of an older age and all the RS are definitely present it may be that they start TT very late.

The running of TT is often not easy and seems to create frustration and stress, and child abuse more than any other step in the child's development. Furthermore, parents may feel more pressured due to time limitations caused by the dual-earner model, with both parents now often working outside the home.

Lower household income is associated with an earlier start and completion of TT. A possible explanation may be that parents with a lower household income wish to avoid the cost of disposable diapers and underwear (pull-ups). Younger maternal age, lower maternal education and single parenthood are also thought to be associated with an earlier start of TT (before 24 months), though such a correlation has not been universally agreed upon. Mothers with a paid occupation think more often that children should be toilet trained before the age of 30 months, and the higher the mother's educational level, the more likely she will send her child to school toilet trained. More of single parents think that children who are not yet toilet-trained should be allowed to go to school and more often send their not fully toilet-trained children to school. But schools may deny entry.

Information as a Crucial Help for TT by Parents [65–78] (Doleys & Dolce, 1982; Schum et al., 2001, 2002; Largo et al., 1996, 1999; Taubman, 1997b; Van Nunen et al., 2015; Wald et al., 2009; Jansson et al., 2008; MOnsen, 2001; Klackenberg, 1971; Van Aggelpoel et al., 2018, 2019; Kaerts et al., 2014)

Focus group discussions (FGDs) have been used to explore parents' experiences in an inductive approach applying purposive sampling. The FGDs aimed to explore the type of information parents wanted to receive on TT, from whom and how. It showed that reputable agencies, family, friends, daycare workers and nursery school teachers are considered very helpful and trustworthy sources of TT information. TT information should be easily understandable and not contain scientific terms or much text. A colourful and illustrated brochure sent by regular mail is preferred.

Asking parents with a questionnaire about TT of their healthy children between 15 and 35 months old, using daycare every week, shows that the cooperation between parents and daycare is seen as positive, providing support for most parents in guiding their child in the TT process. It is often acknowledged that there is an increased responsibility passed on to daycare. Most parents state that daycare and parents should play an equal role in the TT process, a smaller percentage, however, reports uncertainty, stress, and/or frustration related to TT including about the right moment to start TT. Almost one in five parents report a lack of time to guide their child in the TT process. It is not rare that parents have no idea whether they use the same TT method as the daycare.

Parents' beliefs and attitudes in relation to TT have been studied in large groups of children between 30 and 36 months. It shows that many children are toilet trained after the minimum school age of 30 months. Most parents are not aware of the possible negative consequences this can entail.

Daycare [49, 77, 79–83] (Kinservik & Friedhoff, 2000; Kaerts et al., 2014; Barcelona European Council, 2002; Blackburn, 2006; Plantenga & Siegel, 2004; Wu, 2010; Vermandel et al., 2009)

As both parents often work outside the home, the role of daycare has become increasingly important as most children attend daycare centres during a large part of the TT period. It was shown that in half of the daycare workers, the decision to start TT is based on observed DS, while the others use a combination of age and DS. It can be that the TT stage (not started, running and completed) differs between daycare and home, but this has no major effect on the overall outcome of TT. Using daycare does not overall significantly influence TT completion.

One important question to be answered is what should be the role of the parents and of daycare workers, while in the actual context, the attitude of the latter will influence the outcome of TT.

The European Union and other organizations strive for equal rights and opportunities for men and women, an increased employment rate for women and a better combination of work and family. To accomplish this, the EU has motivated its Member States 'to provide childcare by 2010 to at least 90% of children aged between 3 years and the mandatory school age, and at least 33% of children below 3 years of age. Daycare thus plays an important role in preparing the children for nursery school.

The role of the daycare setting in the TT process is diverse. Imitation of other children may facilitate the toilet learning process. Moreover, experienced childcare workers have guided many children in the TT process, and thus may be able to evaluate the child's readiness for TT, and reenforced by their own experience, provide the parents with information and advice, identify problems and discuss them with the parents. They can emphasize that the training methods and expectations at home and in daycare must be similar to avoid confusing the child. Yet, when daycare centres are overcrowded, time and facilities to provide the children with proper TT may be lacking. A Swedish study revealed that TT was viewed as a sensitive and private subject, not commonly talked about with daycare or even with friends. People participating in this study felt frustrated that daycare staff did not talk about this subject or provide them with guidance.

Problems may also arise when parents either assume that only they are responsible for TT, or expect the child-care workers to take full responsibility for TT. Both assumptions and the lack of adequate communication, in general, may lead to different methods and expectations at home and in daycare, which may confuse the child, create stress or delay and obscure existing problems. Good communication and coherence between the different caregivers working in the same setting are required to provide the child with a consistent learning environment and to avoid questions of accountability, commitment and control over the TT process. It is important that children receive the attention, guidance and consistency they need during the TT.

Nursery Schools [78] (Van Aggelpoel et al., 2018)

In Western societies, life has become gradually more complex and important learning phases in the life of young children are now taught at different places and by different people. Children may go to nursery school from 30 months onwards, and as they are on average between 21 and 36 months old before TT is started, and the age till completing has increased to 36–39 months, many nursery teachers are confronted with toddlers who are not yet toilet-trained. The consequences of this are not minor.

Nursery schools may decide whether they allow or refuse children who are not yet toilet-trained. Legislation on this topic is often lacking. However, it is noteworthy that schools who refuse incontinent children have as many not toilet-trained toddlers on the first day of school as schools that do not refuse these children. Parents may claim that their child is toilet trained, but this is not the case. The number of incontinent children has a tendency to decrease during the school year.

There is little space and time for educating nursery teachers in TT. Many state that such training would be worthwhile. But others (up to 50% in some studies) think that TT does not belong to nursery school tasks. When the date comes closer for the child to enter nursery school at least half of the parents start TT. Not many nursery teachers use RS.

Now those nursery teachers are often confronted with many incontinent children in their class, they have also become responsible for TT. This gives a heavy extra workload, negative impact on pedagogic activities, and many ask for extra help, though many also claim they would refuse such help.

Incontinent children may need more attention, which is unfair for toddlers who are already toilet trained. Other problems are an increased safety risk for already toilet-trained children because they have to be left unsupervised while diapers or wet/soiled pants are changed in another facility (bathrooms are almost always in the hall, not in the classroom). There is also a risk for decreased hygiene. The TT postponement may today jeopardize the preschool kindergarten education.

Factors Influencing TT [24, 27, 34, 65–68, 71, 73, 84–91] (Horn et al., 2006; Schum et al., 2001, 2002; Mota & Barros, 2008a; Doleys & Dolce, 1982; Largo et al., 1996, 1999; Wald et al., 2009; Monsen, 2001; Vermandel, 2017; Bloom et al., 1993; de Vries & de Vries, 1977; Seema & Begum, 2008; Sun & Rugolotto, 2004; Ravindranathan, 1978; Koc et al., 2008; Hooman et al., 2013)

Gender has been identified as a significant factor in several studies, but more often an association with female gender has been identified. Girls, on average, start and complete TT earlier than boys, as well during the day as by night. There are several possible causes for this phenomenon. It may be that a biological difference between girls and boys exists and that girls show RS faster than boys. It may also be that parents hold different expectations regarding girls and boys about TT and possibly girls are more sensible for socialization, while boys are more dependent on physiological maturation. The average TT duration to become toilet trained during the day does not differ between gender.

Clothing: As pulling up and down clothes in a TT relation is a strong predictor of TT success, it is advisable to dress children in comfortable, easy-to-remove clothing when performing TT.

The influence of the total number of children in the family is uncertain, as well as the presence of older brothers/sisters. This is understandable as the influence will depend on many factors: number of siblings, age differences, time available to parents, closeness in the living area, and many more.

Age is one of the most mentioned factors correlated with successful TT, and the TT duration is likely to decrease when the age of the child increases. But to start TT only based on age is not the best way, as age does not necessarily tells about the development and the readiness of the child. Moreover, as seen above will a later start of TT has several negative consequences.

Race/culture. Expectations and habits concerning TT differ from culture to culture. Caucasian parents start and complete TT later compared to African-American parents and other ethnical groups. Schum et al. (2001) found that African-American children are faster in acquiring motor skills than other ethnical groups. An East-African community 'the Digo' already start TT during the first weeks of a baby's life and TT is expected to be completed by the age of 12 months. At age 1 year, if a child in the Digo tribe evacuates in the living area it is at first warned and then physically punished. Also in southern India, TT is started in early infancy. It should be noted here that the definition of 'toilet trained' is not the same as the one often used in Western society (complete and independent toileting without reminders from caregivers). TT starting this early often implies that the trainers are constantly present, react to grimaces, postures or noises made by the baby as an indication they need to evacuate. When noticing such signals, the trainer can assist the infant when voiding or having bowel movements by putting them in a comfortable position on a suited location (depending on the culture, this can be holding the infant stable on a potty, or making sure the evacuation does not happen in the living area but rather outside the house).

Also in Western Society parents' beliefs about TT can differ from site to site, as was shown in a study in Washington DC and the surrounding metropolitan area. Some caution is needed as living in another area may have different reasons with possible influence on the TT: income, members of the larger family available, habits and more.

A study in Turkey in three different sociocultural settlements showed that in families living in rural and semi-urban settlements, an earlier start of TT was related to the mothers' education of less than 5 years and/or without an outdoor job, to living in houses without an inside toilet, to the use of washable diapers and Turkish style toilets, to the application of punishment. In the infants whose mothers had an education of over 12 years, TT completion age was later and the earliest completion age was seen in families who used a punishment method. The mean duration needed to complete TT was 7+/−7 months.

A study in Iran showed that a majority of parents believed that the appropriate age to start TT was 1–2 years. The method used was intensive in half and more child-oriented in another half of the cases studied. Later age of completing and toilet refusal were negatively correlated with the level of education of the father, and with applying punishment. TT was usually complete at around 23 months.

Diapers or underware. Disposable diapers are very popular for a number of reasons, They keep the child dry, are easy to use and are time-saving for the parents who can afford them. The advertising of these products is very extended. Strong absorbing diapers eliminate however the feedback sensation of being wet.

Cognitive developmental level or temperament is important. Difficult temperament traits give a later initiation of TT and difficulties to develop daytime bladder control. Negative mood (e.g., fretting or crying when learning a new task), lack of persistence/attention in activities (e.g., routine tasks such as dressing and picking up toys), and higher sensory threshold (the amount of stimulation needed to evoke a response in the child, e.g., noticing wet clothing and wanting to be changed right away), all play an important role. It seems likely that these factors can make the mother delay initiating TT. It may be advisable to consider a child's temperament when planning to start TT as this may help to minimize conflict and stress between parents and child. If severe problems are suspected it is advisable to consult a psychologist. Toileting deficits are found more often in children with attention deficit hyperactivity disorder.

Relation with bowel symptoms. The presence of stool toileting refusal or frequent constipation is associated with later completion of TT. Constipation may make the passing of stool painful and brings the child to refuse TT. It is advisable when starting TT to often check whether the stool is soft. In case of hard stool, parents should put the child on a diet rich in fiber and with diminished use of dairy products. As the children's skin is sensitive to long contact with stool or wet underwear, they should be controlled regularly and provided with dry clean clothes.

Role of Physicians and Allied Professionals

Many authors state that it is the role of the clinician and paediatrician to guide the parents in the TT process, by helping them to assess the readiness of the child, helping to choose the right TT method, explaining the importance of a gentle, friendly approach with rewards instead of punishment and providing information on the process. Consulting a physician is needed when problems arise or when other LUT or LBT symptoms are present. They will search for the cause of the signs and symptoms, and a physical/psychological disorder.

How Long Does It Take to TT [19, 21, 30, 33, 83, 92–94] (Bakker & Wyndaele, 2000; Blum et al., 2004, 2006; Joinson et al., 2009; Vermandel et al., 2009; Feehan et al., 1990; Djurhuus et al., 1997; Foxx & Azrin, 1973)

A great variety of data have been published comparing duration of TT. Bakker et al. observed a similar training time of <6 months for children raised 60 years ago, 40 years ago, and nowadays, although the age of initiation differed. Using the child-oriented approach, Blum et al. reported a negative correlation between earlier initiation of intensive TT and the duration of training. Foxx and Azrin stated that children of all ages can be trained in an average of 3.9 h. Bloom et al. found an average of 6 months bladder training. Late ending of TT (at least >42 months of age) is associated with a later age of initiating TT, lower language score at 18 months, stool toileting refusal, increased constipation, and hiding to avoid potty visits during TT. Lower maternal education, younger maternal age, lower household income, and the presence of two or more siblings were (univariate) predictive for the age of the child at the end of TT.

What to Do If TT Has Negative Results When TT seems unsuccessful or the child seems reluctant to start or shows resistance to TT, it is advised to have a period of rest of 1–3 months in which there is no TT given. This does not exclude discussing the topic now and then preparing the child gradually to give it another trial, re-establishing trust and cooperation in the child –parent relationship first. Meanwhile diapers can be used again.

Contraindications for TT Most authors discourage the start of TT when the child is feeling ill or when an important change in the life of the child is taking place, such as the birth of a brother or sister, moving to a new house, a new school or a new daycare situation (e.g. a new facility).

How to Perform TT [19, 51–52, 94] (Bakker & Wyndaele, 2000; Brazelton, 1962; Spock, 1946; Foxx & Azrin, 1973)

From what has been discussed it may be clear that specific rules to perform TT have not been universally approved.

Following are principles given in the literature and from expert opinion.

Since 1900, training guidelines in the US have balanced between a more controlled management and passive permissiveness. Two major approaches in TT used in Western societies between more are the ‘child-oriented’ method of Brazelton and the Azrin and Foxx ‘parent oriented -method’. Both have been proposed by physicians to parents starting training for the first time. Other methods include variations of operant conditioning, and the Spock method (a maturation guided, gradual, passive approach).

The Brazelton method has the basic idea that children must be gently but systematically encouraged to experiment with toileting behaviour. Pressure, punishment, and negative feedback are to be avoided as they will often prolong the TT and cause complications and stress. It is difficult to judge the efficacy of this approach as studies with sufficient power, or randomized controlled trials have not been done. It remains uncertain whether the approach is reasonably successful.

The method proposed by Foxx and Azrin is much more intensive and structured. This TT method is described in detail in a book in 1974 “Toilet Training in Less Than a Day.” It uses drinking of high quantities in a short time, bladder capacity training and a desire to void control, at a high speed. Professional supervision is essential to reach success. With the method emotional side effects have been reported, such as temper tantrums, hitting, and avoidance behaviour. A lot of importance is given to reinforcements, social and tangible. To discourage accidents, reprimands and a short time-out of positive reinforcement are proposed.

A more gradual passive approach seems to get more approval from physicians and child health organizations, despite a lack of evidence.

Less known, but applied for centuries before the Western methods were described, is the assisted infant TT used in China, India, Africa, South America, Central America, and parts of Europe. This method indicates that early training can be effective and that this does not relate to a genetically accelerated development, but to the method itself. As seen above it needs a very active involvement of the caregiver.

Looking back for almost a century it becomes clear that parents gradually were toilet training a decreasing number of children, from 4 to 1–2.

When putting together a summary of positive and negative aspects of TT methods these can be listed as follows

Basic Requirements

The child must have the required body development, and neurologic condition, must be ready and willing and be an active participant in the process.

The parents must be ready and willing and must be well informed.

Stool must not be withheld and must preferably be soft.

Communication between parents and daycare is mandatory with agreement on the way TT will be done.

The toddler must understand what is going on, which includes the possibility to link different events, understanding the language, and being cognitively ready.

The toddler must want to become trained which means collaborating. This is not always easy as during the second and third year of life they develop in full their temperament, and a phase of stubbornness may need to be passed.

Positive Things To Do During TT

As preparation one can start to get interest from the child with a story and drawings. It is nice to buy a potty together and make it personal and attractive. First, put the child on the potty with clothes on, then let him/her walk without a diaper and let the child throw away the diaper after use. This phase normally needs some free hours to be scheduled. Purchase together underpants. Put the child without diapers or underpants on the potty and repeat this after meals, after the nap. Agree on a reward that the child especially likes, such as applause, smile, hug, candy or stickers. If evacuation on the potty is successful give the reward and empty the potty together. In case of leakage, clean up together and discuss gently.

Choose loose comfortable clothing. Imitating is important, which can mean going to observe voiding by a parent, or sibling. The use of a voiding doll can also help stimulate imitation.

Gentle systematic encouragement, operant conditioning, a gradual introduction of the potty, positive reinforcement for correct behaviour, a relaxed approach, no coercion or pressure are all important. Regular fluid intake, learning the desire to void and how to temporarily suppress it, and changing soiled clothes quickly are helping TT substantially. Information between parents and daycare trainers goes together with being consequent in the training method used. If there is no progress, use a time-out and restart later.

When TT begins stop using an absorbing diaper to learn what dry and wet mean. The use of a less absorbing or cotton diaper can have a similar effect.

Negative Aspects of TT Methods

Rush, rigid, punishment, blame, guilt, uninformed, and the difference between different TT methods are to be avoided.

The use of prompting has changed over the years. Sixty years ago, parents prompt children more. Also, the reaction of the parents when the child's attempts to void were unsuccessful, was significantly different. Thirty-forty years ago, listening to running water to provoke voiding, mimic the sound of voiding, verbal encouragements were customary, while more recent generations just asked the child to try again later.

It is not advisable to use an adult toilet without a special child-supporting toilet board and footstool.

Long-Term Effects of TT Methods [26, 28, 33, 36–37, 49–50, 64–65, 73–75] (Rogers, 2002; AAP, 1999; Joinson et al., 2009; Vermandel et al., 2008a; Bakker et al., 2002; Kinservik & Friedhoff, 2000; Stadtler et al., 1999; Monsen, 2001; Schum et al., 2001; Klackenberg, 1971)

At age 10–14 years, as studied in large samples of children, severity and frequency of daytime wetting, with or without bedwetting, faecal soiling and incidence of urinary tract infection were significantly related to the age TT was started and less use of scheduled voiding. The request to push/strain when an attempt to void is unsuccessful proved dangerous for the development of bladder dysfunction.

Enuresis nocturna-Bedwetting [95–111] (Butler & Holland, 2000; Doleys, 1977; Hjalmas, 1988; De Wachter & Wyndaele, 2003b; Sillén, 2001; Hamano et al., 2000; Watanabe & Kawauchi, 1995; Khan et al., 1993; Medel et al., 1998; Oredsson & Jorgensen, 1998; De Wachter et al., 2002; Starfield, 1972; Mowrer, 1980; Butler & Stenberg, 2001; Van Kampen et al., 2002; Landgraf et al., 2004; Pennesi et al., 2004)

The prevalence of bedwetting is high and some define it even as the most prevalent of all childhood problems.

The International Children Continence Society defines bedwetting as leaking during the sleep, not dependent on the quantity lost. The prevalence is 20–25% at age 4. The prevalence is 13–19% in boys 5 years old, 9–13% in girls 5 years old and between 4% and 8% at 12 years of age corresponding with 15% per year. At adult age still, 0.5–3% suffer from some form of bedwetting. There is a hereditary role: if both parents had the same problem their children have a 70% chance to have enuresis. If it is only one of the parents the probability is 40%.

Primary enuresis corresponds to never having been dry for 6 months, and secondary bedwetting when it restarts after a dry period, not seldom when a stressful event occurs. Cure means 14 days without wetting, recurrence corresponds to leakage more than once per month.

Bedwetting is a psychological hazard: parents can be frustrated and can ask themselves what they have done wrong, and the child can be discouraged, loses confidence and feel shame. The psychological impact has tendency to become worse the longer bedwetting continues. It can also interfere with social activities such as participating in camps, sleeping in a dormitory or with a friend leading to social isolation. It is not uncommon for children to be told that they are to blame, that they are lazy, do not show interest in solving the problem, and more. Such accusations are for a large part incorrect and unfair.

Especially older children can behave without much interest but this is caused mostly because they are defending themselves against despair. They can expect that by ignoring it, it will stop. These defensive attitudes are not always understood by the parents. But it is enough to look at the deep proudness of the child when (s)he stays dry during the night to understand that they do care. Bedwetting is involuntary and often children only discover that they have wet themselves when they wake up. As about 15% per year will spontaneously stop bedwetting parents may get convinced that waiting is just enough. This can be potentially dangerous for the child's mental health. If children hide their wet pyjamas or strongly state that they wet the bed are extra warning signs of the psychological impact.

When should a child be dry at night? Convention positions this at around 5 years old, with a need to look for professional help from 6 to 7 years old. But if other signs or symptoms are present as frequency, involuntary voiding, infections, weak voiding stream, leakage during the day, consultation should be done earlier. The sequence which is considered normal is first control of defecation at night and then during the day. For urine, it is the contrary first control in the day and later at night.

What are the causes of bedwetting? Three mechanisms are known: the child does not awaken when the bladder is full, excessive urine production during the night, bladder overactive contractions not suppressed during sleep. The problem can thus be in the brain, at the antidiuretic hormone secretion, or at the bladder which is small and has involuntary contractions.

Management of bedwetting consists primarily of training, behaviour adaptation and general rules, such as voiding before going to bed, treating faecal incontinence/constipation, and drinking 30 ml per kg body weight per day with restriction from 18.00 h. Keeping a wetting diary by sticking signs of the sun on good mornings and signs of a cloud after wet nights can help in 20%.

Of little use are training of the bladder capacity during the day and waking up the child at night when the parents go to sleep or by a watch alarm next to the bed. Discussing in a friendly and constructive way can help to motivate.

Childhood nocturnal enuresis can have different causes. A variety of treatment interventions is the consequence of this. Current treatment models generate a three-system approach: desmopressin to correct a deficient anti-diuretic hormone release, bladder-relaxing drugs for detrusor overactivity, and a bedwetting alarm. The bedwetting alarm is used to drill the child first to wake in response to wetting himself, then to prevent wetting by early arousal. The clinical value of active bladder volume training in childhood is still unclear.

Retention capacity training is a behavioural intervention strategy designed to increase the functional bladder capacity. Bladder distension, during maturation, seems amongst the most appropriate stimuli for bladder growth and for the development of bladder control. In cases with overactive detrusor the intake of, for example, an antimuscarinic creates the possibility to distend the bladder repetitively to its full capacity by helping to postpone voiding more easily. Achieving a normal capacity bladder is not a primordial key to night-time dryness. Often additional treatment will be needed as with a bedwetting alarm. It is a traditional view that once the child is dry they usually do not get up at night to void but remain asleep all night. This is often not the case and it is not rare that children wake up at night and go to the toilet independent of a larger or smaller bladder capacity. Some can even go to the toilet without remembering it in the morning. Developing the trigger of arousal at bladder capacity when the normal desire to void appears can be more important than reaching normal bladder capacity itself. Some believe that the results of a full spectrum therapy, combining an enuresis alarm, bladder training, and motivational therapy, are better than each treatment modality alone and then medication and psychological treatment. More mothers propose a stepwise approach: first capacity training, which may in itself be successful, then bedwetting alarm.

It is important from the start to compose a therapeutic plan during an interactive session with the child and family members, and regular feedback to the trainer.

The Importance of an Equal Terminology

There is no universally accepted definition for toilet training during the day, how long a child should be dry and which habits it should acquire to be considered successful.

Putting a child at regular intervals on a potty may keep the diaper dry. But if it never learns to indicate the desire to empty and take the necessary steps to do so incontinence will continue.

Some definitions from literature are listed here:

- Toilet trained means no help needed or supervision in using the toilet, being free of leakage during the day and indicating that desire is felt without being reminded by others.
- TT is finished when the child can postpone voiding: retaining gives the opportunity to reach the toilet. Postponing permits to take the correct posture.
- The child wears normal underclothes (no diaper) during the day and has less than 4 incontinence events with urine and two or less with defecation.
- When the child feels the desire to void and can control it until sitting on the toilet.
- When the child visits the toilet without encouragement/reminders from parents or caregivers.
- When the child can hold the urine till on the toilet.
- When the child wears underpants during the day, indicates desire or goes to the toilet to empty, initiates the toileting without prompts and without reminders, and has maximal one leakage accident per day.

This lack of agreement on the definition in the research literature makes comparing of events and results more difficult, though many definitions are using similar criteria: reaching the toilet in time, no supervision and reminding needed, desire to empty recognized, without wearing an absorbable diaper.

The TT Sequence

The period for getting control over the bladder and bowel runs in most children chronologically: First control of stools at night, second control of stools during the day, third control of voiding during the day, and finally control of voiding at night.

More rarely control of voiding can precede the control of defaecation. This sequence can guide in the application of the TT methods, though it should not be considered the only normal sequence where changes would mean pathology.

Special Techniques of TT

Group Training in Daycare Centres [112] (Van Aggelpoel et al., 2021)

The value has been studied by comparing children subjected to an intensive TT session, for 2-h on two consecutive days, with those who did not get such sessions but were trained at home by the parents in their own way. The duration of TT was significantly shorter (2 weeks) in the session group compared to 5 weeks in the other group.

Daytime Wetting Alarm [113–116] (Levato et al., 2016; Vermandel et al., 2008b; Friman & Vollmer, 1995; Van Laecke et al., 2006)

The use of an auditory alarm system is an accepted treatment in children with bedwetting, and it has been used for TT of healthy toddlers by a few researchers. Programs combining an auditory wetting alarm with structured behavioural training have proven to be successful in children with intellectual disability retardation and for children with daytime enuresis and daytime incontinence.

The wetting alarm diaper consists of a light alarm box fixed to the outside of the diaper and attached to a self-adhesive strip put inside the diaper. When this strip becomes wet, a ringing sound signal is heard and the child is taken to the potty where it is encouraged to finish voiding. A reward (e.g., playing with a toy, or cookie) can be used when they void in the potty.

It is important to regularly (every morning) show the individual steps of the toileting process with the help of a doll: walking to the pot, lowering pants, sitting on the pot, eliminating in the pot, raising pants, and assisting in emptying the potty. Patience and positive reinforcement as with kisses, hugs, effusive praise, smiles, and applause are important. More children become fully dry within a couple of weeks, and the results sustain. The important advantage of the wetting alarm diaper training method is that the child and the trainer are immediately warned that leakage has occurred. The alarm itself distracts the child from his activity and strengthens the awareness of bladder signals, while by doing toileting at that time further reinforcement of the awareness is given. The methods applied in the home need further study. It requires the continuous presence of the parent and changing the strip + diaper when the alarm goes off.

Bowel

Most of what is done for bowel TT has been discussed above: preparing the child, start TT when constipation is cured, choice of potty, example with doll, reward when defecation is done on potty, gentle approach and more. Other aspects of importance will be looked at here.

Gastrocolic Reflex [9, 117–128] (Van Aggelpoel et al., 2020; Hertz & Newton, 1913; Di Lorenzo et al., 1995; Rodriguez et al., 2017; Dobson & Rogers, 2009; Loening-Baucke, 1994, 1996; Har & Croffie, 2010; Rajindrajith et al., 2016; Borowitz et al., 2003; Mota et al., 2012; Benninga et al., 2004; Weaver & Steiner, 1984)

The gastrocolic reflex is a response of the colon to the presence of food in the stomach. A bowel movement occurs after a meal in a majority of children, between 15 and 60 min after a meal, and defecation happens in many during that period. The reflex is most active in the morning, but can also be effective at noon and in the evening.

The gastrocolic reflex plays an important role in emptying the colon, but its precise and complicated mechanism is not unravelled completely today. In 1913, Hertz and Newton described for the first time, by means of X-rays, that presence of food in the gastrointestinal system, is an important stimulus leading to mass movements in the colon and named this the gastrocolic reflex. More recent colon manometric investigations reported higher and more frequent high-amplitude segmental contractions and an increase in the colonic tone after eating. Presence of stool in the rectum stimulates parasympathetic and local reflexes which will result in relaxation of the internal anal sphincter. As a consequence, faeces will descend further into the anal canal. In case of defecation, the abdominal muscles and diaphragm will contract with simultaneous relaxation of the external anal sphincter and the puborectal muscle, causing faeces to be expelled.

The gastrocolic reflex is considered as the most plausible reason to defecate shortly after a meal. It can be used for TT with established toileting routines, such as sitting on the toilet for 10 min after meals at the moment the gastrocolic reflex occurs. In more than 95% of healthy children (more than 1 year old) with bowel complaints, faecal constipation is the underlying reason and the most common gastrointestinal pathology in children. The worldwide prevalence varies between 0.3% and 29%, in developed as well as developing countries. Three per cent of all children that are referred to a paediatrician have constipation, and this number increases up to 25% of children who consult a gastroenterologic paediatrician If a child voluntarily retains stool when feeling the urge to defecate, defecation is suppressed by contracting the external anal sphincter and the puborectal muscle. Faecal mass that remains in the rectum for too long, will become dry and hard and will enlarge. The rectum will gradually widen and evolve into a megarectum. As a consequence, rectal sensitivity will diminish, defecation will become difficult, faecal soiling will occur and, in the end, the child losses control over the bowel and defecation.

Withholding Defecation Parents can be ignorant of withholding behaviour and even consider this as an effort to defecate. Some children dislike the toilets in school or sport facilities and will retain stool during the day. Constipation can cause pain when defecating and there may develop avoidance to defecate and stool retention. The cause has to be established. It is advised that trainers facilitate the TT process for stool by putting the child on the potty 15–30 min after a meal. Food and drinking should be optimized when the stool becomes hard and of large quantity.

What Can Be the Meaning of Children Hiding While Defecating Before They Have Completed TT [129] (Taubman et al., 2003)

The behaviour of hiding while defecating before completion of TT is associated with stool toileting refusal, constipation, and stool withholding. Besides making TT more difficult, the reason for this behaviour has to be diagnosed: food, psychological problems, avoiding foreign toilets thought to be dirty, and more.

Conclusion

There remain many questions about urinary and bowel TT today, though intensive research gradually gives more and more important information. It is well known that TT has psychological aspects, both in a normal evolution and when problems occur. Psychological disturbances can be a cause of unsuccessful results, and when such problems are suspected they need the aid of a psychologist. Guidelines for normal TT are being composed with new data found, and consist overall in a knowledgeable child-friendly approach given by parents and daycare personnel who are well informed, consistent, communicate with each other and decide together on what TT method will be mainly used. TT is a time investment and needs focus. If this is not done the course of the training becomes difficult.

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Somatic Syndromes: Assessment and Treatment for Children and Adolescents

Maria Kangas

Introduction: Somatic Syndromes in Youth

Health complaints and somatic symptoms such as headaches, abdominal pain, non-cardiac chest palpitations, musculoskeletal pain, nausea, vomiting, dizziness, and fatigue are common in children and adolescents. Up to one-third of children and adolescents experience recurring and/or chronic functional somatic symptoms (FSS), for which no well-defined physical disorder is identified to explain the symptoms (Campo, 2012; Korterink et al., 2015). Four to 10% of these children will experience persistent symptoms and these can have serious psychosocial implications in the medium to longer-term (Rask et al., 2018). When these symptoms are recurring and increase in intensity, a growing and evolving body of literature has shown that they are related to functional impairment, as well as psychosocial problems, and a reduction in overall quality of life (Kangas et al., 2020). However, the assessment and treatment of debilitating and recurring somatic symptoms in children and adolescents has been hampered by a lack of consensus in definitions and terminology, which has further been impacted by changes across the diagnostic nomenclature for somatic syndromes including the change in focus of somatic criteria stipulated between the fourth and current, fifth editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV/TR (1994; 2001); DSM-5/TR; American Psychological Association, 1994, 2001, 2013, 2022) and the criteria for somatization disorder and bodily distress disorder in the International Classifications of Diseases and Related Health Problems codes (ICD-10 and ICD-11; World Health Organization).

The objective of this chapter is to provide an overview of the prevalence and characteristics of somatic syndromes in children and adolescents, and diagnostic and assessment methods used to screen for somatic syndromes in youth, as well as evaluating the current evidence base for psychological interventions for managing somatic symptoms in children and adolescents. First, an overview of common definitions used in this field will be presented, followed by an overview of features characterizing somatic syndromes in children and adolescents. A summary of key components of biopsychosocial conceptual models in this field will also be presented as a heuristic framework to facilitate assessment and treatment evaluations. A review of current, relevant diagnostic frameworks and assessment methods including validated measures used to screen and assess children and adolescents for

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recurring somatic symptoms is then presented. This is followed by a review of the evidence base for the psychological treatment of somatic syndromes in children and adolescents presenting for therapy. The chapter concludes with clinical implications for practitioners working with children and adolescents with somatic syndromes as well as highlighting gaps that need to be addressed in future research to further advance the assessment and treatment evidence-base for somatic syndromes in youth. For the purpose of this chapter, the term "youth" will refer to both children and adolescents.

Prevalence of Somatic Syndromes in Youth

A variety of terms have been used to refer to recurring somatic complaints in youth related to pain and/or discomfort and which have no clear pathophysiology (Campo, 2012; Walker, 2019). These terms include functional somatic syndromes (FSS) (Kangas et al., 2020), medically unexplained symptoms, physically unexplained symptoms, bodily distress syndrome, persistent physical symptoms, and persistent somatic symptoms. More specialized terms have also been used focusing on specific sites (or clusters) of symptoms including functional abdominal pain (FAP); recurrent abdominal pain (RAP); functional gastrointestinal disorders (FGIDs), chronic fatigue syndrome (CFS), and functional intestinal bowel syndrome (functional IBS). The term "functional" in this body of literature is typically used (e.g., FSS, FGIDs, and functional IBS) to denote that no clear pathophysiological cause has been detected to explain the onset and maintenance of symptoms and/or clusters of symptoms.

The DSM-5 (American Psychiatric Association, 2013) introduced the category somatic symptom and related disorders (SSRDs) to capture somatic-related psychological disturbances in individuals across the life span. The DSM-5/TR (2013; 2022) category comprises seven specific types of disorders including somatic symptom disorder (SSD), illness anxiety disorder (formerly known as health anxiety or hypochondriasis), functional neurological symptom disorder (conversion disorder), psychological factors affecting other medical conditions, factitious disorder, other specified somatic symptom and related disorder, and unspecified somatic symptom and related disorder. A common feature across these disorders is the recurrence of somatic symptoms and/or illness anxiety which is associated with heightened, significant distress and impairment in functioning (American Psychological Association, 2013; 2022). Whereas the previous DSM-IV/TR criteria for somatoform disorders (1994; 2001) placed a heavy focus on the centrality of symptoms being unexplained by recognized pathophysiological processes, the DSM-5/TR (2013; 2022) criteria have shifted from an absence of symptoms to the presence of somatic symptoms, notably distressing somatic symptoms associated with maladaptive thoughts, feelings, and behaviors in response to these symptoms. With the introduction of the SSRD category in DSM-5, the term SSRDs has also been used in the literature focusing on youth experiencing recurring somatic syndromes (e.g., Ibeziako et al., 2017; Winarizal et al., 2020). Additionally, the introduction of the Bodily Distress Disorder (BDD) in the International Classification of Diseases (ICD-11; World Health Organization, 2018) further captures a constellation of physical/somatic symptom presentations categorized into one of four groups including cardiopulmonary, gastrointestinal, musculoskeletal, and general symptoms group. Importantly, the interchangeable use of somatic symptom terminologies such as FSS, medically unexplained symptoms, and persistent physical symptoms with diagnostic conditions such as somatic symptom disorder (SSD) and BDD is problematic when assessing children presenting with somatic health complaints (Blake et al., 2018). Due to developmental considerations, some children and adolescents may not necessarily meet all the criteria for any of the DSM or ICD somatic-related disorder codes, although they may still present for treatment due to recurring and distressing somatic symptoms which are causing functional impairment (Kangas et al., 2020). Hence, for the purposes of this chapter the term "somatic syndromes" will be used to refer to children and adolescents with recurring somatic symptoms (either singular and/or multiple symptoms) which cause significant functional impairment. In line with other researchers (e.g., Brostrom, 2019, Kangas et al., 2020; Walker, 2019), the use of term "somatic syndromes" refers to a dimensional phenomenon, without assumptions referring to any specific organic cause.

Prevalence and Characteristics of Somatic Syndromes in Youth

The prevalence of somatic syndromes in youth is highly variable contingent on the range of terminology and diagnostic frameworks that are used within this field, including the presence of chronic pain (e.g., Rief et al., 2017). The estimated prevalence of FSS has been reported to be between 4% and 30% (Elliott et al., 2020; Geist et al., 2008; Rask et al., 2018), with prevalence rates being lower (between 4% and 10%) for youth whose symptoms contribute to substantial adverse impacts on functionality (Rask et al., 2018). Similarly, using diagnostic frameworks, research has indicated that between 10% and 15% of children and adolescents meet the criteria for SSRDs (Ibeziako et al., 2019; Winarizol et al., 2020). In children, the most common somatic complaints include recurring headaches, abdominal pain, fatigue, and nausea (American Psychiatric Association, 2022; Ng et al., 2016; O'Connell et al., 2020).

Moreover, due to the heterogeneity in symptom presentations, some children may present with only singular site symptoms of pain and/or discomfort (e.g., RAP or headaches), while others may present with multiple symptoms. It is noteworthy that the actual presence of any somatic symptoms is high in childhood. It is therefore important to differentiate between symptom presence per se relative to the recurring, chronicity of symptom presence and intensity, and the impact this has on functioning. The latter denotes the ability to perform activities of daily living expected commensurate with a child's developmental milestones (Winarizol et al., 2020).

There is an increasing body of literature demonstrating that recurring somatic syndromes in youth have a significant impact on functioning. Recurring somatic symptoms are a predictor of school absenteeism (Korterink et al., 2015), decline in academic performance (Janssens et al., 2014), and poor peer and social interactions (Mackner et al., 2012). Repeated school absenteeism and withdrawal from social activities also hinder social maturation including connectedness with same-aged peers (Mackner et al., 2012). It is therefore not surprising that recurring somatic syndromes in youth are associated with a range of emotional problems and have been documented to have a chronic course well into adulthood (Horst et al., 2014). For example, in a 15-year follow-up study, Bohman et al. (2012) found that adolescents with somatic syndromes, particularly abdominal pain were at greater risk of developing depression in adulthood. Moreover, four or more somatic symptoms during childhood predicted more severe mental illness in adulthood including recurrent, chronic depression, and suicidal behaviors.

Understandably, the ambiguity pertaining to the underlying cause of the somatic symptoms, inclusive of the recurring pain, is often highly distressing for both children/adolescents and their parents (Neville et al., 2019) and has been referred to as a "diagnostic vacuum" (Eccleston et al., 2003). These children and adolescents are prone to undergo numerous medical investigations including repeated (and costly) medical consultations to rule out the presence of organic disease with the risk of iatrogenic harm (Kangas et al., 2020; Malas et al., 2017; Neville et al., 2019; Rask et al., 2018). Indeed, in a recent Canadian population-based sample of children and young people with somatic syndromes, Saunders et al. (2020) found this cohort of youth to have a high-frequency use of the health-care system associated with substantial health-care system costs. Importantly, these researchers found that the identification and care for comorbid mental health problems in youth with somatic syndromes were poor.

In particular, studies have shown that 50–80% of children and adolescents with recurring somatic syndromes experience clinically elevated anxiety and/or depression symptomatology (Campo, 2012; Deshplande et al., 2015; Heimann et al., 2018; Winarizol et al., 2020). Unfortunately, the psychological impact of somatic syndromes in youth, for the most part, goes undetected or is minimized (Sood et al., 2016), as the immediate focus for parents/carers is typically to find a "medical" solution for their child's somatic symptoms. Although the causal link between somatic syndromes and psychological problems is not definitively known, it is most likely bi-directional and even multidimensional. Converging neurobiological and psychological research in adult populations with somatic syndromes suggests that anxiety reactions which enhance the central stress regulation system may provide a specific mechanism for elevated visceral sensitivity toward pain and other bodily sensations arising from somatic health complaints (Craske et al., 2011). Research indicates that somatic symptom-specific anxiety is a critical variable contributing to pain sensitivity, hypervigilance of bodily sensations, and poor coping responses (Craske et al., 2011). In one of the first studies investigating fear and avoidance in children with chronic abdominal pain, Flack et al. (2017) found that provocation of proximal (vs. distal) interoceptive sensations elicited greater fear and avoidance responses. These results indicate that children with recurring somatic syndromes have heightened pain perception due to biases in their pain expectations which contributes to exacerbating comorbid anxiety and mood disturbances (and/or vice versa). Moreover, the bi-directional effects of somatic and psychological symptom presentations further attest to shifting from a dualistic explanation of somatic syndromes to a more holistic, biopsychosocial explanation of symptom onset and maintenance.

Biopsychosocial Conceptual Framework for Somatic Syndromes in Youth

Over the past four decades, the child and adolescent literature for somatic syndromes have paralleled the adult literature in terms of moving from biomedical, dualistic explanations to more holistic biopsychosocial models (Chalder & Willis, 2017; Walker, 2019). To this end, recent biopsychosocial models incorporate specific individual theoretical frameworks (including social learning theory, attachment and family system theories), to conceptualize biological/genetic, child, parent/carer, family, and environmental variables related to predisposing, precipitating, and perpetuating mechanisms for the manifestation of somatic syndromes in children and adolescents (e.g., see Beck, 2008 and Kangas et al., 2020 for reviews). In particular, social learning theory (SLT) is a common conceptual framework within this field highlighting the role of parental/carer modeling behaviors.

In accord with SLT, studies have shown that parental factors including parental styles, appraisals and behaviors toward their child's somatic responses, parental emotion regulatory strategies, and emotional well-being can have a negative reinforcing effect on their child's coping repertoire and contribute to maintaining somatic syndrome responses and functional impairment. Specifically, research has shown that parental maladaptive modeling of somatic behavior is related to somatic syndromes in youth (Elliott et al., 2020; Rousseau et al., 2014). Parents' own catastrophizing of their child's somatic symptoms has been associated with elevated pain symptoms in their child (Wilson et al., 2014). Parental responses including over-protectiveness, reassurance seeking, and reduced child autonomy and decreases in participation in somatic-inducing activities have also been related to an increased functional disability including distress in children with somatic syndromes (Caes et al., 2011; Palermo et al., 2014). Poor emotional regulatory skills among parents have also been associated with heightened somatic complaints in children (Horwitz et al., 2015). Furthermore, maternal communication and modeling of pain management strategies have been found to influence adolescents' pain management choices (Elliott et al., 2020; Hatchette et al., 2008). In fact, a growing body of research has demonstrated the intergenerational transmission of pain (Stone et al., 2018), illness-beliefs (Ramchandani et al., 2011), and sick-role behaviors (e.g., Elliott et al., 2020). Parents' own health including chronic pain experiences and associated emotional distress have also been linked with somatic syndromes including chronic pain in youth (Cordts et al., 2019; Elliott et al., 2020).

Collectively, these findings support the proposition that parental modeling of their own health-related behaviors and emotion-regulatory strategies influence the maintenance and potential exacerbation of somatic reactions and associated dysfunction in children and adolescents with recurring somatic syndromes. This attests to the importance of actively involving parents in psychological interventions for youth with somatic syndromes.

Research has further shown that a child's intrapersonal vulnerability factors as well as environmental/contextual variables may also predispose and precipitate the development and maintenance of chronic somatic syndromes in youth (Kangas et al., 2020). For example, early childhood trauma and adversity have been associated with somatic syndromes in children including SSRDs (American Psychiatric Association, 2022). As aforementioned, iatrogenic factors may also play a pivotal role in perpetuating maladaptive somatic reactions in youth by way of parents/carers seeking repeated medical consultations for reassurance as well as in the hope of finding an underlying organic, "medical" cause for their child's symptoms (Kangas et al., 2020; Neville et al., 2019; Sood et al., 2016). Unfortunately, repeated medical tests can lead to false-positive diagnosis and/or inappropriate interventions that do not necessarily alleviate the somatic responses including pain (Rask et al., 2018). Explicit focus on finding underlying medical causes is increasingly being recognized as a hindrance in identifying in a timely manner comorbid mental health problems in youth with somatic syndromes (Saunders et al., 2020).

In terms of intrapersonal vulnerability factors, a child's interoceptive and stress sensitivity may also play a role. A child's temperament including less adaptive coping styles (e.g., Walker et al., 2007) and emotion-regulatory behaviors (e.g., Jungmann et al., 2022) may further exacerbate their heightened interoceptive and stress sensitivity (e.g., Cappucci & Simons, 2015) and lower thresholds of pain (e.g., Bruehl et al., 2010). To this end, a child's appraisals of their somatic symptoms may also facilitate the chronicity of their symptoms. Research has shown that both child and maternal pain catastrophizing is associated with greater somatic symptoms even in pain-free children (Van Lierde et al., 2020).

In summation, this body of literature attests to the role of biopsychosocial mechanisms in the onset and maintenance of somatic syndromes in youth. This conceptual framework, therefore, has utility in informing assessment and treatment interventions for children and adolescents referred to psychological clinics in hospital, community, and private practice settings.

Screening and Assessing Youth with Somatic Syndromes

Given the various terminology and nomenclature used in the pediatric field for referring to and classifying somatic syndromes, this has resulted in a lack of universal consensus of international guidelines for assessment instruments and diagnostic frameworks to use when screening youth who present to clinical settings with somatic complaints (Ibeziako et al., 2019; Kangas et al., 2020; Walker, 2019). This lack of consensus is further reflected in the recent findings of a scoping review conducted by Winarizal et al. (2020) to identify outcome measures used to index functional recovery in youth (0–24 years) with SSRDs presenting to clinical/health services. Based on 16 studies, Winarizal et al. (2020) found that only six of these studies used validated measures, a further three of the studies used a combination of measures and clinical notes, while the remaining seven trials relied solely on clinical notes to monitor and index functional recovery.

Winarizal et al. (2020) identified a total of eight validated measures used to assess functional recovery (defined as the ability to perform activities of daily living concordant with an individual's developmental age), in youth presenting with SSRDs. The majority of measures included multidimensional elements of functioning (overlapping with domains from multidimensional quality-of-life, or QoL, scales), which included the Strengths and Difficulties Questionnaire (SDQ: Goodman et al., 2003) (measuring physical, emotional, social cognition, behavioral, academic, leisure/social activities, and impact on family functioning), Child Health Questionnaire (CHQ; Raat et al., 2002) (measures physical, mobility, emotional, social cognition, behavioral, academic, leisure/social activities, and impact on family functioning), and Columbia Impairment Scale (CIS; Attell et al., 2020) (measures emotional, social cognition, behavioral, academic, leisure/social activities). A further common measure identified in this review is the Functional Disability Inventory (Claar & Walker, 2006; Walker & Greene, 1991). However, the FDI was a unitary measure, and in contrast to the SDQ, CHQ, and CIS, it does not include items on emotional well-being. A noteworthy outcome from Winarizal et al.'s (2020) scoping review is that none of the scales identified were specifically designed to measure functional recovery in youth recovering from SSRDs. Yet as these scholars acknowledge, this in part could reflect the relative infancy of the SSRD category in DSM5/TR (American Psychiatric Association, 2013, 2022).

Despite the lack of consensus of assessment instruments in this field, there is increasing recognition for the need to conduct a comprehensive and multifaceted assessment when screening and assessing children and adolescents presenting with somatic health complaints. To aid assessment, adapting a biopsychosocial framework has utility to ensure that both the child's psychological and physical functioning is considered and that specific disorders are ruled out through applications of differential diagnostic considerations (Blake et al., 2018; Kangas et al., 2020).

In psychological settings, it is recommended that a case formulation approach is adopted. The clinical interview is recommended to be supplemented by using relevant modules from validated structured diagnostic interviews (where appropriate), and to also consider potential comorbid affective and mood disorders, particularly given the high rates of comorbidity in this cohort of youth which tend to be minimized or go unrecognized (e.g., Campo, 2012; Heimann et al., 2018; Korterink et al., 2015; Saunders et al., 2020). It is further recommended that validated self-report measures are also administered to index the severity of somatic symptom presentations including presence and frequency of pain, and the impact these symptoms have on functioning, illness appraisals, parenting behaviors, and comorbid anxiety and/or depressive symptoms. In Table 33.1, a summary of commonly used measures to assess these multidimensional domains of symptoms and functioning including parenting responses in the pediatric somatic syndrome literature is outlined. In particular, the CSSI and FDI are two of the most frequent measures utilized in clinical trials to monitor somatic symptom presence, intensity, and impact on functioning. Moreover, parallel versions are used to index both the child's response and their parent/guardians' perception of the child's symptoms. As further outlined in Table 33.1, pain symptoms should also be considered when screening youth with somatic presentations, including pain scales to measure intensity and severity of pain, as well as coping styles, especially if the pain is a primary and/or chronic complaint. This latter recommendation aligns with the Initiative on Methods Measurement and Pain Assessment in Clinician Trials (IMPACCT: McGrath et al., 2008).

Psychological Clinical Assessment: Case Formulation

Table 33.2 presents a framework to aid clinicians in assessing children who present with somatic health complaints in clinical settings. A comprehensive case formulation is recommended including

Table 33.1 Summary of clinician interviews and common self-report measures for assessing somatic syndromes and psychological comorbidities in youth

	Clinician scale/interview	**Description**
Clinician-administered – scales and interview(s)	Children's Global Assessment Scale (CGAS: Shaffer et al., 1983)	The CGAS is a 0–100 metric used by clinicians to measure the children and adolescents' (6–17 years) global level of functioning across multiple domains over typically a 2-week period
	Anxiety Disorders Interview Schedule (ADIS-C/P) for Diagnostic and Statistical Mental Disorders (DSM) – Child and Parent version	The ADIS-C/P is the most widely used structured diagnostic interview to assess anxiety and related disorders in youth
	The Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS) – DSM5 (Kaufman et al., 2016)	The K-SADS is a validated semi-structured interview to assess anxiety, mood, disruptive-related disorders, and other DSM-5 conditions in children aged 6–18 years. The questions are semi-structured which give several prompt options in how to ask requisite questions to children and their parents.
Domain	**Measures**	**Description**
Somatic symptom – presence and severity	Children's Somatic Symptom Inventory (CSSI: Walker & Garber, 2018; Walker et al., 2009). (Formerly known as Children's somatization Inventory; CSI)	The CSSI is a 24-item scale that assesses the presence and severity of a broad range of somatic symptoms reported to be bothersome to children and adolescents (8–17 years) over a 2-week period (e.g., headaches, abdominal pain, sore muscles)
		Parallel parent-proxy version available
Pain – severity and coping	Faces Pain Scale – Revised (FPS-R: Hicks et al., 2001)	The FPS-R is a visual scale to index the sensation and severity of pain as depicted on 6 varied facial expressions based on a 0–10 metric scale. Suitable for ages 4–16 years
	Pain Response Inventory for Children (PRI: Walker et al., 1997).	The PRI is a 60-item multidimensional scale that assesses children's coping responses across 3 domains: Active, Passive, and Accommodative (8–18 years)
	The Pain Catastrophizing Scale – Child Version (PCS-C: Crombez et al., 2003)	The PCS-C is a 13-item self-report scale that measures children's catastrophizing reactions to pain across 3 domains: rumination, magnification, and helplessness. Suitable for ages 8–17 years
		Parallel parent-proxy version available
Functional	Functional Disability Inventory (FDI: Claar & Walker, 2006; Walker & Greene, 1991)	The FDI is a 15-item self-report scale that measures children's difficulties (aged 8–17 years) in performing regular activities of daily living across 4 domains, home, school, social, and recreational, over a 2-week period (e.g., eating regular meals, watching TV; attending school)
Health/illness appraisals	Childhood Illness Attitudes Scale (CIAS; Wright & Asmundson, 2003)	The CIAS is a 35-item self-report measure to assess children's (8–15 years) attitudes, including fears and beliefs about illness behaviors and health anxiety
Anxiety	The Spence Children's Anxiety Scale (SCAS) (Spence, 1998)	The SCAS is a validated and widely used measure to assess anxiety symptom severity in children aged 7–17 years, across 7 domains (comprising a total of 44 items including several filler items). Clinical cut-off scores are available
		There is a parent-proxy version available
	Screen for Child Anxiety Related Disorders (SCARED) (Birmaher et al., 1999)	The SCARED is a validated measure to assess anxiety symptom severity in children aged 7–17 years across 5 domains including Significant School Avoidance subscale
		There is a parent-proxy version available

(continued)

Table 33.1 (continued)

Depression	The Revised Child Anxiety and Depression Scale – Child (RCADS) (Chorpita et al., 2000)	The RCADS is a validated measure to assess anxiety and depressive symptom severity in children 7–17 years including five anxiety subscales and a major depressive disorder (MDD) subscale. Clinical cut-off scores are available
		There is a parent-proxy version available
Quality of Life (QoL)	KIDSCREEN-27 (Ravens-Sieberer et al., 2014)	The KIDSCREEN-27 is a 27-item self-report multidimensional QoL measure that assesses children's (8–18 years) subjective health and well-being including parent relations, social support, and school functioning
	The Pediatric Quality of Life Initiative (PEDS QL) (Varni et al., 1999)	The PEDS QL is a self-report multidimensional QoL measure that assesses children's (5–18 years) physical and emotional well-being, social, and school functioning
		There is a parent-proxy version available.
Parenting	Adult Response to Children's Symptoms (ARCS) (Van Slyke & Walker, 2006)	The ARCS is a 29-item scale that measures parents'/carers' responses to the child's pain in 3 domains: (1) Protective; (2) Minimizing symptoms; and (3) Encouraging and monitoring of symptoms

Table 33.2 Summary of topics when conducting an assessment case formulation for youth with somatic syndromes

Referral	Establish the reason for referral (source)
Evaluation of current somatic symptoms and functioning relative to medical history and current physical well-being	Single or multi-sites symptoms
	Intensity and frequency of symptoms; duration, and trigger cues (including recovery from illness, physical injury, trauma, etc.)
	Medical consultations (timeline) including tests; other allied health consultations (e.g., physiotherapy, nutritionist, gastroenterologist, etc.); and frequency of health-care usage due to symptom complaints
	Interventions received to date (including medication and non-pharmacotherapy treatments)
	Current medical status including the presence of any chronic conditions (e.g., asthma and diabetes), and whether exacerbations of symptoms worsen somatic health concerns
	Family history of somatic conditions
Psychological functioning	Current psychological functioning including concurrent anxiety, mood and/or behavioral disorders, as well as other somatic-related problems (e.g., illness anxiety disorder). Onset and duration of problems including trigger cues (e.g., negative life events and ongoing stressors)
	Screening for psychiatric history including interventions
	Family psychiatric history
Social and academic functioning	Impact of symptoms on functioning including engaging in social, peer and family activities; regular school attendance and academic performance (versus school refusal and school absenteeism and withdrawal from social/peer activities)
Parental/carer behaviors	Parenting attitudes and responses to child's symptoms – monitoring for negative reinforcement of illness/sick role behaviors, over-protectiveness

establishing reasons for the referral and whether the child and their parents/carers elicit any reluctance to seeking professional support from psychological services. In line with pediatric psychological assessments, it is also recommended that both the child and parent should be assessed in relation to the child's symptom presentation. In particular, the child's onset and duration of somatic health complaints need to be determined, as well as whether any triggers precipitate the onset of ongoing symptoms. It is also useful to determine whether the child reports primarily one somatic complaint (e.g., recurring headaches) or multiple symptoms (e.g., combined headaches and nausea, dizziness). Using a dimensional (continuum) perspective for evaluating presence, severity, and diagnostic status of symptom presentation, given that a proportion of children may not necessarily meet full diagnostic criteria for somatic syndromes (Rask et al., 2018), it is important to determine symptom frequency and duration, and whether the constellation of symptoms actually meet criteria for SSRDs in line with DSM-5/TR (American Psychiatric Association, 2013, 2022), particularly Somatic Symptom Disorder (SSD). Illness Anxiety Disorder (IAD), formerly known as health anxiety needs to also be considered and ruled out. A summary of the core criteria for SSD relative to IAD is summarized in Table 33.3. Although both conditions include heightened levels of anxiety about one's health and are also associated with health/illness-related behaviors, they differ primarily in relation to the presence and recurrence of somatic symptoms. Notably, a core, essential criterion for SSD is the presence and persistence of at least one or more somatic symptoms resulting in distress and significant impairment in functioning for a 6-month duration (American Psychiatric Association, 2022). In contrast, somatic symptoms are not a core feature of IAD; and even if present, they are only mild in intensity. Indeed, given the central feature of IAD is the fear of illness, there is ongoing debate as to whether IAD would have been better classified under the anxiety category of disorders in DSM-5. It is also noteworthy that children with chronic medical conditions (e.g., asthma and diabetes) can meet the criteria for SSD. The latter needs to be considered if the somatic symptoms are disproportionate and excessive to common symptoms associated with the child's chronic health condition

When assessing children for the presence and impact of somatic syndromes, it is important to identify what type of medical and allied health consultations and tests the child has received prior to seeking psychological assistance and whether the child has been recommended any interventions including pharmacological treatments by other providers for managing the symptoms. It is also useful to gage what the child and their parent/carer attributes the symptoms to as this will also facilitate determining whether the child meets criteria for an SSRD, particularly SSD as well as helping incorporate misappraisals of typical physiological sensations into the treatment formulation.

As discussed, given the high psychological comorbidity with somatic syndromes, it is also important for clinicians to assess for comorbid anxiety and mood disorders, including psychiatric history. The impact of both somatic symptoms and any comorbid psychological problems need to be determined in the context of academic, social, and general functioning. For example, is school absenteeism a problem since the onset of somatic problems? And/or what impact has this had on the child's academic performance? Related to this, it is useful to establish if the family reinforces and/or even models sick-role behaviors as this can inadvertently perpetuate symptoms and would need to be factored into the treatment formulation. The assessment should also be supplemented with relevant diagnostic and/or validated self-report instruments (e.g., measures outlined in Table 33.1). These measures also have utility in monitoring treatment progress and determining treatment outcomes if the child is recommended to receive psychotherapy to facilitate the managing of their somatic symptoms.

Table 33.3 Differentiating between somatic symptom disorder and illness anxiety disorder in children and adolescents presenting with recurring somatic complaints

Somatic Symptom Disorder (SSD) [3 criteria and 3 types of specifiers]	Illness Anxiety Disorder (IAD) [6 criteria and 2 specifiers]
Criterion A: *[Presence of distressing somatic symptoms causing impairment]*	**Criterion A**: *[Fear and worry of illness]*
One or multiple distressing somatic symptoms resulting in significant disruption to activities of daily living	Preoccupation with thinking one has or will develop a serious, undiagnosed medical illness
Somatic symptoms can be specific (e.g., localized pain) or more diffuse (e.g., fatigue)	Anxiety arises due to meaning/attributions arising from any sensations experienced (typically benign and normal physiological sensations such as orthostatic dizziness)
Criterion B: *[Impact of symptoms on thoughts, feelings, and behaviors]*	**Criterion B**: *[No or minimal somatic symptoms]*
This criterion pertains to the persistent and disproportionate thoughts, feelings, and/or behaviors the child experiences in relation to their somatic symptoms or associated health concerns. They need to experience at least one of the following three sets of symptoms to meet criterion B:	Typically somatic symptoms are NOT present – or if present, they are only mild in intensity
[1] Child reports persistent, excessive, and maladaptive thoughts/appraisals about the seriousness of their somatic symptoms	If individual does have an existing medical condition (or family history of serious medical conditions), the preoccupation of developing a serious illness is excessive and/or disproportionate to risk
The child may misinterpret the bodily symptoms associated with somatic sensations as unduly threatening to their health	
[2] Child reports persistent elevated levels of anxiety related to their somatic symptoms and/or health	
[3] The child spends excessive time and energy on these symptoms	
Criterion C: *[Duration of symptoms]*	**Criterion C**: *[Excessive anxiety about health]*
Symptoms persist typically for more than 6 months	The idea of having or developing a serious illness is associated with high levels of anxiety
However, symptoms may fluctuate during this time, although the state of being symptomatic is persistent	Sensitive to health-related cues: for example, media stories about serious illness
Specifiers:	**Criterion D**: *[Impact on functioning]*
[1] *With predominant pain*: (Previously pain disorder) – relevant for children whose symptoms primarily involve pain	Excessive health-related behaviors for reassurance seeking (e.g., repeatedly scanning body for signs of illness; repeated medical consultations; checking Internet health sites, etc.) and/or displays maladaptive avoidance (e.g., avoiding health checks, medical/hospital settings, and medical programs)
[2] *Persistent*: Specify if the course of symptoms is persistent and symptoms are severe over more than a 6-month period.	
[3] *Current severity*: [three levels]	
Mild: Only one of the three symptoms for Criterion B is met	
Moderate: At least two (or three) of the symptoms for Criterion B are met	
Severe: Same as moderate, plus the presence of multiple somatic complaints (or at least one very severe symptom persisting over 6 months)	
Caveats:	**Criterion E**: *[Duration criteria]*
Symptoms may or may not be associated with a medical condition. That is, SSD with a concurrent medical condition (e.g., asthma) are not mutually exclusive	Preoccupation with illness anxiety present for at least 6 months, although specific fear of illness may change over this timeframe

(continued)

Table 33.3 (continued)

Somatic Symptom Disorder (SSD) [3 criteria and 3 types of specifiers]	Illness Anxiety Disorder (IAD) [6 criteria and 2 specifiers]
Associated features:	**Criterion F**: *[Differential diagnostic considerations]*
Associated typically with high levels of medical care utilization for same set of symptoms	Fear and preoccupation with illness are not better accounted by other mental health disorders including SSD
Heightened attention to somatic bodily sensations, which may be accompanied by catastrophizing interpretations, intolerance of bodily complaints, and illness-related worry	
Behavioral features may include repetitive bodily checking, avoidance of activities (e.g., peer invitations, school absenteeism, physical and family activities), reassurance from parents/carers and medical providers. Reassurance from even medical providers may be short-lived. Although these features are more pronounced in severe levels of SSD	
Due to the nature of somatic health complaints, individuals/families typically present initially to medical health services. Referral to mental health providers may initially be met with surprise or even reluctance and/or refusal (American Psychiatric Association, 2022)	**Specifiers**:
	[1] *Care-seeking type*: Frequent use of medical/health-care providers including repeated tests/examinations. May consult multiple providers.
	[2] *Care-avoidant type*: Medical care rarely used or avoided.

NB: Criteria and characteristics summarized for SSD and IAD are based on the current DSM-5/TR (American Psychiatric Association, 2022)

Treatment Interventions for Somatic Syndromes in Children and Adolescents

Given the lack of consensus on terminology and diagnostic screening frameworks for somatic syndromes in youth, the evidence-base has to date been informed by trials investigating the effects of psychological treatments targeting children and adolescents with a specific constellation of symptoms (e.g., recurrent abdominal pain), to more heterogeneous somatic clusters including recurring pain. Over the past two decades there has been a consistently, growing body of psychological-based treatment trials testing predominantly cognitive-behavioral therapy (CBT) approaches in managing somatic syndromes in youth samples. This has culminated in an increasing number of systematic reviews and meta-analyses in this field. In this section, synthesis and evaluation of the most up-to-date systematic and meta-analytic reviews will be presented which have focused on testing the efficacy of psychological treatments for managing somatic syndromes (including recurrent pain) in youth and which have been published in peer-reviewed journals.

Evaluation of Psychotherapy Interventions for Somatic Syndromes in Youth

A total of six published reviews were identified as summarized in Table 33.4. There were two systematic reviews (SR) (Holsting et al., 2021; O'Connell et al., 2020), and four meta-analytic (MA) reviews (Abbott et al., 2017; Bonvanie et al., 2017; Fisher et al., 2018, 2019). Whereas one of the MA reviews focused explicitly on samples experiencing recurrent abdominal pain (RAP; Abbott et al., 2017), the other five reviews focused on samples with a mixed array of somatic presentations using the terms, FSS (Bonvanie et al., 2017); chronic and recurrent pain (Fisher et al., 2018, 2019); persistent physical symptoms (Holsting et al., 2021); and medically unexplained symptoms (O'Connell et al., 2020).

Table 33.4 Summary of methods from the systematic and meta-analytic reviews evaluating psychological treatments for somatic-related syndromes including chronic pain for children and adolescents

Reference	Aim of review and type	Review criteria (inc. definitions and end search date)	Total studies included and sampling details	Type of psychological Treatments
Abbott et al. (2017)	Evaluate evidence for the effectiveness of psychosocial Txs for children with recurrent abdominal pain (RAP)	Restricted to RCTs focusing on children and adolescents aged 5–18 years with RAP (defined as min. 3 pain episodes interfering with normal activities over a 3-month period) or abdominal pain-related functional gastrointestinal disorder – based on Rome III criteria (comprising abdominal migraine; IBS; functional dyspepsia, and FAPS)	$K = 18$ RCTs (from 26 papers); pooled sample of $N = 928$	Intervention ranged: 1–12 weeks, with most between 4 and 6 weeks
	[NB: Update on Huertas-Ceballos (2008) Cochrane review]	Any psychosocial Tx compared to a control condition (inc. active condition)	Mean age range: 9.4–14.9 years	Categorized into 4 groups:
	Type: MA (Cochrane)	Primary outcomes: Tx success (dichotomous – Yes/No); Pain intensity, duration, and frequency	More girls in every trial	(1) *CBT*: $K = 10$ (all family-based, involved both parent and child; although parental role varied); $K = 7$ in-person and 3 at home (with 1 facilitated via website access)
		Secondary outcomes: School performance, social or psychological functioning, quality of life (QoL)	Majority recruited via pediatric gastroenterology or pain clinics	$K = 2$ group based & $K = 8$ individual
		Searches until June 9, 2016	Studies conducted across six countries with $K = 8$ from the United States	$K = 9$ had a homework component
				Duration range: 3–8 weeks; 30–90 min in length
				Components inc. coping and distraction strategies; relaxation; identify and change pain cognitions; modifying family responses to illness and wellness behaviors
				Control conditions inc. $K = 4$ WLC; $K = 3$ usual care; $K = 3$ usual care with psychoeducation
				(2) *Hypnotherapy* (inc. guided imagery which comprises physical relaxation and behavior modification via imagery)
				$K = 4$ studies
				Sample size range: 22–52 participants
				(3) *Yoga*
				$K = 3$ studies
				Sample size range: 25–69
				(4) *Written self-disclosure*
				$K = 1$ study with $N = 63$ children with RAP

Bonvanie et al. (2017)	(1) Test effectiveness of psychological treatments (Tx) on symptom (Sx) load & disability in children with FSS	RCT min. </ = 10 individuals per group at end of Tx	$K = 27$ original studies with $N = 22$ inc. in MA	15/27 CBT (mode of delivery & Tx duration variable)
	(2) Test potential moderators of Tx effects	Any type of Psych. Tx including CBT, ACT, relaxation, coping skills training, psychoeducation, etc.	12/27 FAP	14/27 in-person therapy (hospital clinics) and 8/27 home based
			6/27 CFS	
			4/27 tension headache	
			2/27 fibromyalgia	
			3/27 mixed pain	
	Type: SR and MA	FSS defined as “physical symptoms not fully explained by a well defined medical psychiatric or somatic illness” (p. 273). Hence excluded samples with pain (e.g., arthritis and migraines)	Sx duration range: 7–44 months	
		Searches until December 2015	6–18 years (7/27 studies 6–12 years)	
			Control groups = 7/27 wait-list (WL); 9/27 care-as-usual (CAU); 7/27 placebo; and 4/27 active Tx	
Fisher et al. (2018)	Updated Cochrane MA review (from Eccleston et al., 2014) to test the efficacy of psychological Tx for chronic and recurrent pain in children and adolescents. Primary outcomes comprised pain intensity and disability	RCTs with min. 10 or > participants in each condition based on in-person or via phone Tx (excluded Internet and smartphone Tx)	$K = 47$ studies comprising 2884 individuals	“Credible Psychological” Tx is defined as Tx based on extant psychological theory or framework
	Secondary aim was to test the effects on anxiety and depressive Sx, and adverse events	Participants aged <18 years with chronic pain Sx (min. 3 months duration)	$K = 25$ trials inc. <20 individuals per condition. (Mean sample size = 36)	Three types: (1) Behavioral = relaxation, biofeedback; (2) Cognitive or CBT = coping skills; (3) Problem-solving Tx – involved delivery of skills to the family/parents
		Categorized pain via (1) headache conditions or (2) mixed pain (non-headache) conditions inc. abdominal pain, musculoskeletal pain, disease-free pain)	M sample size for all trials at end of Tx = 68	Control conditions inc. TAU ($K = 8$), active ($K = 27$) or WL ($K = 12$)
		Searches until May 1, 2018	Mean sex = 66% female samples	Variable settings inc. clinic ($K = 23$); clinic or home ($K = 8$); home ($K = 5$); inpatient ($K = 1$); school ($K = 3$); unclear ($K = 7$)
			Sample mean age = 12.65 years ($K = 44$)	Average Tx length 5–7 h
			$K = 30$ trials recruited from hospitals and clinic settings	
			$K = 23$ headache sample; $K = 10$ abdominal pain; $K = 2$ combo abdominal pain and/or IBS; $K = 2$ fibromyalgia; $K = 2$ temporomandibular disorders; $K = 3$ sickle cell disease pain; $K = 2$ IBS; $K = 3$ mixed pain conditions inc. headache	

Reference	Aim of review and type	Review criteria (inc. definitions and end search date)	Total studies included and sampling details	Type of psychological Treatments
Fisher et al. (2019)	Companion Cochrane review to Fischer et al. (2018) with the aim to evaluate the efficacy of psychotherapy Tx delivered remotely via technology such as the Internet, computer programs, and smartphone applications using combined SR and MA	RCTs with min. 10 or > participants in each condition delivered remotely via technology	$K = 10$ ($N = 697$) comprising $K = 4$ headache samples; $K = 1$ juvenile idiopathic arthritis; $K = 1$ sickle cell disease; $K = 1$ IBS; $K = 3$ headache and mixed pain conditions	Focused on psychological Tx based on existing psychological models or frameworks. All studies identified were CBT-based
		Control conditions inc. WL, TAU, or active control. Equivalence trials were excluded	$K = 8$ recruited samples via hospitals and clinics	Type of technology used: $K = 7$ used Internet delivery; $K = 1$ smartphone; $K = 2$ CD-Rom
		Participants aged <18 years with chronic pain Sx (min. 3 months duration)	All trial samples diagnosed with primary condition by a medical profession	$K = 8$ used active control comparisons inc. TAU vs. $K = 2$ WL condition
		Categorized pain via (1) headache conditions or (2) mixed-pain (non-headache) conditions inc. abdominal pain, musculoskeletal pain, disease-free pain	Retention rate across trials by post-Tx 84% ($N = 830$ to $N = 697$); with more females (66%)	
		Searches until May 1, 2018	Mean age = 13.2 years.	
O'Connell et al. (2020)	Evaluate efficacy of psychological Txs for mental health problems in children and adolescents with 'medically unexplained symptoms' (MUS) based on SR only method	Restricted to RCTs including children and adolescents up to the age of 18 years	$K = 18$ trials with sample sizes ranging between 20 and 273	Psychological Txs defined as those specifically designed to change psychological processes conceptualized to underlie distress and suffering and could inc. CBT (variants – BT and CT), psychodynamic Tx
		MUS is defined as "any physical symptom causing distress or impeding function which was not accounted for through medical examination" (p. 275)	Mean age range between 11.1 and 15.83 years (and full range between 7 and 18 years)	Type of interventions inc. both in-person and group CBT, self-directed CBT, "Lightening Process" group therapy (inc. osteopathy, life coaching, and neurolinguistics), and biofeedback
		Search end date January 2018	More females in sample compositions	
			$K = 6$ trials inc. stringent diagnostic criteria for mental health conditions	
Holsting et al. (2021)	Evaluate therapeutic approach, content and efficacy on symptom burden, and psychosocial outcomes of self-help interventions (SHI) for persistent physical symptoms in young people using WHO definition (with mean age of 10–24 years) based on SR only method	Samples comprised mean age between 10 and 24 years	$K = 11$ studies (20–260 sample size range), based on European or US samples	SHI targeting individuals (may inc. parents) based on non-pharmacotherapy or non-medical Txs.
		Persistent physical symptoms defined on a continuum including individuals experiencing non-specific symptoms (e.g., abdominal pain); or an FSS or SSRDs in line with DSM-5 or Somatoform disorders in ICD-10/DSM-IV for a minimum of at least 3 months	Sample mean age 11–15 years, with full range between 6 and 18 years	SHI is defined as "stand-alone treatment delivered through online programs, written manuals, or audio files conducted with minimal support" (p. 2); although inc. programs that had standardized contacts with therapist/health-care professionals for (non-therapeutic) instructions
		Searches between January 24 and 27, 2020	Mean Sx duration range from 7 months to 4 years	
			Female sample composition ranged between 46% and 90%	
			Psychotherapy approaches inc. CBT, relaxation training, hypnotherapy, and written disclosure	
			$K = 3$ inc. parental support, and $K = 2$ based on the Internet and smartphone applications	

Note: *ACT* Acceptance and Commitment Therapy, *CBT* Cognitive Behavior Therapy, *inc.* including/includes, *CFS* Chronic Fatigue Syndrome, *FAP* functional abdominal pain, *FSS* functional somatic symptoms, *IBS* irritable bowel syndrome, K = number of studies, *MA* meta-analyses, *min.* minimum, *Psych.* psychological, *QoL* quality of life, *RAP* recurrent abdominal pain, *RCT* randomized controlled trial, *sig.* significant, *SMD* standardized mean difference, *SR* systematic review, *Sx* symptom(s), *TAU* treatment as usual, *Tx* treatment(s) or therapy, *WHO* World Health Organization, *WL* wait-list

Three of the MA reviews are based on the most recently updated Cochrane review focusing on testing the efficacy of RAP (Abbott et al., 2017) and chronic and persistent pain (Fisher et al., 2018, 2019). The latter are companion Cochrane reviews, given that the Fisher et al. (2018) review focuses on testing the efficacy of psychological treatments conducted in-person or via the telephone (excluding the Internet and smartphone) for chronic pain in youth, whereas the Fisher et al. (2019) review focuses on testing the efficacy of psychotherapy trials delivered remotely via technology which they defined as the Internet, computer programs, and smartphone applications.

In the Cochrane MA review focusing on children and adolescents (aged 5–18 years) with RAP (defined as experiencing three pain episodes over a 3-month interval), Abbott et al. (2017) identified 18 randomized controlled trials (RCTs) with a pooled sample of 928 youth, with a mean age range between 9.4 and 14.9 years. Four types of therapies were evaluated. A majority of trials were based on CBT interventions ($K = 10$, 55%) which included components such as relaxation, coping and distraction strategies, cognitive reappraisal, as well as modifying responses to illness and wellness behaviors. The other three types of interventions tested comprised hypnotherapy ($K = 4$) which included relaxation and imagery techniques, yoga ($K = 4$) and one trial focused on written self-disclosure. A summary of the key findings for this review is outlined in Table 33.5.

Overall, Abbott et al. (2017) found some short-term significant effects in relation to CBT-based “therapy success” (defined as pain-free or reduction in pain symptoms). However, these effects were not maintained at medium or longer-term follow-up. Similarly, no significant, robust effects were found for pain intensity, pain-related functioning, school performance, or overall quality-of-life (QoL). For the hypnotherapy trial, the findings revealed significant effects for therapy success, reduction in pain intensity and frequency, although mixed effects were found for QoL, while no significant effects were documented for school performance/absences. Similar results emerged for the yoga trials. Specifically, one of the studies reported therapy success up to one-year follow-up, while all three studies reported a significant decline in pain intensity post-therapy. However, no significant effects were reported for improvement in pain frequency, school performance, or overall QoL. Finally, Abbott et al. (2017) identified one trial testing the effects of written disclosure, although no significant effects were reported for pain outcomes including QoL.

It is noteworthy that the trials included in the Abbott et al. (2017) Cochrane MA review were evaluated to be of low-grade quality, including very small sample sizes. Overall, the evidence for the effects of non-pharmacotherapy interventions for managing RAP in youth is weak. There is some preliminary support for CBT and hypnotherapy interventions in reducing pain symptoms in the shorter-term, although there is a paucity of evidence for longer-term maintenance. In terms of the CBT studies identified in Abbott et al.’s review, there was high variability in specific therapy components as well as format (see Table 33.4), thus making comparisons between CBT studies difficult in order to determine which components and types of format(s) are more conducive to better outcomes for youth with RAP.

In a separate review, Bonvanie et al. (2017) extended their criteria to evaluate the effectiveness of psychological interventions on symptom load and disability in youth aged 6–18 years with FSS (defined as “physical symptoms not fully explained by a well-defined medical psychiatric or somatic illness”; p. 273). Bonvanie et al. (2017) identified 27 studies of which 22 trials were included in their MA review. Comparable to Abbott et al.’s (2017) MA, a majority of trials identified ($K = 15/27$; 56%) were CBT-based interventions. Bonvanie et al. (2017) reported pooled moderate to small significant effects for the psychotherapy trials in reducing symptom load ($g = -.61$) and disability ($g = -.42$) post-therapy, with significant, yet smaller effect sizes reported at follow-up for both symptom load ($g = -.38$) and disability ($g = -.31$). Notably, these researchers found pooled significant moderate effect for reducing school absence at post-therapy ($g = .51$). Given the heterogeneity of trial therapy

Table 33.5 Summary of key findings from the systematic and meta-analytic reviews evaluating psychological treatments for somatic-related syndromes including chronic pain for children and adolescents

Reference	Key findings	Limitations
Abbott et al. (2017)	*CBT vs. control*	Paucity of studies assessing RAP sub-groups via ROME III criteria
	$K = 4$ inc. Tx success (defined as pain-free or Sx reduction) with a pooled sample of $N = 175$	Small sample sizes and very small number of studies assessing non-CBT Tx
	The pooled odds ratio (OR) for Tx success = 5.67 (significant but of low quality)	Overall relatively weak evidence based on Txs of primarily short-duration in length. Preliminary support for CBT and hypnotherapy in reducing short-term pain Sx; with paucity of evidence for long-term maintenance
	$K = 3$ of 4 studies reported Tx success at follow-up, with pooled OR = 3.08 ($N = 139$ pooled sample) – suggesting insufficient evidence for the effect of CBT on medium-term Tx success (Low grade pooled sample) – suggesting insufficient evidence for the effect of CBT on medium-term Tx success	High variability in measures used between studies
	$K = 7$ ($N = 405$ pooled sample) tested pain intensity post-Tx. Non-significant pooled standardized mean difference (SMD) = −.33 (with low-grade quality)	High variability in Tx components and format – inc. CBT-based Txs
	$K = 4$ ($N = 301$ pooled sample) tested medium-term follow-up on pain intensity. Non-significant pooled SMD = −.32 (with low-grade quality)	Due to high variability between Txs no combined global analysis conducted
	$K = 3$ ($N = 308$ pooled sample) tested longer-term follow-up on pain intensity. Pooled SMD (non-significant) = −0.04 (with low-grade quality)	Due to low volume of RCTs – mechanisms of effects unknown
	$K = 1$ study ($N = 104$) assessed pain duration with no significant outcome for CBT vs. active control	
	$K = 1$ study ($N = 16$) assessed school performance with no significant effect found	
	$K = 3$ ($N = 200$ pooled sample) tested social/psychosocial (internalizing Sx) outcomes with no study finding a sig. effect	
	$K = 3$ tested effects on QoL ($N = 136$). Pooled SMD for both physical (0.71) and psychosocial (SMD = 0.43) QoL was non-sig. with low-grade quality	
	$K = 4$ tested functional impairment in daily living due to pain ($N = 176$). Pooled SMD (−.57) was non-sig. with low-grade quality	
	Hypnotherapy vs. controls	
	$K = 4$ tested Tx success with the pooled being significant at OR = 6.78, although with low grade (due to small sample sizes)	
	$K = 4$ tested pain intensity ($N = 146$). The pooled SMD = −1.01 was significant, although low-grade quality	
	$K = 4$ tested pain frequency ($N = 146$). The pooled SMD = −1.28 was significant, although low-grade quality	
	$K = 2$ tested school performance/absences and both found no significant effects with comparison conditions	
	$K = 2$ tested QoL with mixed effects (only 1 study reported sig. effect)	
	Yoga vs. Controls (based on $K = 3$ studies ($N = 122$))	
	$K = 1$ tested Tx success with significant effects found at 1-year follow-up	
	$K = 3$ tested pain intensity, with pooled SMD = −.31, and low-grade quality, with no evidence supporting yoga post-Tx	
	$K = 1$ tested pain frequency and no sig. effect was found	
	$K = 1$ tested school performance and reported sig. effects for school absenteeism, post-Tx and 12 months follow-up	
	$K = 2$ tested QoL ($N = 53$) with non-sig, pooled SMD = −.32, with low-grade quality	
	Written Self-Disclosure vs. Controls (based on $K = 1$ study ($N = 63$))	
	No sig. effect for pain duration & frequency post-Tx, although frequency was lower by 3 months follow-up	
	No sig. effects for QoL	
	No adverse effects reported for any type of Tx	

Bonvanie et al. (2017)	Compared with WL, CAU, and placebo controls, Psych Tx had sig. effect on:	Heterogeneity in Tx types and dosage, functional Sx types, yet small no. of studies inc. in MA
	Symptom load post-Tx ($K = 21$; $g = -.61$ [CI: −.87 −.35]; and at follow-up ($K = 16$; $g = -.38$ [CI: −.63 – −.12]	Many measures used were not previously validated
	Disability post-Tx ($K = 14$; $g = -.42$ [CI: −.67 – −.16]; and at follow-up ($K = 8$; $g = -.31$ [CI: −.56 – −.07]	Funnel plots indicated publication bias (hence effect sizes may be overestimated)
	School absence post-Tx ($K = 74$; $g = -.51$ [CI: −.92 −.11]	Lacked detail of type of intervention components included
	Effect estimate for Psych Tx was highest for children with fatigue	
	Neither age nor Tx dose did not significantly influence outcomes	
Fisher et al. (2018)	Headache samples – Headache Frequency Post-Tx & follow-up	Overall low quality studies
	$K = 15$ ($N = 644$) – Risk Ratio (RR) = 2.35 indicating sig. reduction in headache frequency post-Tx, although low-grade quality. At follow-up $K = 5$ ($N = 223$) – with RR = 2.73, sig decline in pain, although low-grade quality	Did not conduct sub-group analyses according to type of control condition (ie whether differences emerged between active vs. WL control conditions)
	$K = 13$ ($N = 437$) comprise samples of <20 per arm (RR = 2.86, sig decline in headache frequency post-Tx). At follow-up $K = 4/5$ trials had <20 participants per arm with sig. decline in pain (RR = 3.49)	Lack of consensus on outcome measures used
	$K = 2$ ($N = 207$) comprised samples of >20 per arm (RR = 1.88, sig decline in headache frequency)	
	Headache samples – Disability Post-Tx & follow-up	
	$K = 6$ ($N = 446$), with no sig improvement in disability (SMD = −.26), with low-grade quality. $K = 3$ ($N = 209$) reported beneficial reduction in disability at follow-up (SMD + −0.37, medium effects), although low quality	
	$K = 4$ ($N = 61$) had small sample sizes (<20 per arm), with no sig. improvement in disability (SMD = 0.04)	
	$K = 2$ (>20 per arm), with medium beneficial effects in reducing disability (SMD = −0.35). $K = 2$ ($N = 185$) also had a medium effect on disability at follow-up (SMD = −0.36)	
	Headache samples – Depression Post-Tx & follow-up	
	$K = 6$ ($N = 400$), with no beneficial effects post-Tx (SMD = −0.08), with low-grade quality. Same non-sig. outcome for studies with < or > 20 participants per arm. At follow-up, $K = 3$ ($N = 228$), no sig. effects (SMD = −0.05), with low-grade quality	
	Headache samples – Anxiety Post-Tx & follow-up	
	$K = 7$ ($N = 439$), with no beneficial effects (SMD = −0.11), with low quality. Same non-sig. outcome for studies with < or > 20 participants per arm. At follow-up, $K = 4$ ($N = 271$), no sig. effects (SMD = −0.12), with low-grade quality	
	Mixed Pain/ Non-Headache samples – Pain Intensity Post-Tx & follow-up	
	$K = 16$ ($N = 1210$) – moderate beneficial effects in reducing pain intensity post-Tx (SMD = −0.43), although low-grade quality	
	$K = 7$ ($N = 250$) had <20 people per arm and had large effects in reducing pain intensity [post-Tx (SMD = −0.83). $K = 9$ trials ($N = 960$) had >20 people per arm, and only found small but non-beneficial effects in reducing pain intensity at post-Tx (SMD = −0.20)	
	At follow-up $K = 9$ ($N = 833$) – No sig reduction of pain intensity (SMD = −0.08), with low quality	
	$K = 2$ ($N = 53$) with small samples (<20 per arm) at follow-up found beneficial effects in reducing pain intensity (−0.94); whereas $K = 7$ ($N = 780$) with larger samples (>20 per arm) had no beneficial effects in reducing pain intensity (SMD = 0)	
	Mixed Pain/ Non-Headache samples – Disability Post-Tx & follow-up	

(continued)

Table 33.5 (continued)

	$K = 14$ ($N = 2610$) – small effects in reducing disability post-Tx (SMD = −0.34), with low-grade quality	
	$K = 6$ ($N = 213$) had <20 people per arm, showing large beneficial effects in reducing disability (SMD = −0.72). $K = 8$ ($N = 1013$) had >20 people per arm and showed only small beneficial effects (SMD = −0.20)	
	$K = 9$ ($N = 935$) showed small beneficial effects in reducing disability at follow-up (SMD = −0.27), although low quality. $K = 2$ ($N = 53$) had <20 per arm and did not find sig. reduction in disability at follow-up (SMD = −1.17); whereas $K = 7$ ($N = 882$) with >20 people per arm, showed small sig. beneficial effects in reducing disability at follow-up (SMD = −0.20)	
	Mixed Pain/ Non-Headache samples – Depression Post-Tx & follow-up	
	$K = 8$ ($N = 757$) – no sig. beneficial effects in reducing depression post-Tx (SMD = −0.05), although low-grade quality. Same non-sig. outcome for studies with < or > 20 participants per arm. At follow-up, $K = 7$ ($N = 667$), no sig. effects (SMD = 0.09), with low-grade quality. Same non-sig. outcome for studies with < or > 20 participants per arm at follow-up.	
	Mixed Pain/ Non-Headache samples – Anxiety Post-Tx & follow-up	
	$K = 8$ ($N = 957$) – small sig. beneficial effects in reducing anxiety post-Tx (SMD = −0.16), although low-grade quality	
	$K = 7$ ($N = 851$) had > 20 people per arm and found small sig. effects post-Tx (SMD = −0.17)	
	At follow-up, $K = 8$ ($N = 975$), no sig. effects (SMD = 0.01), with low-grade quality. Same non-sig. outcome for studies with >20 participants per arm at follow-up	
Fisher, et al. (2019)	Headache Samples:	Overall very low quality of studies
	Headache Severity Post-Tx & follow-up:	Adverse effects and satisfaction with Tx inconsistently evaluated
	$K = 7$ ($N = 379$) found sig. beneficial effects of at least 50% reduction of headache pain severity at post-Tx (RR = 2.02), and the effect was maintained at follow-up (RR = 1.76) based on $K = 4$ studies ($N = 230$); although the quality of studies was low	
	Headache Disability Post-Tx & follow-up:	
	$K = 5$ ($N = 440$) found no sig. reduction in disability post-Tx (SMD = −0.16) or at follow-up (SMD = −0.16) ($K = 3$, $N = 341$); with the quality of studies evaluated as low	
	Depression in Headache Samples Post-Tx & follow-up:	
	$K = 4$ ($N = 442$) found no sig. reduction in depression post-Tx (SMD = −0.04) or at follow-up (SMD = 0.03) ($K = 2$, $N = 320$); with the quality of studies evaluated as very low	
	Anxiety in Headache Samples Post-Tx & follow-up:	
	$K = 3$ ($N = 380$) found no sig. reduction in anxiety post-Tx (SMD = −0.08) or at follow-up (SMD = −0.01) ($K = 3$, $N = 360$); with the quality of studies evaluated as very low	
	Mixed Pain Samples – Pain Intensity Post-Tx & follow-up:	
	$K = 5$ ($N = 501$) found no sig. reduction in pain intensity post-Tx (SMD = −0.90) or at follow-up (SMD = −0.41) ($K = 2$, $N = 3041$); with the quality of studies evaluated as very low	
	Mixed Pain Samples - Disability Post-Tx & follow-up:	
	$K = 3$ ($N = 363$) found no sig. reduction in disability post-Tx (SMD = −0.28) and only $K = 1$ trial evaluated follow-up effects. Study quality was very low	
	Depression in Mixed Pain Samples Post-Tx & follow-up:	
	$K = 2$ ($N = 317$) found no sig. reduction in depression post-Tx (SMD = 0.04) and only $K = 1$ trial evaluated follow-up effects. Study quality was very low	
	Anxiety in Mixed Pain Samples Post-Tx & follow-up:	
	$K = 2$ ($N = 370$) found no sig. reduction in anxiety (SMD = 0.53), evaluated of low quality	

O'Connell et al. (2020)	Descriptive evaluation due to SR-only method	Quality of studies were evaluated as low overall
	CBT – Child-only therapist delivered: *K* = 3 trials. *K* = 2 comprised individual CBT for headache samples and neither found sig. between group effects on mental health outcomes (only within group effects found). *K* = 1 trial based on CBT-group-based program and also did not find a sig improvement in depression and anxiety measures; although a sig., reduction in headache scores was found	No MA, quantitative synthesis due to heterogeneity of methods, inc. Tx methods and samples
	CBT – Child & Parent Therapist Directed: *K* = 7 trials, of which 6 found sig. between group differences for mental health outcomes	
	K = 4 trials based on anxiety Sx – and all 4 trials reported sig. reductions in anxiety at post-Tx relative to controls. However, Tx effects only sig. maintained for 2/4 trials at follow-up due to control groups improving or receiving WL condition	
	K = 3 of 5 trials assessing depression found sig. reductions at post-Tx, and although effects were maintained, only 1/3 of trials were sig. at follow-up, as control conditions also improved for the other 2 trials	
	K = 1 trial assessed emotional behavioral functioning and reported sig. greater improvements in Tx condition between baseline and 24 months follow-up, but not between baseline and 12-month follow-up	
	K = 6 assessed physical health outcomes and 4/6 reported sig. improvements post-Tx and/or follow-up, inc. pain and functional somatic Sx complaints	
	CBT-self-directed: *K* = 4, with 3 trials finding no sig. between group differences on mental health outcomes (only within group differences). Only *K* = 1 found sig. reduction in depression and pain-related anxiety but not general anxiety at post-Tx, but not sig. at follow-up as control group also improved by 6-month follow-up	
	Only K = 1 trials reported sig. differences in pain intensity	
	Lightening Process therapy: *K* = 1 trial which combined therapy with specialist medical care. Sig. reductions reported for depression, anxiety, physical function, and fatigue scores post-Tx and effects maintained at 12-month follow-up. Although 6 months improvement occurred for anxiety, physical functioning, and fatigue but not depression	
	Biofeedback: *K* = 3 trials – none found sig. differences in mental health outcomes when controlling for baseline levels, although all 3 trials found sig. improvements on physical outcomes inc. pain and headache post-Tx	

(continued)

Table 33.5 (continued)

Holsting et al. (2021)	Descriptive evaluation due to SR-only method	SR only results
	$K = 5$ trials based on CBT-SHI. 3/5 trials reported no sig. effects (based on headache, abdominal pain, and chronic fatigue samples)), while 1 trial reported a sig. reduction in headache frequency and intensity post-Tx, but effects not maintained at 6-month follow-up, and a further trial found sig. reduction in abdominal pain frequency post-Tx but not for pain intensity	Method quality of studies was relatively low grade given heterogeneity in methods inc. measures used, intervention content, duration, and therapy framework used
	$K = 2$ trials focused on relaxation training – SHI with mixed effects found. With $K = 1$ finding no sig improvement in headache frequency or intensity post-Tx, but a sig. decline occurred in frequency at 2- and 5-month follow-up. In a further $K = 1$ trial, sig. decline in headache frequency and intensity found at post-Tx, but not in terms of a number of headache episodes relative to control condition	Minimal studies assessed broader functioning inc. school absence ($K = 2$); physical functioning ($K = 3$); anxiety and depressive comorbid Sx
	$K = 2$ hypnotherapy-SHI trials also found mixed effects. In 1 trial, non-inferior effects were found between active condition and control condition for abdominal pain. In a further trial, the active control condition reported sig. greater improvement in pain frequency and intensity reduction post = TX, but by 12-month follow-up the active condition was relatively comparable in Tx success (62.1% in SHI condition vs. 71% in individual hypnotherapy via therapist)	
	$K = 2$ used written disclosure SHI method with mixed effects. $K = 1$ found no sig. difference in gastrointestinal pain frequency at 3 months, although sig. decline in pain frequency in SHI condition by 6-month follow-up. In second trial, no sig. difference in headache frequency found between conditions at post-Tx	

Note: *ACT* ACCEPTANCE and Commitment Therapy, *CBT* Cognitive Behavior Therapy, *inc.* including/includes, *CFS* Chronic Fatigue Syndrome, *FAP* functional abdominal pain, *FSS* functional somatic symptoms, *IBS* irritable bowel syndrome, *K* number of studies, *MA* meta-analyses, *min.* minimum, *Psych.* psychological, *QoL* quality of life, *RAP* recurrent abdominal pain, *RCT* randomized controlled trial, *sig.* significant, *SMD* standardized mean difference, *SR* systematic review, *Sx* symptom(s), *TAU* treatment as usual, *Tx* treatment(s) or therapy, *WHO* World Health Organization, *WL* wait-list components, it is not clear which therapy components contributed to better outcomes, as moderator analyses were not conducted due to methodological variability. However, Bonvanie et al. (2017) reported that neither therapy dosage nor age significantly influenced outcomes; although they did report that stronger effects were found for samples that included youth with fatigue symptoms.

In the third review, Fisher et al. (2018) conducted an updated Cochrane review to evaluate the efficacy of psychotherapy interventions (excluding Internet or smartphone therapies) for youth (less than 18 years of age) experiencing chronic and recurrent pain (with a minimum of 3 months duration). A secondary aim was to also test the efficacy of these trials in reducing comorbid anxiety and/or depressive symptoms. Fisher et al. (2018) identified 47 trials with a pooled sample of 2884 youth. They categorized pain samples into two groups of studies: (1) headache conditions and (2) mixed-pain (predominantly non-headache) conditions including RAP, FAP, and musculoskeletal pain. A majority of trials comprised cognitive and/or behavioral-based therapy components including coping skills, problem-solving, and relaxation training.

For the headache trials, Fisher et al. (2018) found that the psychotherapy interventions contributed to a significant reduction in headache frequency post-therapy and at follow-up. However, no significant improvement in disability post-therapy was found. Similarly, no significant reductions in depression or anxiety symptoms were found post-therapy or at follow-up (see Table 33.5). For the mixed-pain conditions, moderate beneficial effects were found in reducing pain intensity symptoms post-treatment, but these effects were not maintained at follow-up. Significant small effects in reducing disability were however found both post-therapy and at follow-up. Additionally, small significant effects were also found in reducing anxiety post-therapy, although no significant effects were found at follow-up. Moreover, no significant effects in a decline in depressive symptoms were found at post-therapy or follow-up.

Comparable to the Abbott et al. (2017) Cochrane MA review, the overall quality of studies was evaluated to be low or very low in the Fisher et al. (2018) Cochrane review. Moreover, most of the trials included youth samples with recurring headaches and the therapeutic approaches were predominantly CBT-based. Overall, the findings from the Fisher et al. (2018) review indicate that in the short-term, CBT-based interventions may have utility in facilitating the reduction of pain intensity, disability, and potential comorbid anxiety symptoms. However, further research is warranted to determine what therapy components are instrumental for facilitating the maintenance of effects in the medium to longer term for youth with recurring somatic pain.

As aforementioned, Fisher et al. (2019) conducted a companion Cochrane MA review to examine the efficacy of psychotherapy interventions delivered remotely via technology for youth experiencing chronic and recurring pain with a minimum of 3 months duration. Comparable to the Fisher et al. (2018) review, Fisher et al. (2019) evaluated the studies according to two categories: (1) headache samples and (2) mixed pain (predominantly non-headache) samples. A total of 10 trials were evaluated which comprised CBT-based approaches. Specific details of results according to pain severity, intensity, and disability and concurrent anxiety and depressive symptom outcomes are outlined in Table 33.5. The findings showed that CBT-based therapies delivered remotely using e-health and smartphone approaches may help reduce headache pain severity post-therapy but these effects are not necessarily maintained at follow-up. Moreover, this field in terms of remote technology interventions is very much in its infancy, as reflected by the small number of RCTs included in this review ($K = 10$). Notably, there is a current lack of evidence for the remote delivery of CBT in reducing pain intensity and disability due to pain symptoms as well as concurrent anxiety and depressive symptoms in youth with recurrent pain presentations. Importantly, comparable to the other MA reviews (Abbott et al., 2017; Fisher et al., 2018), the Fisher et al. (2019) review also accentuates the need to improve the quality of trial methodology in this field.

O'Connell et al. (2020) conducted the first systematic review (SR) to evaluate the efficacy of psychological therapies for mental health problems in youth (7–18 years) with medically unexplained symptoms (which they defined as "any physical symptom causing distress or impeding function which was not accounted for through medical examination" (p. 275)). They included 18 RCTs which were predominantly CBT-based (*K* = 14, 78%; see Table 33.4). Once again, comparable to the previous reviews in this field, O'Connell et al. (2020) also noted that the quality of the studies was low. Moreover, given the heterogeneity of methodology including treatment types, dosage, and measurement variability, they did not conduct a MA, but rather provided a qualitative (descriptive) evaluation of pooled findings, with key results summarized in Table 33.5. In summary, none of the three child-only therapist-delivered CBT programs found improvements in anxiety or depressive symptoms. For the CBT trials which were both child and parent-directed approaches (*K* = 7), all four trials that included anxiety outcomes reported significant reductions post-therapy, although only two of these four trials found these effects were maintained at follow-up relative to the control conditions. Similarly, three of the five CBT, child- and parent-directed approaches found a significant reduction in depressive symptoms post-therapy, although these effects were only maintained for one of these trials at follow-up. For the most part, non-significant effects were found for improvements in mental health outcomes for CBT self-directed approaches. Only one of these four trials reported a significant decline in depression and pain-related anxiety but not for general anxiety post-therapy.

O'Connell et al. (2020) also identified three biofeedback trials, although all three studies did not find significant differences in mental health outcomes. These researchers also identified one trial, referred to as the "Lightening Process Therapy" which combined psychotherapy with medical care for youth with CFS (*n* = 100). For this latter trial, significant reductions were found for both anxiety and depression symptoms post-therapy and which were maintained at 12 months follow-up.

Overall, the findings from the O'Connell et al. (2014) review indicate some provisional evidence for in-person CBT-based approaches which include both child and parent components in reducing comorbid anxiety and/or depressive symptoms in the short-term for youth with somatic syndromes. However, a noteworthy outcome from this review was that the overall improvement in mental health functioning was not necessarily related to the concurrent improvement in physical symptoms including pain intensity. This outcome further attests to the need for a more integrative biopsychosocial therapeutic approach for youth with somatic syndromes experiencing comorbid anxiety and/or depressive symptoms, particularly given that until recently, mental health symptoms have for the most part been overlooked or at most considered as secondary outcomes in this population (Kangas et al., 2020; Saunders et al., 2020).

In the final, the most recent review identified, Holsting et al. (2021) evaluated the efficacy of self-help psychological-based interventions for youth (6–18 years) with persistent physical symptoms which they defined on a continuum perspective (ranging from non-diagnostic FSS to SSRDs; see Table 33.4). Holsting et al. (2021) identified 11 trials comprising five self-help CBT-based interventions, two relaxation trials, two self-help hypnotherapy trials, and two written self-help disclosure trials. Comparable to O'Connell et al.'s (2020) review, Holsting et al. (2021) did not conduct a MA due to the heterogeneity in methods including measures used, intervention frameworks, and content and duration of therapy. Overall, mixed effects were found across the four broad categories of interventions identified in Holsting et al.'s (2021) review in terms of pain symptom frequency and intensity, as summarized in Table 33.5. Again, comparable to the other reviews, Holsting et al. (2021) also found the quality of self-help interventions to be low; hence, there is only provisional evidence at best in using self-help psychotherapy interventions to assist youth in managing their somatic syndromes. Importantly, most of the self-help interventions involved some level of therapist/professional guidance either in-person, by phone or via email, with a paucity of trials identified using solely Internet media.

Clinical and Research Implications

The findings from the recent treatment outcome reviews indicate that the majority of trials are predominantly CBT-based interventions, with a smaller proportion of studies testing other forms of interventions including hypnotherapy, yoga, biofeedback methods, and written disclosure. The evidence indicates that CBT-based approaches should be considered as part of a multidisciplinary care plan to facilitate children and adolescents presenting with distressing somatic complaints to mental health services. Specifically, there is evidence to show that CBT approaches can help reduce pain intensity and disability in the short term, as well as facilitate the management of comorbid anxiety symptoms. However, there is mixed evidence for the co-management of depressive symptoms for youth with somatic syndromes. Moreover, the medium- to longer-term effects of CBT-based approaches is lacking for managing both primary somatic symptoms, as well as comorbid anxiety and/or mood problems in youth, and the impact this has on broader functioning including academic performance and peer relations. These latter outcomes are likely due to several reasons. First, psychological interventions have not conventionally been the first line of treatment for this population. In line with recent stepped-care approaches proposed to manage somatic syndromes in youth (e.g., Rask et al., 2018), the first step has typically involved children and adolescents being referred to primary care/medical settings. Management of somatic syndromes is also managed in pediatric specialist settings, while mental health referrals are not typically activated unless children and adolescents present with more severe and chronic levels of somatic symptoms and are typically comorbid with anxiety and/or depression. Hence, it is not unusual for some children and their parents to have some initial reservations when being referred to mental health settings (Kangas et al., 2020) including fear of stigmatization (e.g., Hulgaard et al., 2020), and considering the problem from a biomedical perspective (Neville et al., 2019).

A further reason for the lack of medium to long-term effects for the utility of CBT-based approaches is that there has been a lack of consensus on what the core therapy components comprise for managing somatic syndromes in youth presenting with various symptom profiles (inclusive of single-site versus multi-site health complaints). This is further reflected in the diversity of specific cognitive and/or behavioral strategies used across CBT trials in the reviews summarized in this chapter (see Table 33.4). To this end, common components have included relaxation training, distraction strategies, coping and problem-solving training, cognitive reappraisal techniques, as well as targeting modification of illness and sick-role behaviors in children and their parents through behavioral (including exposure) methods. However, given the heterogeneity in methods including primary and secondary outcome measures, no meta-analytic review to date has been able to conduct analyses to determine which specific components are deemed most essential in reducing pain and somatic discomfort. Indeed, there is also a paucity of programs to date that have been specifically designed for youth with somatic syndromes to also target comorbid anxiety and/or depressive symptoms (Kangas et al., 2020). Hence, there is a vital need for future trials to conceptually design and test transdiagnostic frameworks in the concurrent management of both somatic and comorbid mental health problems in youth experiencing distressing chronic somatic syndromes.

The evidence further shows the importance of including parents/carers in therapy, as the O'Connell et al. (2020) review revealed that combined child and parent-directed CBT approaches were more effective in reducing pain intensity and disability than child-only-directed approaches. This latter outcome further supports the biopsychosocial framework for somatic syndromes (e.g., Kangas et al., 2020), where parents and family members may inadvertently influence the perpetuation of symptoms through negative reinforcement and/or overprotective behaviors. Hence, the inclusion of a parent-focused module may be a crucial factor in enhancing the efficacy of psychological interventions for managing somatic syndromes in youth. Although there are a few studies that have included parental-specific modules, the focus has primarily been on operant techniques to facilitate parents to encourage the use of more proactive and less illness-related behaviors in their children (Palermo et al., 2014).

For parental interventions to make an additive contribution to the efficacy of psychological interventions, these interventions need to clearly target mechanisms associated with somatic syndromes in youth. To this end, recently, Stone et al. (2018) tested an integrative conceptual model based on social learning theory for the intergenerational transmission of chronic pain between parents and adolescents aged 11–17 years using baseline parent-adolescent dyadic measures followed by a 7-day diary assessment. This is one of the first studies to simultaneously evaluate adolescent perceptions of parental pain behaviors and parental reinforcement as prospective predictors of adolescent daily pain severity and functional impairment. Parental modeling of pain-related behaviors was found to have the strongest relation to adolescent daily pain severity and functional impairment, while adolescents were found to be cognizant of parental pain behaviors. These findings accentuate the importance of children's appraisal of parental health-related behaviors (Stone et al., 2018). Notably, these results attest to the important role parents have in hindering versus facilitating their child's management and recovery from recurring somatic complaints contingent on their own health-related behaviors, illness perceptions, and emotion-regulatory strategies. This further highlights that parental interventions need to target the modeling of adaptive parental health-related behaviors and emotion-regulatory strategies. Yet there is a notable paucity of such interventions in this field (inclusive of pediatric chronic pain) (Stone et al., 2018).

The findings from the treatment reviews further revealed that interventions delivered with minimal therapist guidance and/or remotely using e-health technology are very much in their infancy. For adolescents, online therapies may be a fruitful avenue to test future research given adolescents may be more adept and likely to engage with e-technological-based interventions. Additionally, future research is warranted in testing interventions beyond traditional CBT-based approaches including third-wave, mindfulness-based interventions.

A consistent outcome from the treatment reviews is that for the most part, the quality of the trials was deemed low grade. This attests to the importance of improving the methodological rigor of trials in this field, including using larger scale studies, including longer-term follow-up periods to monitor maintenance effects, as well as clearly differentiating between primary and secondary outcome measures, and using appropriate measures to test symptom and functional recovery.

Concluding Comments

Over the past decade, there is a continuing growth of research which has focused on the symptom profile, course, and management of recurring somatic complaints in youth. However, the lack of consensus and consistency in terminology, assessment tools, and diagnostic nomenclature has contributed to a notable absence of international clinical guidelines for clinicians working with this population. Yet there is increasing acknowledgment that a collaborative multidisciplinary health-care approach is needed for health-care professionals including psychologists working with children and adolescents with recurring somatic syndromes (e.g., Ibeziako et al., 2019; Rask et al., 2018). This body of literature highlights the importance of clinicians to regularly screen for comorbid mental health problems given that a considerable proportion of youth with somatic syndromes is also experiencing undetected elevated anxiety and/or depressive symptoms. A case-formulation approach using the proposed biopsychosocial framework is also recommended, along with using a CBT-based intervention approach which includes both children and parented-directed components. Early interventions may also have utility given untreated somatic syndromes in youth increase the probability of experiencing a more chronic course of comorbid psychopathology well into adulthood. This necessitates a shift from medicalizing the presence of recurring somatic health complaints in youth to acknowledging the mid-body connections. To this end, psychologists have an instrumental role in the multidisciplinary care of somatic syndromes in children and adolescents.

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Pediatric Cancer

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Overview of Pediatric Cancer

Nearly 16,000 children and adolescents ages 0–19 years are diagnosed with cancer each year in the United States. The most common diagnoses include acute lymphoblastic leukemia (ALL) and other blood cancers, medulloblastoma and other brain tumors, and neuroblastoma and other solid tumors, and prevalence rates for each vary across age at diagnosis, sex, and race. Treatment for pediatric cancer might include any combination of surgery, chemotherapy, radiation therapy, immunotherapy, stem cell transplant, and other targeted therapies. Although significant variability in outcomes remains, advances in treatment over the past 50 years have pushed overall survival rates to nearly 80% (National Cancer Institute, 2021). Because of the long-term effects and health risks associated with pediatric cancer and survivorship (e.g., side effects of treatment, increased risk of second cancers, etc.), it is now conceptualized as a chronic illness (Armstrong et al., 2014; Hudson et al., 2013; Robison & Hudson, 2014). The disease itself, as well as the invasive treatments, often produces a variety of acute and long-term (or late) effects that can impact physical, cognitive, emotional, and behavioral functioning.

Psychosocial Care for Pediatric Cancer Patients and Their Families

In addition to the obvious challenges presented by the disease and its often complex treatment, pediatric cancer patients and their families endure disruption to their normal routines and changes in access to their typical supports, which can negatively impact the overall social, emotional and academic development of the child or adolescent (Fuemmeler et al., 2002; Gerhardt et al., 2007; Mancini et al., 1989; Noll et al., 1991; Willard et al., 2017) as well as the emotional and social functioning of caregivers and siblings (Gerhardt et al., 2015; Kearney et al., 2015; Klassen et al., 2008). Integrated behavioral and mental health care is now widely accepted as the gold standard across medical settings

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and is associated with benefits including improved health outcomes and patient experience (Agency for Healthcare Research and Quality, 2018). The pediatric oncology setting is no exception, and the American Academic of Pediatrics (AAP) calls for the integration of psychosocial care in pediatric cancer centers including access to pediatric psychologists, social workers, and child life specialists (AAP Section on Hematology/Oncology, 2004).

Screening, assessment, consultation, intervention, and support services should be provided to patients and their families throughout the cancer trajectory. Providers should seek to deliver care according to the Standards for Psychosocial Care for Children with Cancer and Their Families (Wiener et al., 2015). These 15 empirically based standards serve as a blueprint for the provision of services addressing the range of emotional, social, educational, communication, and even financial needs of these families. Recommendations such as serial psychosocial screening, intervention, neurocognitive assessment, ensuring academic continuity, ongoing assessment of adherence, and facilitation of social interaction are outlined. The Pediatric Psychosocial Preventative Health Model (PPPHM; Kazak, 2006; Kazak et al., 2007) framework illustrates the necessity of screening and providing universal psychoeducation and support to all families facing pediatric cancer. Using the PPPHM, the psychosocial risk falls into one of three categories (i.e., universal, targeted, and clinical/treatment), thereby linking the results of screening to the appropriate intervention path. Pediatric psychologists and neuropsychologists, along with other psychosocial providers, may fill a variety of different roles and address a wide range of needs with pediatric oncology patients and their families depending on diagnosis and prognosis, type of and response to treatment, age or developmental level, family risk factors, and individual factors. Several distinct phases in the pediatric cancer journey are associated with unique patient and family needs, while other areas for psychological intervention remain important across the cancer trajectory, as described below.

Diagnosis and Treatment

The receipt of a pediatric cancer diagnosis is an overwhelming experience for patients and their families as they navigate shock, struggle to understand novel medical information, make rapid treatment decisions, and begin to learn complex treatment regimens. Pediatric psychologists play key roles in assisting with communication around the time of diagnosis, assessing patient and family coping, conducting early screening and prevention efforts, and providing necessary support throughout the child's treatment.

Communication with healthcare providers occurs across the cancer trajectory, though it is particularly important at the time of diagnosis when critical treatment decisions are made. Effective communication and involvement of patients and families in discussion about diagnosis and medical care are integral to improved patient health outcomes, adherence, and satisfaction (see Coyne et al., 2016 for a review). Facilitating a collaborative relationship between patient and medical team can enhance internal locus of control (Tiffenberg et al., 2000), decrease fears and concerns (Runeson et al., 2002), enhance preparedness, and promote belief that patient preferences are important (Coyne & Gallagher, 2011).

Psychological Functioning and Adjustment of Patients

Pediatric patients newly diagnosed with cancer must quickly adjust to novel situations that can be quite challenging, including hospitalization, initiation of intensive treatment regimens, and painful procedures. Indeed, one of the most common referrals to psychologists is adjustment to new diagnosis

(Clerici et al., 2008), with over half of Children's Oncology Group (COG) institutions reporting that they provide multiple psychosocial supports to patients and families within 30 days of new diagnosis (Selove et al., 2012). Importantly, the length and intensity of cancer treatments are highly variable and will depend on diagnosis, disease status, age, and other factors. For some patients, treatment can be profoundly difficult and characterized by long hospitalizations, complex treatments, medication side effects, and invasive and painful procedures. As a result, some patients can experience increased levels of distress compared to healthy peers (Price et al., 2016; Sawyer et al., 2000). Yet, the majority of patients adjust to treatment adequately and do not experience significant emotional or behavioral problems (Price et al., 2016; Sawyer et al., 2000; Van Schoors et al., 2015). Consistent with the PPPHM framework (Kazak, 2006), most patients function well with the universal supports provided in most children's hospitals (e.g., chaplain support, Child Life services, etc.), with smaller percentages of patients requiring more individualized and targeted interventions.

Screening and Prevention

Because of the variability in coping with diagnosis and treatment, early and ongoing psychosocial screening and prevention efforts are now considered essential in pediatric cancer care (Kazak et al., 2015). Early in the treatment process, most patients and families benefit from anticipatory guidance, psychoeducation, and information related to illness, treatment, potential side effects, and psychosocial factors (Thompson & Young-Saleme, 2015). Key areas to assess of both the patient and family include patient developmental history, emotional and behavioral functioning, social functioning and social supports, understanding of diagnosis and treatment, coping and adjustment to diagnosis, and health behaviors (e.g., sleep, diet). This information is often gathered from psychosocial providers via interview and structured assessment methods and can be obtained routinely throughout the cancer trajectory. Some examples of commonly used rating scales in a pediatric oncology setting include (but are not limited to) the Pediatric Quality of Life Inventory™ (PedsQL™; Varni et al., 2001), the Patient-Reported Outcomes Measurement Information Systems® (PROMIS®; DeWalt et al., 2015), the Psychosocial Assessment Tool 2.0™ (PAT 2.0™; Pai et al., 2008), and the NIH Toolbox for Assessment of Neurological and Behavioral Function® (NIH Toolbox®; Gershon et al., 2013). Ongoing and regular screening and assessment of individual patient and family coping can help determine risk level and design more targeted interventions and supports when appropriate.

Management of Somatic Symptoms

Many forms of cancer treatment are associated with aversive physical side effects, with most common short- and long-term side effects including nausea, vomiting, pain, and fatigue (Collins et al., 2000; Olson & Amari, 2015). Moreover, many pediatric patients with cancer routinely undergo painful and invasive medical procedures (e.g., venipunctures, intravenous line insertions, bone marrow aspirates, lumbar punctures, etc.) that can incite significant psychological distress (Stevens et al., 2011; Twycross et al., 2015). As a result, patients can develop anticipatory symptoms (e.g., nausea), procedural distress, and nonadherence to necessary components of their medical treatment (DuHamel et al., 1999). Sleep disturbance and fatigue are also common both during and following cancer treatment. These symptoms are described as distressing and can negatively impact behavioral, social, emotional, and daily functioning (Crabtree et al., 2015), making this another important area of functioning to regularly assess.

Effective use of cognitive-behavioral treatments to address physical symptoms (e.g., nausea, pain, and anticipatory symptoms) is well documented in the literature, including the use of distraction, hypnosis, diaphragmatic breathing, progressive muscle relaxation, biofeedback, guided imagery, and other mindfulness-based interventions such as yoga and music therapy (AAP Section on Integrative Medicine, 2016; Birnie et al., 2018; Kanitz et al., 2012). Engagement in cognitive-behavioral interventions can also enhance youth's sense of self-efficacy in managing pain and other distressful symptoms (Kanitz et al., 2012; Kuppenheimer & Brown, 2002). Parents and caregivers play key roles in helping patients utilize learned coping techniques, and it is well documented that caregivers contribute to a pediatric patient's experience of and management of distress (Caes et al., 2014; Harper et al., 2013). Pediatric psychologists work with patients and caregivers throughout a patient's treatment in implementing interventions that lessen pain, distress, discomfort, and fatigue.

Management of Emotional and Behavioral Symptoms

Again, diagnosis and treatment of pediatric cancer can contribute to the onset of emotional and behavioral problems; however, some patients bring premorbid emotional and behavioral concerns to the cancer experience. And, again, early screening can assist in identifying these needs. It is recommended that pediatric cancer patients have access to psychosocial interventions throughout the cancer trajectory to address these difficulties (Steele et al., 2015). Most often, evidence-based treatments for childhood internalizing and externalizing disorders (e.g., cognitive-behavioral, behavioral, social skills, problem-solving, etc.) are utilized to address both premorbid and new-onset mood and behavior problems; however, these interventions often require flexibility in implementation due to medical treatment variables such as side effects of medical treatment, timing of hospitalizations, and other factors (Salley & Catarozoli, 2019).

Risk and Resilience Factors

Developing an understanding of specific risk and resilience factors aids pediatric psychologists in determining the level of risk and matching supports accordingly. For example, disease status (e.g., relapse and prognosis), involvement of the central nervous system, and certain medical treatments (e.g., cranial irradiation and intrathecal chemotherapy) can negatively impact adjustment and neurocognitive outcomes (Reddick et al., 2014; Phipps et al., 2009). In addition, family risk factors, such as lower socioeconomic status, poor parental coping, and parental experience of prior trauma have been shown to impact patient and family coping (Kupst et al., 1995; Boman et al., 2013). Individual resilience factors (e.g., self-esteem, perceived competence, temperament, and effortful control) and social factors (e.g., social support and strong family cohesion) account for variability in distress, can aid in positive adaptation, and can contribute to better outcomes (Harper et al., 2019; Hoekstra-Weebers et al., 2001; Howard Sharp et al., 2015; Tillery et al., 2019). Attention should also be given to other vulnerable populations, including young children who are at heightened risk for disturbances in their development as a result of both their medical diagnoses/treatments and missed opportunities at a critical time in development (Kenney et al., 2020; Willard et al., 2017).

End of Treatment and Survivorship

Many imagine that achieving cure and completing treatment for cancer would come with an overwhelming sense of relief, but that is not always the case for pediatric cancer survivors and their families who often struggle to establish a “new normal” in the face of ongoing side effects and uncertainty while adjusting to decreased contact with their oncology team. Survivors and caregivers turn their attention from treatment to reintegrating at school and with peers while families attempt to resume their pre-diagnosis roles and routines, and this transition often brings significant stress (Karst et al., 2018). Pediatric cancer survivors report mixed emotional experiences, including anxiety, as they transition off therapy (Nathan et al., 2011). Likewise, caregivers report anxiety and fear of relapse (Wakefield et al., 2011). Moreover, youth with cancer often face functional consequences associated with their treatment, including missed academic and social opportunities, physical changes and limitations, neurocognitive deficits, and disruptions to family functioning that extend well past the end of treatment (Husson et al., 2017; Long & Marsland, 2011; Mulhern et al., 2004; Reddick & Conklin, 2014). As such, screening for psychosocial needs and providing developmentally appropriate preparation including psychoeducation and anticipatory guidance are essential to a successful end-of-therapy transition (Kazak et al., 2015; Thompson & Young-Saleme, 2015). Survivors should be provided with screening and support throughout long-term survivorship as well (Lown et al., 2015), related to medical care (e.g., transition from pediatric to adult care) and psychosocial functioning (e.g., educational transition after high school and transition to independent living). Nathan et al. (2011) set out six domains of functioning in which childhood cancer survivors should receive support: physical health and function, sexual/reproductive health, mental health, health behaviors, health education, and social competence (including education and employment). The Children’s Oncology Group (COG, 2018) has published clinical practice guidelines that outline recommendations for screening and management of potential medical and psychosocial late effects for providers working with long-term survivors of childhood cancer.

Cognitive and Academic Functioning

School Reintegration Many children and adolescents return to school following treatment, highlighting the importance of academic continuity during cancer-directed therapy and support to facilitate academic and social aspects of school re-entry (Thompson et al., 2015). Survivors may continue to experience pain, fatigue, decreased immune functioning, changes in physical appearance (e.g., hair loss, amputation, and weight loss/gain), changes in physical functioning (e.g., decreased mobility and fine motor weakness), and changes in cognitive functioning as they reintegrate into the classroom. Nearly all cancer survivors will require accommodations or interventions, including rehabilitation services such as physical, occupational, and speech and language therapies, to address individual needs, which may be best delivered via formal educational plans such as 504 Plans and Individualized Educational Programs (IEP). Common accommodations include preferential seating, provision of teacher notes, shortened school day, allowance of rest breaks, shortened assignments and/or extended time for test taking, and support for social reintegration into the classroom. Please see Harman et al. (2019) for a comprehensive list of common needs and accommodations.

Cognitive Late Effects Patients with central nervous system disease or directed therapy (e.g., cranial radiation and intrathecal chemotherapy), such as patients with brain tumors and ALL, are at higher risk for long-lasting cognitive late effects such as attention, working memory and processing speed difficulties (Jacola et al., 2016; Knight et al., 2014; Reddick et al., 2014; Winter et al., 2014). These core deficits can lead to secondary deficits in global cognitive functioning (i.e., IQ) and academic skills. Young age at diagnosis, greater treatment intensity, and neurological complications (e.g., hydrocephalus and stroke) are also associated with increased risk for developing cognitive difficulties, which typically emerge following treatment and may worsen over time. Prevalence rates for cognitive effects in childhood cancer survivors vary across studies, but at least 35% experience impairment in at least one domain (Krull et al., 2018; Michel et al., 2020). Given these risks and their potential impact on academic functioning, serial monitoring of cognitive functioning is recommended in these high-risk populations (Annett et al., 2015). At a minimum, these survivors should be routinely screened for weaknesses or changes in cognitive functioning via interview and/or questionnaires and should be assessed with comprehensive cognitive evaluation at the time of school re-entry and every 2–3 years or with notable changes in status. The standard for assessment of neuropsychological outcomes suggests assessment of intelligence, attention, memory, language, executive functioning, and processing speed. Assessment results should inform classroom services (Harman et al., 2019) and may reveal the need for additional intervention as well. It is important to keep in mind that these cognitive late effects are long-lasting and continue to impact survivors' functioning beyond school and throughout adulthood (Krull et al., 2018; Michel et al., 2020; Ullrich & Embry, 2012).

In addition to compensatory interventions and accommodations provided in the classroom setting as described above, survivors with cognitive deficits may benefit from pharmacological intervention or cognitive rehabilitation. Although multiple pharmacological agents have been studied in this population, the most studied drugs are psychostimulants. In particular, multiple trials have illustrated the efficacy of methylphenidate in improving attention and working memory in leukemia and brain tumor survivors (Conklin et al., 2010; Smithson et al., 2013). Computerized cognitive remediation has shown promise in recent studies in improving working memory performance, though the functional impact of these demonstrated improvements is not yet known (Conklin et al., 2017; Hardy et al., 2013).

Psychological Functioning and Adjustment of Survivors

Overall, pediatric cancer survivors are not at increased risk for psychological problems as compared to their healthy peers, with 80–90% considered psychologically well (Eiser et al., 2000; Mertens & Gilleland Marchak, 2015; Phipps et al., 2009; Stam et al., 2001). However, a subset will experience emotional and related difficulties such as anxiety, depression, and post-traumatic stress symptoms (PTSS; Bitsko et al., 2016; McDonnell et al., 2017; Michel et al., 2020). While models of traumatic stress often influence the conceptualization of pediatric patients' experiences (Kazak et al., 2006), rates of formal post-traumatic stress disorder (PTSD) are actually quite low and commensurate with healthy controls (Allen et al., 2018; Phipps et al., 2014; Tillery et al., 2019). Indeed, pediatric patients with cancer often display remarkable resilience (Tillery et al., 2017; Van Schoors et al., 2015), reporting similar or even lower levels of psychological problems than healthy peers (DeJong & Fombonne, 2006; Eiser et al., 2000; Howard Sharp et al., 2015). Moreover, the concept of post-traumatic growth has been increasingly studied, with results of some studies suggesting that pediatric patients with cancer can experience long-term psychological benefits from their cancer experience (Barakat et al., 2006; Phipps et al., 2014; Van Schoors et al., 2015). Again, brain tumor survivors are at increased risk of struggling with psychosocial functioning following treatment, with some studies identifying higher rates of internalizing and externalizing symptoms (Cox et al., 2019; Fuemmeler et al., 2002). Brain tumor survivors are also at increased long-term risk for social and adaptive functioning difficulties such as lower rates of employment, social relationships, and independent living (Armstrong et al., 2009). All long-term survivors of childhood cancer should receive annual screening for anxiety, depression, adverse educational and vocational issues, and social functioning following completion of therapy (COG, 2018; Lown et al., 2015).

Disease Recurrence and End-of-Life Care

Patients and families hope they never have to face disease recurrence or death. However, if this happens, pediatric psychologists can help provide support and guide difficult conversations. Different from the time of diagnosis, when communicating about relapsed or refractory disease, these patients have lived experiences that may influence how they wish to proceed with (or without) further treatment. Especially when confronted with limited or no curative options, these conversations and resulting decisions are high-stakes – with a substantial impact on the patient. Although patients, especially adolescents, may not always be included or actively engage in conversations about their advanced cancer status (Frederick & Mack, 2018; Poort et al., 2020) there is precedence to involve the patient in these discussions and the decision-making process (Lövgren et al., 2020; Weaver et al., 2015).

Advance Care Planning

Given that some patients with a diagnosis of cancer still face early death, advance care planning is an integral component of end-of-life (EOL) care and should involve three core components: understanding of values, discussion between patient, caregiver(s) and providers, and completion of written directives (Fried et al., 2010). However, despite international guidelines and recommendations that early conversations regarding goals of care and treatment options happen in pediatrics (AAP Section on Hospice and Palliative Medicine and Committee on Hospital Care, 2013), there appear to be few structured pediatric models to help facilitate these conversations (Lotz et al., 2013), with many approaches limited to single aspects of the advance care planning process (e.g., advance directives; Hein et al., 2020). Goals of advance care planning include improved communication about prognosis and care plans to honor the patient and family values and goals, establishment of advance directives, and outlining of goals for care should a patient acutely decompensate (DeCourcey et al., 2019).

End of Life

Although there has been significant advancement in the treatment of pediatric cancer, approximately 20% of youth diagnosed with cancer in the United States do not survive their disease (Siegel et al., 2016). Though a focus during the EOL period is often on comfort and minimizing symptom burden, children with cancer often suffer physical and psychological symptoms during this time (Jalmsell et al., 2006), with more overall symptoms being associated with decreased health-related quality of life (Eche et al., 2020). Symptom burden tends to differ by diagnosis (e.g., more symptoms in children with brain tumors than those with hematologic malignancies), with symptom prevalence ranging from 2 to 15 symptoms during the EOL period, coupled with heightened fears of being alone and dying (Eche et al., 2020).

Palliative care is defined by the World Health Organization (WHO) as “an approach that improves the quality of life of patients (adult and children) and their families who are facing problems associated with life-threatening illness” (WHO, 2020). Unfortunately, for children with cancer, referral to palliative care specialists often happens late in the care trajectory (Cheng et al., 2019; Kaye et al., 2016), though earlier initiation of pediatric palliative care within oncology has been found to afford more opportunity to improve symptom burden and quality of life, increase opportunities for advanced care planning, decrease the intensity of medical interventions, and improve the chance of dying within the home setting (Kaye et al., 2016, 2021; Sansom-Daly et al., 2020; Taylor et al., 2020).

Legacy-Making and Bereavement

When faced with EOL, children and adolescents want to know that they will be remembered by their loved ones. Legacy-making is an activity that provides the opportunity for the patient to contribute to or create something for others to serve as a remembrance (Foster et al., 2009). When death is anticipated, engaging in legacy-making activities can decrease symptoms of prolonged grief and increase the perception of support for caregivers (Schaefer et al., 2019). Further, participating in legacy artwork can enhance family bonding, communication, and meaning-making and lessen parental grief following the death of the child (Schaefer et al., 2020).

Across the Cancer Trajectory

Certain aspects of the pediatric cancer experience transcend the specific phases and milestones described above and are relevant across the entire cancer trajectory. These additional factors weave throughout the pediatric cancer experience and can influence a patient's and family's coping, adjustment, and overall outcomes.

Communication and Decision-Making

Pediatric oncology medical providers may struggle to effectively communicate information about prognosis, including deciding when in the care trajectory this information should be relayed. For some medical providers, the perception is that families may not be ready to hear this type of information early in the treatment process (Lövgren et al., 2020; Mack et al., 2007). When information is presented, it is important that it be communicated in a manner commensurate with the patient's developmental and cognitive levels. Psychologists can assess developmental and cognitive functioning, partner with other psychosocial providers to enhance patient and family understanding, help address questions of the pediatric patient, and offer support during difficult conversations. Psychosocial providers can also collaborate with healthcare professionals to enhance communication styles and foster the inclusion of patients and families in relevant decision-making processes. Importantly, understanding patient preference is critical, as pediatric patients with cancer can differ vastly in their desired extent of involvement in treatment decisions (Siembida & Bellizzi, 2015), and factors such as age, developmental level, severity of disease/prognosis, and individual factors may contribute to patient preference. Adolescents, in particular, are often capable of meaningfully contributing to conversations and decision-making related to their cancer-directed treatment and medical preferences (Stegenga & Ward-Smith, 2008), and the presence of the child or adolescent during diagnostic and treatment planning conversations does not seem to negatively impact parental experience or communication with the medical provider (Brand McCarthy et al., 2019). Indeed, open and respectful communication and collaboration between providers, patients, and families are essential to patient-family-centered care, can contribute to a patient's sense of respect, safety, and control (Lin et al., 2020), and are recognized as a key standard in the psychosocial care of pediatric patients with cancer (Patenaude et al., 2015).

Family Coping and Psychosocial Interventions for Family Members

For many caregivers of pediatric cancer patients, the trajectory of coping is similar to that of their child and marked by transient distress around the time of diagnosis, followed by gradual decline in distress symptoms (Dolgin et al., 2007; Sawyer et al., 2000; Wijnberg-Williams et al., 2006). Yet, for caregivers with pre-existing mental health problems or other risk factors (e.g., prior trauma, relapse of child's disease), their child's cancer diagnosis can be paralyzing (Boman et al., 2013; Jurbergs et al., 2009). Moreover, it is well documented that caregiver mental health problems can cause disruption to a child's medical treatment, impact the parenting and support of the patient and their siblings, and cause disruption to family functioning (Barrera et al., 2004; Fedele et al., 2013; Harper et al., 2019; Pai et al., 2007; Trask et al., 2003). Indeed, distinct patterns of parental coping have been identified (Dolgin et al., 2007; Steele et al., 2004), which underscores the importance of early and ongoing screening and intervention of caregivers (Kearney et al., 2015).

Several interventions have been designed to specifically reduce distress in caregivers of pediatric patients with cancer. The Bright Ideas: Problem-Solving Skills Training (PSST) program has been shown to enhance problem-solving skills and decrease mood disturbance in mothers of children newly diagnosed with cancer (Sahler et al., 2005, 2013). Likewise, parents receiving the Promoting Resilience in Stress Management for Parents (PRISM-P) program displayed improvements in resilience and benefit finding (Rosenberg et al., 2019). Finally, the Surviving Cancer Competently Intervention Program (SCCIP) aims to reduce post-traumatic stress symptoms and reduce cancer-related anxiety while improving coping; however, results of randomized clinical trials show varying success (Kazak et al., 2004; Stehl et al., 2009).

Siblings of pediatric cancer patients face unique challenges and stressors that can impact their coping, including changes in family roles and routines, less contact with the parent caring for the patient, less parental attention, concern for the patient, and less access to psychosocial supports than the patient (Alderfer et al., 2010). Similar to coping patterns of patients and parents, siblings can experience initial problems with mood and other areas of functioning (e.g., academics, social relationships) that typically improve with time (Alderfer et al., 2010; Houtzager et al., 2003). Indeed, many siblings show resilience and positive outcomes (Cordaro et al., 2012). Yet, there is variability in sibling coping and adjustment, and factors including age and gender have been explored (Houtzager et al., 2003; Long et al., 2013). These findings highlight the need for support of siblings as a standard of care in pediatric cancer (Gerhardt et al., 2015). Intervention research with siblings of pediatric cancer patients is more limited but suggests that sibling support groups and camps may help decrease negative mood, improve quality of life, and enhance medical knowledge (Martiniuk et al., 2014; Prchal & Landolt, 2009).

Adherence

Management of pediatric cancer can be arduous for both the patient and the family. Complex and lengthy treatment regimens are common, and many treatment agents are associated with adverse side effects and long-term sequelae. Moreover, some patients will require long-term use of medications for many years (or potentially lifelong) after completion of their medical treatment. As a result, many patients and families struggle to fully adhere to the treatment regimen. Medication adherence is critical to obtaining cure (Bhatia et al., 2012), and medication nonadherence is associated with an increased chance of relapse and decreased survival rates (Lilleyman & Lenard, 1996).

It is increasingly understood that individual patient factors contribute to medication adherence, with adolescents and certain minority groups showing lower rates of adherence (Bhatia et al., 2012;

Butow et al., 2010). Indeed, published medication nonadherence rates in the adolescent oncology population are astonishingly high (25–60%; Butow et al., 2010; Festa et al., 1992; McGrady et al., 2014), and families often struggle with balancing an adolescent's developmentally appropriate need for independence with ensuring compliance with oral medical regimens (Landier et al., 2011). Other risk factors for medication nonadherence include weak family support, lack of open communication, limited understanding of the threat of the illness, psychological distress of the patient and family, limited resources, and adverse side effects of medications (Butow et al., 2010; Spinetta et al., 2002).

Other types of adherence are also crucial to the well-being of pediatric cancer patients both during and after treatment, including engagement in positive health behaviors (Klosky et al., 2012) and routine attendance at ancillary appointments that promote physical and emotional health (e.g., rehabilitation therapies, nutrition consults, psychological intervention, etc.). As such, more routine and objective assessment of adherence has been recommended, and the critical need for effective adherence interventions in pediatric oncology is apparent. A number of interventions have been developed to enhance adherence more generally in pediatric psychology, including educational interventions that provide illness-specific instruction, cognitive-behavioral interventions (e.g., reminders, incentives, and addressing illness attitudes), and family-based interventions (see Hommel et al., 2017 for an overview), and ongoing evaluation in the pediatric cancer population is needed.

Promotion of Health Behaviors

Health behaviors are generally modifiable behaviors that can be improved using targeted interventions and/or psychoeducation. Among pediatric cancer patients and survivors, it is important to assess for risky health behaviors, such as sun exposure, low physical activity, poor diet and nutrition, poor sleep behaviors, substance use (e.g., tobacco, marijuana, and illicit substances), and risky sexual behavior. Patients receiving cancer treatment are encouraged to cease smoking and drinking, to engage in physical activity, and to adopt a healthy diet and healthy sleep behaviors in order to optimize medical outcomes (Pinto & Trunzo, 2005). Cancer survivors are at heightened risk for secondary cancers and other medical problems (e.g., cardiovascular disease, pulmonary disease, endocrine dysfunction, nervous system abnormalities) due to their receipt of toxic medical treatments (Hudson et al., 2013), and engagement in unhealthy behaviors can exacerbate these vulnerabilities. While survivors appear to engage in risky health behaviors at a comparable rate to controls (Brinkman et al., 2018; Klosky et al., 2012), their heightened medical risk underscores the importance of ensuring a healthy lifestyle. Certainly, pediatric psychologists play a crucial role in providing education on long-term health risks and assisting in modifying risky behaviors.

Summary

Along with the significant advances in medical treatment of pediatric cancer over the past 50 years, the field has seen striking progress in the development and implementation of comprehensive psychosocial care for pediatric patients and their family members. Yet, gaps remain in our understanding of aspects of the patient and family experience during and after treatment for pediatric cancer, as well as specific factors that may contribute to variable psychosocial outcomes. It is increasingly documented that most patients and family members are resilient during the pediatric cancer trajectory, and routine screening and assessment can help identify those who may require additional supports. With the wide acceptance of the need for comprehensive and preventative approaches to psychosocial care, psychologists will continue to play key roles in developing and researching evidence-informed programs and models of psychosocial care. In addition, pediatric psychologists have tremendous opportunity and responsibility to engage in advocacy efforts for youth with cancer to ensure that the psychosocial needs of patients and families are met throughout the cancer trajectory (see Parris et al., 2020).

Resources

Websites

Together: Your Home Base to Face Cancer: www.together.stjude.org
Teen Cancer America: www.teencanceramerica.org
Children's Oncology Group: www.childrensoncologygroup.org
Children's Cancer Web: www.cancerindex.org/ccw
National Cancer Institute: www.cancer.gov
American Cancer Society: www.cancer.org
CancerCare: www.cancercare.org
Leukemia & Lymphoma Society: www.lls.org
National Brain Tumor Society: www.braintumor.org

Guides and Tools

Voicing My CHOiCES- Five Wishes™: www.fivewishes.org
OncoLife™ Survivorship Care Plan: oncolife.oncolink.org
Passport for Care®: www.passportforcare.org/en/

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35

Health-Related Fitness During Early Years, Childhood, and Adolescence

Antonio García-Hermoso

Physical Fitness Definition and Its Components

Many definitions of the term physical fitness are in use throughout the scientific literature, and all of them define it in terms of movement capacities (Pate, 2012). Probably one of the most used definitions is from Corbin et al. (Corbin et al., 2000), who defined it as "*a set of attributes that people have or achieve that relates to the ability to perform physical activity*."

Physical fitness is composed of various elements that can be further grouped into health-related fitness and traditional motor fitness, which pertain more to athletic abilities (i.e., skill-related physical fitness components) which are defined in Table 35.1. All of them are relatively independent of one another, given the observed low correlations between physical fitness components (Ross, 1987).

Growth, Maturation, and Development in Physical Fitness

Conceptually, growth, maturation, and development are frequently used interchangeably and sometimes even considered synonyms, but all three should be defined separately. The three processes occur simultaneously and interact during approximately the first two decades of postnatal life, from birth to full maturity (Malina et al., 2004). Growth can be defined as an increase in size of the whole body or specific parts of the body, mainly by three processes: hyperplasia (i.e., an increase in cell number), hypertrophy (i.e., an increase in cell size), and accretion (i.e., an increase in intercellular material) (Malina et al., 2004). Maturation can be defined as progress toward the biologically mature state or biological maturity (Malina et al., 2004; Stratton & Oliver, 2019). It is important to mention that maturation is a biological process that occurs in all tissues and affects body size and function. Maturation specifically comprises a tempo (i.e., refers to the rate at which the processes of growth and maturation progress) and timing (i.e., refers to when specific events or milestones in growth and maturation occur) in the progress toward the mature biological state, which vary considerably among children. Maturity, for its part, is a state which varies with the biological system and is typically considered in terms of skeletal age (the progress of the skeleton from cartilage to bone), sexual age (the

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Table 35.1 Physical fitness components terminology

Health-related physical fitness components
Cardiorespiratory endurance (also referred to as cardiovascular endurance, aerobic fitness, and cardiorespiratory fitness): a health-related component of physical fitness that relates to ability of the circulatory and respiratory systems to supply oxygen by the circulation to the mitochondria during sustained physical activity
Muscular endurance: a health-related component of physical fitness that relates to the muscle's ability to continue to perform without fatigue
Muscular strength: a health-related component of physical fitness that relates to the ability of the muscle to exert force
Flexibility: a health-related component of physical fitness that relates to the range of motion available at a joint
Skill-related physical fitness components
Agility: a skill-related component of physical fitness that relates to the ability to rapidly change the position of the entire body in space with speed and accuracy
Coordination: a skill-related component of physical fitness that relates to the ability to use the senses, such as sight and hearing, together with body parts in performing motor tasks smoothly and accurately
Balance: a skill-related component of physical fitness that relates to the maintenance of equilibrium while stationary or moving
Power: a skill-related component of physical fitness that relates to the ability to the rate at which one can perform work
Reaction time: a skill-related component of physical fitness that relates to the time elapsed between stimulation and the beginning of the reaction to it
Speed: a skill-related component of physical fitness that relates to the ability to perform a movement within a short period of time

Adapted from Corbin et al. (2000)

development of secondary sexual characteristics, i.e., the breasts, genitalia, and pubic hair), and somatic age maturation (the progress and rate of development toward full adult size and proportion) (Malina et al., 2004; Stratton & Oliver, 2019). Biological age can be quantified through several methods, and youth can be categorized as early-maturing, average-maturing, and late-maturing. Finally, development is a broader concept of progress toward the adult state, encompassing growth, maturation, learning, and experience.

According to Rowland, physical growth can be considered the most important factor in the development of physical fitness, because is largely responsible for differences in performance across children of similar age (Rowland, 2005). Overall, changes in physical fitness during childhood and adolescence often result from increased size, particularly the addition of fat-free mass. For example, Armstrong et al. (Armstrong & Welsman, 2001) confirmed among boys and girls aged 11–17 years that fat-free mass appears to be the predominant influence in the increase of peak oxygen uptake (VO_2peak). Concerning muscular strength, its rise associated with growth is related to muscle mass, mainly by increase in the numbers of sarcomeres and fibrils per muscle fiber, which is associated approximately with an increase of 1.5 kg per year from age 6 to 14 years (Malina et al., 2004).

In the case of biological age, several studies have suggested that at a given chronological age, early-maturing boys present many advantages in some aspects of physical fitness compared with their late-maturing counterparts, but not in girls (Malina et al., 2004). A prospective study that analyzed the growth and physical performance of boys followed between 13 and 18 years and again as adults at 30 years of age, confirmed that early-maturing outperforms average or late-maturing for several physical fitness components during the adolescent period (mainly in muscular fitness, i.e., power and strength), however, the differences in performance between early, average, and late-maturing disappear or are reversed at adult age (30 years old) (Beunen et al., 1997).

Therefore, when interpreting performance on physical fitness tests, the individual's level of maturity must be accounted, particularly over the period of adolescence. To do this, assessments of biological maturation may be used from an estimation of skeletal age using radiograph techniques (Ehrenberg et al., 1977) or sexual maturation using pictures of secondary sex characteristics (Tanner, 1962). Other less invasive methods are those related to somatic measurements and prediction of adult height or age at peak height velocity (PHV) (Baxter-Jones et al., 2005). To determine the PHV, a measure of standing height (cm), sitting height (cm), body mass (kg), and chronological age (years) is required, using the following equations proposed by Moore et al. (Moore et al., 2015):

Boys: Maturity offset (years) = $-8.128741 + (0.0070346 \times (\textit{age} \times \textit{sitting height}))$.

Girls: Maturity offset (years) =$-7.709133 + (0.0042232 \times (\textit{age} \times \textit{standing height}))$

An alternative equation was also provided for boys:

Maturity offset (years) =$-7.999994 + (0.0036124 \times (\textit{age} \times \textit{standing height}))$

Physical Fitness Assessment

Physical fitness can be measured or estimated with a variety of tests and protocols. Assessment may be performed from a health or performance perspective and measured through laboratory-based, field-based tests, or questionnaires. Laboratory assessments require qualified technicians and sophisticated instruments, as well as high costs and time constraints. The most commonly evaluated components in the laboratory are cardiorespiratory endurance and muscular fitness. In contrast, field-based tests involve minimal equipment, are easy to administer, have a low cost, and can be utilized on a larger number of children and adolescents over a period of time (España-Romero et al., 2010; Marques et al., 2021; Ruiz et al., 2009). The following part of this chapter moves on to describe in greater detail the above-mentioned assessments.

Laboratory-Based Tests

Cardiorespiratory Endurance

Laboratory measures of physical fitness in children and adolescents are more commonly used in the research setting and have typically focused on developing protocols to measure cardiorespiratory endurance with or without gas analyzed. Maximal oxygen intake (VO_2max) is the single best indicator of cardiorespiratory endurance in children and adolescents, which provides information about the limit of the cardiovascular, respiratory, and muscular systems to transport and utilize oxygen during exercise (Armstrong & Welsman, 1994). It is reported in liters of oxygen per minute (absolute) or relative to body weight in milliliters of oxygen per kilogram body weight per minute (mL/kg/min). Since it is well documented that children can exercise to exhaustion without demonstrating an oxygen intake plateau (Armstrong et al., 1991; Cooper et al., 1984), the appropriate term to use is therefore VO_2peak, which is the highest oxygen consumption elicited during exercise test without the existence of an oxygen consumption plateau (Armstrong & Welsman, 1994).

The tests used to measure cardiorespiratory endurance that requires maximal effort are referred to as maximal exercise tests, which often but not always are performed in the laboratory setting. Moreover, submaximal tests, those that do not require a maximal effort, often estimate or predict cardiorespiratory endurance with the use of nomograms or equations (Raghuveer et al., 2020). Laboratory measurement techniques include measurement of VO_2peak/VO_2max with the use of ergometers during progressive exercise to the point of exhaustion (i.e., direct determination) or through submaximal exercise (i.e., indirect determination) (Blais et al., 2015). According to the World Health Organization (WHO) (Shephard et al., 1968), the gold standard for determining VO_2 is obtained by measuring O_2 and CO_2 partial pressures in expired air at regular intervals during graded exercise to exhaustion, typically on a treadmill or cycle ergometer, although other ergometers (e.g., arm cranking) may be used. It is important to consider that a difference of 5–30% of VO_2peak/VO_2max between cycle ergometer and treadmill has previously been reported in youth (Braden & Strong, 1990; Krahenbuhl, 1985), mainly due to local fatigue development before exhaustion. For very small children, sometimes bespoke pediatric cycle ergometers with different adjustments may be also required (e.g., handlebar and/or seat).

A large number of different maximal protocols for cardiorespiratory endurance determination can be used with children and adolescents (Shephard et al., 1968). These protocols have featured different modes of activity, intensities and durations, continuous and discontinuous work, and a variety of considerations exclusive to children. Two continuous treadmill protocols frequently used for children and adolescents are the modified Balke protocol, in which treadmill speed is held constant while the gradient is increased every minute by 2%, and the modified Bruce protocol, in which treadmill speed and gradient increase every 3 minutes (Chang et al., 2006). Regarding cycle ergometer protocols, one of the most used and well-established among children and adolescents is the McMaster protocol, in which the starting power output and increments in power output every 2 minutes are based on stature (Cooper et al., 1984).

On the other hand, when a maximal test cannot be performed for safety, setting, or cost reasons, alternative tests for measuring cardiorespiratory endurance have been developed (Cooper, 1995). One of the most frequently used tests is the PWC_{170} protocol, which determines the physical work capacity corresponding to a heart rate of 170 beats per minute. This submaximal test is moderately well correlated with measured VO_2peak in children aged 11–16 years (Bland et al., 2012) and is administered with a cycle ergometer, typically conducted with three stages of 3 or 4 minutes of increasing workload.

Muscular Fitness

Muscular fitness has gained attention in the last few years. The laboratory-based standard for muscular fitness is the measurement by dynamometry, specifically isometric, isokinetic, and single-repetition maximal isotonic tests. Most measurements are made on specific, selected muscles such as handgrip, elbow flexion and extension, knee flexion and extension, and plantar flexion strength. These results are normally extrapolated to "whole body" strength; however, its validity has been questioned (Plowman, 2014).

Another common test used in laboratory settings is the determination of one-repetition maximum (1 RM). This test can be defined as the maximum resistance that can be used for a complete repetition of an exercise (Stricker et al., 2020). This protocol is considered a valid and reliable measure of strength and power in children (Faigenbaum et al., 2003) and adolescents (Faigenbaum et al., 2012). According to the American Academy of Pediatrics (Stricker et al., 2020), this test can be safe and efficacious when established testing protocols are followed by qualified professionals (Faigenbaum et al., 2003; Faigenbaum et al., 2012).

Body Composition

Overall, the aim of body composition measurements, whether in the laboratory or in the field, is to obtain a measure of fat-free or lean body mass. Since chemical analysis protocols are the only direct method to measure body composition (Knight et al., 1986), an expensive and impractical method, common laboratory standards of measurement are from indirect assessment. It is also important to consider that body composition throughout childhood is variable and not constant (Lohman, 1986), and therefore numerous problems in determining body composition in children are encountered.

Body composition has been widely measured in children and adolescents and laboratory settings using the densitometry, air displacement plethysmography, and dual-energy x-ray absorptiometry

(DXA) methods. The text below describes some of the commonly used methods that are suitable for use in laboratory settings.

- Densitometry: this method determines the density of an individual by dividing actual body weight by the decrease in weight when the person is completely submerged in water.
- Air displacement plethysmography: this method discriminates fat mass and fat-free mass after assuming specific densities of these two tissues and calculates the percentage of whole body fat using equations (Siri, 1993).
- Dual-energy x-ray absorptiometry (DXA): this method measures the body's differential absorption of two low-dose x-rays at different energy levels and the ratios are used to predict lean body mass, total body mass, and bone mineral density.

Field-Based Tests

As previously stated, the use of laboratory tests to measure health-related fitness is not always appropriate or feasible. Several batteries of field-based tests have been developed mainly to cater for large-scale population studies and/or the educational environment which are implemented in different parts of the world, showing the reliability and validity of their test measures (Castro-Piñero et al. 2010a). Most of them include the same or similar tests and can be summarized in three main health-related fitness components: body composition, cardiorespiratory endurance; and a component that includes the following physical qualities: strength, speed, agility, and flexibility, all of which will be characterized separately.

Probably, the most widely used test batteries worldwide in children and adolescents are "EuroFIT" (Klissouras et al. 1988), "FitnessGram" (Welk et al., 2011), "Canadian Assessment of Physical Literacy" (Healthy Active Living and Obesity Research Group, 2013), and "ALPHA-FIT" (Ruiz et al., 2011). A proposal for a field-based fitness battery in preschool children (3–5 years old), the PREFIT battery (field-based FITness testing in PREschool children) (Ortega et al., 2015) is also available. Table 35.2 shows a comparison between the components and the tests used by those batteries.

Cardiorespiratory Endurance

The most common measure of cardiorespiratory endurance in the field is a long-distance run of various structures or lengths. All field-based test batteries above-mentioned include the 20 m shuttle run test and its variants, all of them with very similar protocols. This test was developed by Léger et al. (Léger et al., 1998) and is considered the most widely used test to estimate cardiorespiratory endurance in children and adolescents in the world (Tomkinson et al. 2017). This protocol is a progressive aerobic exercise test involving continuous running between two lines 20 meters apart (also called shuttles) in time to audio signals, which starts at ≈5 mph (8 km/h) and increases in 0.3-mph (0.5-km/h) increments each minute (also called stages or levels). In preschool children aged 3–5 years, the PREFIT 20 m shuttle run test is also conducted over the 20 meters distance, but it starts at a speed of 6.5 km/h and increases in speed by 0.3-mph (0.5-km/h) each minute. It is also recommended that two testers concurrently run with a small group of preschoolers in order to assist with pacing (Ortega et al., 2015). The tests end when the individual can no longer run the 20 meters distance in time with the audio signal (on two consecutive occasions) or when the child stops due to fatigue, noting the number of laps or stages. A review published by Tomkinson et al. (2019a) synthesizes the evidence about the measurement variability, validity, reliability, feasibility, and interpretation of this test. They suggest that the 20 m shuttle run test is an acceptable, feasible, and scalable measure of cardiorespiratory endurance and that it has moderate criterion validity and high to very high reliability.

Table 35.2 Comparison between the components and the field-based tests used by the batteries

Battery	Body composition	Cardiorespiratory endurance	Muscular fitness	Motor skill	Flexibility	Balance
EuroFIT Klissouras et al. (1988)	Height and weight Skinfolds: biceps, triceps, scapular, suprailiac, and calf	20 m shuttle run test Cycle ergometer test (PWC 170)	Handgrip strength Standing long jump Bent arm hang Sit-ups	Shuttle run (10x5m) Plate tapping	Sit-and-reach	Flamingo balance
FitnessGram (Welk et al. (2011)	Height, weight, and body mass index Skinfolds: triceps and calf Portable Bioelectric Impedance Analyzers	PACER: Progressive aerobic cardiovascular endurance run 1 mile run/walk 1 mile walk test	Curl-ups Bent arm hang Push-ups Modified pull-ups Trunk lift		Back-saver sit and reach Shoulder stretch	
Canadian Assessment of Physical Literacy Healthy Active Living and Obesity Research Group (2013)	Height, weight, and body mass index Waist circumference	PACER: Progressive aerobic cardiovascular endurance run	Handgrip Prone plank		Sit-and-reach	
ALPHA-FIT (Ruiz et al., 2011)	Height, weight, and body mass index Waist circumference Skinfolds: triceps and calf	20 m shuttle run test	Handgrip strength Standing long jump	Shuttle run (4 × 10 m)		
PREFIT (Ortega et al., 2015)	Height, weight, and body mass index Waist circumference	PREFIT 20 m shuttle run test	Handgrip strength Standing long jump	Shuttle run (4 × 10 m)		One leg stance

PACER, Progressive Aerobic Cardiovascular Endurance Run; PWC, Physical Work Capacity

Other alternatives to walk/run field tests include protocols in which children and adolescents are instructed to complete the run in as short an amount of time as possible or to cover the greatest possible distance. Mayorga-Vega et al. in a meta-analysis aimed to determine which distance or time was most appropriate to use in children and adolescents found that the highest correlation to cardiopulmonary exercise tests VO_2max was with the 1.5-mile (i.e., 2400 m) distance and 12-minute time, showing moderate to high correlation (Mayorga-Vega et al., 2016).

Muscular Fitness

As was mentioned in the previous section, muscular fitness refers to the ability to perform activities that require a high level of muscular force. Overall, muscular fitness cannot be defined by a single measurement because field-tests are often specific to the muscle group, muscle contraction, contraction velocity, type of muscle action, equipment, and joint range of motion (Dooley et al., 2020). Thus, most of the field-test batteries have tried to achieve an anatomical distribution (upper arm and shoulder, girdle, core, and lower body) and construct distribution (strength, endurance, and power).

The handgrip strength test is one of the field tests used the most to measure the maximum isometric strength of the grip strength of both hands (Wind et al., 2010). This tool is a practical, feasible, and scalable functional field-test of overall strength for clinical and general population screening and surveillance (Dooley et al., 2020). Studies have demonstrated high to very high construct validity with lower body, upper body, and overall muscular strength in children and adolescents (Milliken et al., 2008; Wind et al., 2010) and high to very high test–retest reliability (Artero et al., 2011).

Another field test included in most batteries is the standing long jump, also called the long jump or standing broad jump test. This test is a practical, feasible, widely used, ecologically valid, and scalable measure of functional explosive force for clinical and population detection and surveillance (Castro-Piñero et al. 2010b). It consists of a horizontal jump on two legs, noting the best or the mean score (in cm) of two or three attempts. The standing long jump is strongly associated with other lower-body muscular strength tests (e.g., vertical jump, squat jump, and countermovement jump) and with upper-body muscular strength tests (e.g., throw basketball, push-ups, and isometric strength exercises).

Other field-based tests of muscular fitness also entail the movement of part or all of the body mass against gravity (e.g., flexed arm hang, curl-up, push-ups, or sit-up tests), all of them with acceptable reliability and validity (Plowman, 2014). These tests allow assessing muscular endurance (e.g., push-ups, sit-ups, bent arm hang, etc.) and strength (e.g., handgrip, standing long jump, vertical jump, etc.).

Table 35.3 shows the different tests and components of muscular fitness commonly used in field-based setting.

Balance, Coordination, Speed-Agility, and Flexibility

The physical fitness components of balance, agility, and speed are often combined in one motor fitness component, also called as skill-related or performance-related fitness (Table 35.1). Commonly implemented tests for assessing motor skills in children and adolescents are the flamingo balance test, shuttle run (10x5m), and 4x10m shuttle run test (Ruiz et al., 2009). The most widely used test to measure flexibility is the sit-and-reach test, however, have been demonstrated that test performance is influenced by maturation and growth (Malina et al., 2004). Is important to know that muscular strength and flexibility can sometimes be found together in one musculoskeletal component (Bouchard et al.,

Table 35.3 Tests and components of muscular fitness commonly used in field-based setting

Muscular fitness component	Test
Strength	Handgrip Bent-arm hang Pull-up Trunk lift
Endurance	Modified pull-up Push-up Sit-up Curl-up Prone plank Basketball throw Medicine ball throw
Power	Sand ball throw Shot put Standing long jump Vertical jump Squat jump Countermovement jump

2007) (e.g., FitnessGram battery), however, evidence supports flexibility as a unique construct of physical fitness (Dumith et al., 2012).

Body Composition

Many methods are available to assess body fatness in children and adolescents and are typically done by measuring anthropometric parameters (e.g., body circumferences), skinfold thickness, and bioelectric impedance analysis. As shown in Table 35.2, all batteries include the height and body weight measures, both allow the calculation of body mass index (BMI). Although their use is common, a major limitation of BMI is the lack of differentiation between fat-free mass and fat mass (Prentice & Jebb, 2001). Some batteries also include waist circumference and its relation with height (i.e., waist-to-height ratio) (Ashwell & Gibson, 2014).

Examination of body composition in the field is typically also done by measuring skinfold thickness. Despite the concurrent validity between measurements of skinfolds and densitometry or potassium spectrometry being moderate to high (Going, 1988), the main threat of this method is that should be undertaken only by practitioners with the necessary experience following international recommendations (Marfell-Jones et al., 2012).

Bioelectric impedance analysis is based on the principle that impedance to electrical flow varies in proportion to the amount of existing lean tissue. A weak electric current passes through the body, and its impedance is measured. Whole-body bioelectrical impedance analysis is a reliable and acceptably accurate method of estimating fat-free mass and fat mass in children (Houtkooper et al., 1989).

Normative-Referenced Standards

In order to assess the level of health-related fitness, as well as to monitor the fitness status of the population, practitioners, researchers, physical education teachers and coaches can use normative reference values (also called percentile scores). These types of normative referenced standards could be used to standardize test scores (i.e., develop z scores) to facilitate comparisons between countries or regions. Comparing an individual’s score in a particular fitness field-based test with normative values stratified for age and sex is widely used when assessing an individual’s fitness status.

Several publications have provided reference values for health-related fitness components among healthy youths from different countries. Normative values for a number of fitness reference values in children and adolescents are available from different countries and/or regions such as Asia (Zhang et al., 2020), Australia (Catley & Tomkinson, 2013), Europe (De Miguel-Etayo et al., 2014; Kolimechkov et al., 2019; Ortega et al., 2011a; Tomkinson et al., 2018), North America (Carrel et al., 2012; Hoffmann et al., 2019; Pate et al., 2006), South America (Garcia-Hermoso et al., 2021a; Ramírez-Vélez et al., 2019), or worldwide (Olds et al., 2006; Tomkinson et al. 2017). In preschoolers (3–6 years old), to date, three national studies from Chile (Godoy-Cumillaf et al., 2020), Poland (Przednowek et al., 2021), and Spain (Cadenas-Sanchez et al., 2019) report normative values in several physical fitness components.

At international level, several studies can be highlighted. For example, age and sex-specific normative data for cardiorespiratory endurance have been published based on 1,142,026 children and adolescents from 50 countries, including 16 low- and middle-income countries from Africa, Asia, and South America (Tomkinson et al. 2017). At the European level, the IDEFICS (Identification and prevention of Dietary- and lifestyle-induced health EFfects In Children and infantS) study (De Miguel-Etayo et al., 2014) was the first to provide normative values for children (6–10.9 years old) using the modified ALPHA-FIT battery. The HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) study was also the first to provide normative values in European adolescents across ten countries (Ortega et al., 2011). Table 35.4 shows examples of studies that included international data from several countries or regions in their samples for apparently healthy youth aged 3–18 years.

Table 35.4 Normative-referenced standards for physical fitness in apparently healthy children and adolescents of international studies

Author and year	Region	Sample size	Year of testing	Age range, years	Sex (girls %)	Physical fitness component or battery
Kolimechkov et al. (2019)	Europe: NR	NR	NR	5–18	NR	ALPHA-FIT battery
De Miguel-Etayo et al. (2014)	Europe: Sweden, Germany, Hungary, Italy, Cyprus, Spain, Belgium, and Estonia	7862	2007–2008	6–11	50.7	20 m shuttle run test Handgrip strength Standing long jump test 40 m sprint test Back-saver sit-and-reach test Flamingo test
Ortega et al. (2011a)	Europe: Austria, Belgium, France, Germany, Greece, Hungary, Italy, Spain, and Sweden	3428	2006–2008	12–18	53.8	20 m shuttle run test Handgrip strength Bent arm hang test Standing long jump test Abalakov jump Squat jump Countermovement jump 4 × 10 m shuttle run test Back-saver sit-and-reach test
Thomas et al. (2020)	Europe: Italy, Lithuania, Germany, Spain, Portugal, Croatia, and Turkey	2140	2012–2018	6–18	45.1	Standing long jump test
Tomkinson et al. (2018)	Europe: 30 countries	445,092	1981–2016	9–17	46.8	Eurofit battery
Tomkinson et al. (2017)	International: 50 countries	1,142,026	1984–2015	9–17	51.6	20 m shuttle run test

NR not reported

Questionnaires

Several studies have described easily administered instruments that do not require sophisticated technology and have been validated by self-report scales or questionnaires. Sometimes these scales are useful when youth are unable to complete fitness testing for various reasons (e.g., body size and maturity limitations) or due to other difficulties associated with recruiting a qualified testing team and providing accessories. Researchers from the HELENA study developed a self-report physical fitness questionnaire called the International Fitness Scale (IFIS) (Ortega et al., 2011b). The scale consists of five questions that use a five-point Likert scale (i.e., very poor, poor, average, good, and very good) on general physical fitness, cardiorespiratory endurance, muscular strength, speed/agility, and flexibility. This questionnaire was originally validated in adolescents from nine European countries in English language, adapted and translated into nine languages (German, Austrian German, Greek, Flemish, French, Hungarian, Italian, Spanish, and Swedish) (Ortega et al., 2011), and also validated for use in children (Ramírez-Vélez et al., 2017a; Sánchez-López et al., 2015).

Tracking Health-Related Fitness from Childhood and Adolescence to Adulthood

Tracking refers to the tendency of child and adolescent to maintain their rank or position within a group over time. Knowledge of an indicator's stability allows one to predict future levels of the indicator and to potentially identify children and adolescents at risk early enough to confer benefits from preventive measures. Therefore, physical fitness screening in childhood could identify individuals with low levels of fitness at risk of developing adverse health outcomes.

In light of the well-documented benefits of optimal health-related fitness in adults (García-Hermoso et al., 2018; Kodama et al., 2009), the degree of fitness tracking from childhood to adulthood is of interest. Until now, data about the tracking of health-related fitness from childhood and adolescence to adulthood are limited, and overall show heterogeneous findings (García-Hermoso et al. 2022). These studies have found that the degree to which fitness components track into adulthood varies by methodology (e.g., measured or estimated VO_2), sex, and length of follow-up (Raghuveer et al., 2020). Regarding cardiorespiratory endurance, most of the studies demonstrate moderate tracking ($r = 0.30$–0.58) from adolescence to adulthood (Lefevre et al., 2000; Matton et al., 2006) or mid-adulthood (Sorić et al., 2014; Van Oort et al., 2013) in both sexes, except one study that shows low stability in men, but not in women (Boreham et al., 2004). In contrast, from childhood to young adulthood tracking seems to be low-moderate in women and not existing in men (Blasquez Shigaki et al., 2020; Trudeau et al., 2003). Concerning muscular fitness, studies show moderate to high tracking from adolescence to adulthood (Fraser et al., 2017; Lefevre et al., 2000; Matton et al., 2006) or mid-adulthood (Fraser et al. 2021a) in both sexes, but this stability seems to be low from childhood with low to moderate tracking in the different tests (Blasquez Shigaki et al., 2020; Fraser et al., 2017; Fraser et al. 2021a; Trudeau et al., 2003). Finally, higher stability in flexibility and body fat in comparison with cardiorespiratory endurance and muscular fitness from adolescence to adulthood was observed (Lefevre et al., 2000; Matton et al., 2006), but lower from childhood (Blasquez Shigaki et al., 2020). This section has demonstrated that the tracking of health-related fitness tends to decrease as the time between measurements increases.

Health-Related Fitness Secular Trends

In many parts of life, systematic monitoring is commonly used to inform changes in society and to describe their course over a certain period of time. Interest in changes in the health-related fitness of children and adolescents over time has a long tradition (Malina, 1978), which has increased more recently in the era of systematic reviews and meta-analysis (Dooley et al., 2020; Eberhardt et al., 2020; Fühner et al., 2021; Kaster et al., 2020; Masanovic et al., 2020; Tomkinson, 2007; Tomkinson et al., 2021; Tomkinson et al., 2019b). The majority of large, international studies report the current status and development of health-related fitness on the basis of independent, aggregated data sets from differently composed cross-sectional samples.

To date, three systematic reviews (Eberhardt et al., 2020; Fühner et al., 2021; Masanovic et al., 2020) and other five meta-analyses (Dooley et al., 2020; Kaster et al., 2020; Tomkinson, 2007; Tomkinson et al., 2021; Tomkinson et al., 2019b) have analyzed secular changes in the young population. In summary, physical fitness of children and adolescents (mostly cardiorespiratory endurance) has declined globally, particularly in western industrialized countries until the turn of the century, and stabilized ever since (2010–2015) (Fühner et al., 2021; Masanovic et al., 2020), probably due to the promotion of physical activity and fitness by the WHO (WHO, 2010) and other international institutions (e.g., American College of Sports Medicine) through their physical activity guidelines. In 2019, Tomkinson et al. (Tomkinson, Lang, & Tremblay, 2019b) published an update on secular trends in cardiorespiratory endurance (20 m shuttle run test) and summarized data from 965,264 children and adolescents from 19 high-income and upper-middle-income countries between 1981 and 2014, showing a moderate decline of 3.3 mL/kg/min, larger for boys than girls and similar in children and adolescents. Nevertheless, this international decline has slowed and stabilized since 2000. The authors suggest that a significant proportion of the reported decline in this component (mL/kg/min) may be attributable to the increasing prevalence of obesity (Tomkinson, Lang, & Tremblay, 2019b). However, caution should be taken in the interpretation of associations between VO_2peak when indexed to fatness because indexed values may systematically underestimate VO_2peak in children and adolescents with obesity.

As far as muscular fitness is concerned, two meta-analyses with data from 10,940,801 (Tomkinson et al., 2021) and 2,216,320 (Dooley et al., 2020) children and adolescents, analyzed trends in the standing long jump and the handgrip strength test, respectively. Tomkinson et al. analyzed 34 studies from 24 high- and 4 upper-middle-income countries and 1 low-income country between 1960 and 2017, showing a decline in functional explosive lower-body strength since 2000 (Tomkinson et al., 2021). In contrast, Dooley et al. suggested a substantial improvement in absolute handgrip strength for children and adolescents since 1967, larger for children (9–12 years old) compared to adolescents (13–17 years old), and similar for boys and girls (Dooley et al., 2020). Results from Kaster et al. also suggest a large improvement in abdominal/core endurance through sit-ups performance for 9,939,289 children and adolescents between 1964 and 2017, with the rate of improvement slowing from 1964 to 2000, stabilizing near zero until 2010, and declining thereafter (Kaster et al., 2020). Overall, as abovementioned, temporal trends in muscular fitness could be influenced by trends in biological maturation (Malina, 2004).

Finally, results for proxies of muscle power (i.e., jumping) and speed (i.e., sprint running and agility running) presented an overall positive trend for both qualities between 1958 and 2003 (Tomkinson, 2007). Findings from this study suggest that both muscle power and speed performances improved at 0.03% and 0.04% per year, respectively.

Physical Fitness and Health Benefits

The idea that physical activity is the route to both physical fitness and good health has become a primary focus in programs instituted by the US Department of Health and Human Services. Every 10 years, through the Healthy People initiative, this institution develops the next iteration of the national goals for promoting health and preventing disease. Specifically, Healthy People 2030 has the following goal which includes physical fitness: "*Improve health, fitness, and quality of life through regular physical activity*" (US Department of Health and Human Services, 2020). Compelling scientific evidence indicates that both physical activity and physical fitness provide important health benefits, both components are positively correlated (Piercy et al., 2018) and have important and independent, but overlapping, roles in health outcomes (DeFina et al., 2015). Figure 35.1 shows the health benefits of physical fitness components, mainly cardiorespiratory endurance and muscular fitness, in children and adolescents.

A substantial body of research has examined the relationship between physical fitness and health outcomes across the life course. Overall, findings in adults show that greater physical fitness, mainly cardiorespiratory endurance, and muscular fitness, is associated with reduced all-cause mortality (García-Hermoso et al., 2018; Kodama et al., 2009) and risk of developing a wide range of noncommunicable diseases (Ross et al., 2016), independent of potential confounding variables. The relationships for children and adolescents appear to be less clear-cut, partly because the outcome measure

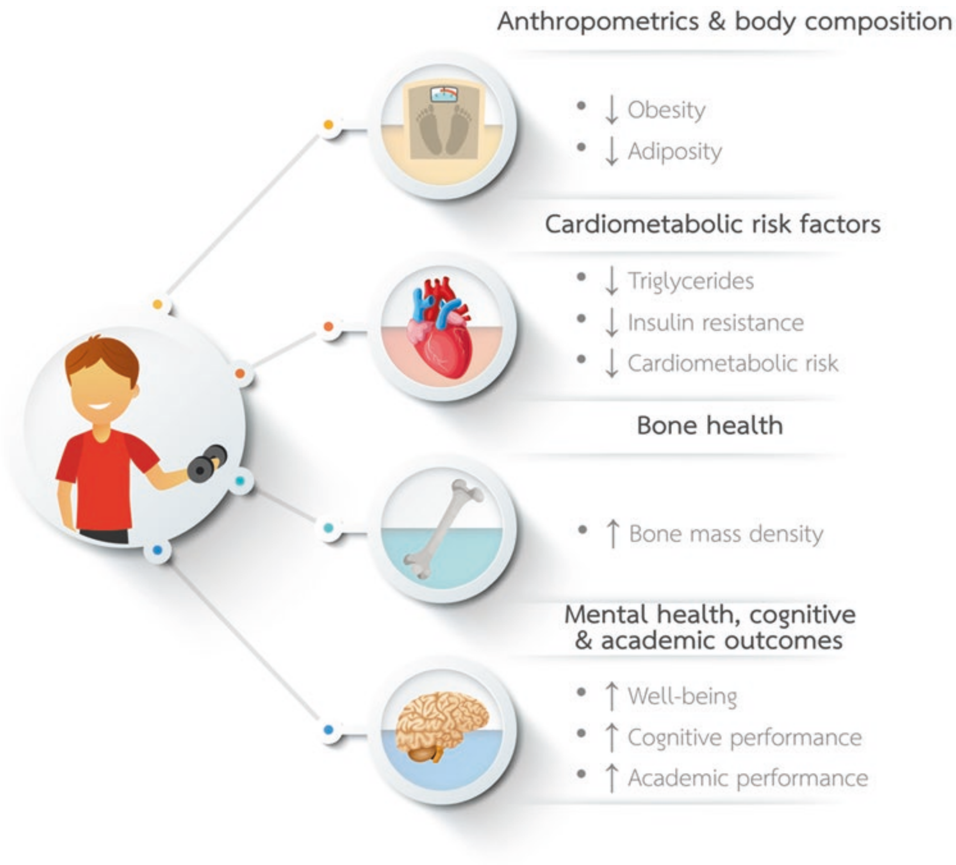

Fig. 35.1 Health benefits of physical fitness components in children and adolescents

health cannot, for obvious reasons, be judged by mortality statistics. Rather, the investigator must rely upon cardiometabolic risk factors, such as blood pressure, insulin resistance, inflammatory proteins, blood lipids, and fatness, because all of them have been shown to track from childhood into adulthood (Andersen et al., 2004). Other health outcomes such as bone health, cognitive and mental health, and academic performance, are also commonly studied in this population (Ortega et al., 2008).

Anthropometric and Body Composition

The most frequently evaluated health outcome in children and adolescents is obesity and other parameters associated with adiposity. Overall, longitudinal data have shown an inverse moderate relationship between physical fitness, mainly cardiorespiratory endurance and muscular fitness, and several anthropometric and body composition outcomes (García-Hermoso et al. 2020c; García-Hermoso et al., 2019b). Specifically, García-Hermoso et al. (2020c) published a systematic review and meta-analysis of 55 studies that included 37,563 youths aged 3–18 years and revealed that cardiorespiratory endurance levels during youth are associated with a lower risk of developing obesity later in life, as measured by skinfold thickness, BMI and waist circumference, showing stronger association in studies that used laboratory-based tests. It is important to highlight that associations detected from baseline to follow-up dissipated over time.

The same authors meta-analyzed the evidence for prospective associations between muscular fitness in childhood and adolescence and future health status in 30 studies and 21,686 youths aged 3–18 years old. Findings suggest a moderate inverse association between muscular fitness at baseline and lower BMI and skinfold thickness later in life (García-Hermoso et al., 2019b). In line with this study, another meta-analysis published previously found an inverse association between muscular fitness and adiposity; however, this study included mainly data from cross-sectional studies (Smith et al., 2014). Since muscular fitness is highly influenced by body weight in youth (Ruiz et al., 2009), especially with regard to weight-bearing tests, several studies have shown this inverse longitudinal association also relative to body weight (Hasselstrøm et al., 2002; Janz et al., 2002).

Information about physical fitness and its relationship with body composition in preschoolers have been less studied; however, longitudinal studies corroborated findings among older children and adolescents. For example, Henriksson et al. (Henriksson et al., 2019) showed that cardiorespiratory endurance and motor skills parameters and lower body muscular strength at 4.5 years were negatively associated with fat mass index and percentage of body fat at 5.5 years in 142 Swedish preschoolers. Further longitudinal studies seem to be necessary in order to clarify the influence of physical fitness in preschoolers with later health parameters.

Cardiometabolic Risk Factors

Childhood and adolescence fitness have also been associated with cardiometabolic risks and a variety of more proximal health outcomes. Longitudinal studies have suggested that both cardiorespiratory endurance and muscular fitness may have a combined and independent effect on the improvement of cardiovascular health in young people (Fraser et al., 2018; Grøntved et al., 2013).

The above-mentioned meta-analysis published by García-Hermoso et al. (2020c) confirmed that cardiorespiratory endurance levels during youth are related to better cardiometabolic health status later in life, concretely with serum lipid, insulin resistance outcomes, and cardiometabolic risk score (i.e., a cluster of measures of adiposity, lipids, metabolism, and blood pressure). Confirming these results, it is worth noting some previous prospective studies from a large cohort of Swedish men who were examined at 18 years of age and suggested that low cardiorespiratory endurance, estimated by a maximal cycling test, was associated with an increased risk of type 2 diabetes (Crump et al., 2016) and myocardial infarction (Högström et al., 2014) during adulthood. Another study of 154 adolescents aged 13–16 years followed up for 24 years, showed that improvement in cardiorespiratory endurance was associated with lower arterial stiffness (Ferreira et al., 2003). Given these findings, several studies have developed criterion-referenced cardiorespiratory endurance cut points to help identify children and adolescents with high cardiometabolic risk (Lang et al., 2019). Despite there exist no universal age- and sex-specific cut points in this population (Rollo et al., 2021), Ruiz et al. (Ruiz et al., 2016) in a meta-analysis combining seven published criterion-referenced standards on 9280 youth 8–19 years of age from 14 countries suggest levels below 42 and 35 mL/kg/min for boys and girls, respectively, as red flag.

A low muscular fitness level is also recognized as a marker of poor metabolic profile during childhood and adolescence. Smith et al. reported strong evidence for the importance of muscular fitness during childhood and adolescence for cardiometabolic risk (Smith et al., 2014). Results from García-Hermoso et al.'s study also show moderate to large negative relationships between muscular fitness in childhood and adolescence and future levels of homeostasis model assessment insulin resistance, triglycerides, and cardiometabolic risk score (García-Hermoso et al., 2019b). The aforementioned cohort study of one million participants from Sweden also explored the role of muscular fitness in adolescence and its association with all cause and cause-specific premature mortality over a period

Table 35.5 Summary of studies that developed muscular fitness cut points for early detection of cardiometabolic risk in children and adolescents

Author and year	Region	Age range, years	Sample size (% girls)	Cardiometabolic risk definition	Muscular fitness component	Muscular fitness test	Health-related cut point
Castro-Piñero et al. (2019a)	Austria, Belgium, France, Germany, Greece, Hungary, Italy, Spain, and Sweden	12–17	969 (53.7%)	Metabolic syndrome and cardiometabolic risk (WC, SBP, DBP, triglycerides, HDL-C, glucose, and insulin)	Muscular strength	Handgrip strength relative to body mass	Metabolic syndrome: ≤0.44 kg/kg (boys, 13 years) ≤0.48 kg/kg (boys, 14 years) ≤0.52 kg/kg (boys, 15 years) ≤0.56 kg/kg (boys, 16 years) ≤0.59 kg/kg (boys, 17 years) Cardiometabolic risk: ≤0.41 kg/kg (girls, 13 years) ≤0.41 kg/kg (girls, 14 years) ≤0.41 kg/kg (girls, 15 years) ≤0.42 kg/kg (girls, 16 years) ≤0.42 kg/kg (girls, 17 years)
Castro-Piñero et al. (2019b)	Spain	6–10, 12–16	511 (47.2%)	Cardiometabolic risk (sum of two skinfolds, SBP, HOMA-IR, triglycerides, and TC-to-HDL-C ratio)	Muscular strength Muscular power	Handgrip strength relative to body mass Standing long jump	≤0.37 kg/kg (boys, 6–10 years) ≤0.47 kg/kg (boys, 12–16 years) ≤0.31 kg/kg (girls, 6–10 years) ≤0.42 kg/kg (girls, 12–16 years) ≤104.5 cm (boys, 6–10 years) ≤140.5 cm (boys, 12–16 years) ≤81.5 cm (girls, 6–10 years) ≤120.5 cm (girls, 12–16 years)

(continued)

Table 35.5 (continued)

Author and year	Region	Age range, years	Sample size (% girls)	Cardiometabolic risk definition	Muscular fitness component	Muscular fitness test	Health-related cut point
López-Gil et al. (2021b)	Chile	7–9	452 (59.1%)	Cardiometabolic Risk (sum of the waist-to-height ratio or WC and insulin, triglycerides, HDL-C, and glucose)	Muscular strength	Handgrip strength relative to body mass	≤0.33 kg/kg (boys) ≤0.40 kg/kg (girls)
Peterson et al. (2016)	USA	10–12	1326 (52.5%)	Cardiometabolic risk (%BF, SBP, triglycerides, HDL-C, and glucose)	Muscular strength	Handgrip strength relative to body mass	High risk: ≤0.33 kg/kg (boys) ≤0.28 kg/kg (girls) Intermediate risk: >0.33 to ≤0.45 kg/kg (boys) >0.28 to ≤0.36 kg/kg (girls)
Ramírez-Vélez et al. (2017b)	Colombia	9–12, 13–17	1950 (55.9%)	Cardiometabolic risk (WC, SBP, DBP, triglycerides, HDL-C, and glucose)	Muscular strength	Handgrip strength relative to body mass	≤0.38 kg/kg (boys, 9–12 years) ≤0.45 kg/kg (boys, 13–17 years) ≤0.36 kg/kg (girls, 9–12 years) ≤ 0.44 kg/kg (girls, 13–17 years)

%BF percent body fat, *DBP* diastolic blood pressure, *HDL-C* high-density lipoprotein cholesterol, *HOMA-IR* homeostatic model assessment of insulin resistance, *SBP* systolic blood pressure, *TC* total cholesterol

of 24 years, showing that high muscular fitness in adolescence, as assessed by knee extension and handgrip tests, was associated with a 20–35% lower risk of premature mortality due to any cause or cardiovascular disease, independently of BMI or blood pressure (Ortega et al., 2012). As with cardiorespiratory endurance, no universal health-related cut points for muscular fitness exist (Fraser et al., 2021b); however, there are several studies in this regard. Table 35.5 shows a summary of studies that developed muscular fitness cut points for early detection of cardiometabolic risk in children and adolescents.

Finally, albeit through cross-sectional designs, both fitness components are also related to other emerging metabolic biomarkers such as low-grade inflammatory markers (e.g., white blood cells (García-Hermoso et al., 2021d), C-reactive protein (Ruiz et al., 2007)) and liver enzyme concentrations (López-Gil et al., 2021a), among others. Therefore, longitudinal studies are needed to examine the independent and joint effects of cardiorespiratory endurance and muscular fitness in preventing the development of emerging cardiometabolic biomarkers among young people.

Bone Health

Longitudinal associations between health-related fitness and bone health have been less studied, mainly muscular fitness. Findings from the above-mentioned meta-analysis support the role of muscular fitness during youth and its association with bone mass density later in life (García-Hermoso et al., 2019b), with a slightly higher effect size observed for upper-body muscular tests. Among these works, it is worth highlighting a study published by Foley et al. (Foley et al., 2008), who shows that childhood cardiorespiratory endurance and muscular fitness levels, particularly in females and in the pre- or early pubertal years, are predictive of adult skeletal status. Findings from the Amsterdam Growth and Health Longitudinal Study show in a 15-year follow-up that during adolescence and young adulthood, only muscular fitness and speed-agility, and not cardiorespiratory endurance, is related to the bone mineral density at adulthood (Kemper et al., 2000).

Mental Health, Cognitive, and Academic Outcomes

Physical fitness has been associated with a range of mental health, cognitive, and academic outcomes in children and adolescents. In this sense, a systematic review and meta-analysis (Cadenas-Sanchez et al., 2021), including 58 studies and data from more than 20,000 children and adolescents, shows small to medium-sized positive associations between young people's cardiorespiratory endurance and muscular fitness and their self-esteem, self-concept, physical self-perceptions and well-being, and negative with young people's depression and anxiety. Speed-agility is also positively associated with self-concept and physical self-perception. However, these findings are mostly based on cross-sectional evidence. Longitudinal evidence suggests that better childhood cardiorespiratory endurance has been associated with 41% lower odds of incidence of mental disorders (i.e., mood disorders, psychosis, or suicidality) later in life (Tacchi et al., 2019).

With respect to cognition, the extant literature also suggests that childhood and adolescence fitness, mainly cardiorespiratory endurance, is associated with higher levels of cognition and differences in regional brain structure and function (Donnelly et al., 2016). A position stand of the American College of Sports Medicine (Donnelly et al., 2016) suggests that higher levels of fitness are predictive of better cognitive performance. According to evidence to date, cardiorespiratory endurance, motor skills, and muscular fitness have different influences on the brain. Specifically, cross-sectional studies have shown that cardiorespiratory endurance is associated with greater gray matter volume of the hippocampus and the basal ganglia in both normal–weight and overweight/obese children (Chaddock et al., 2010; Esteban-Cornejo et al., 2017) and greater white matter volume only among children with overweight/obesity (as assessed by functional magnetic resonance imaging) (Esteban-Cornejo et al., 2019). Furthermore, motor skills and muscular fitness may also influence white matter volume (Esteban-Cornejo et al., 2019), and motor skills also in a greater gray matter volume in distinct cortical regions (i.e., frontal, temporal, and calcarine cortices) in children with overweight/obesity (Esteban-Cornejo et al., 2017).

High fitness levels may also improve academic performance by improving cognitive abilities (García-Hermoso et al., 2020b). Previous systematic reviews and meta-analyses support positive associations between children and adolescent fitness, mainly the cardiorespiratory endurance (Álvarez-Bueno et al., 2020; Santana et al., 2017), and academic performance across several domains (i.e., language/reading-related skills, mathematics-related skills, and composite scores). These studies also reported uncertain evidence about the association between muscular fitness and flexibility and academic performance for both cross-sectional and longitudinal studies (Ruiz-Ariza et al., 2016; Santana et al., 2017). Among longitudinal studies, maintaining a healthy cardiorespiratory endurance

(García-Hermoso et al., 2021c; Sardinha et al., 2016) over time has been associated with better academic performance. Another large longitudinal study from 382,259 Taiwanese junior high school students followed up for 3 years, suggests that while cardiorespiratory endurance is positively related to academic performance, the relationship depends on academic subject (more strongly associated with performance in math- and science-related subjects relative to language-related ones), as well as the length and time of being aerobically fit (Hsieh et al., 2019).

Physical Fitness Components and Training

Although training and conditioning are terms often used interchangeably, it is important to distinguish between them. Physical training is considered specific exercises designed to promote changes in performance of a particular type of activity. Physical conditioning, by contrast, can be defined as the process by which exercise, repeated over a specified duration, induces morphologic and functional changes in body systems and tissues. In the context of this chapter, training is discussed in relation to specific physical fitness components.

As explained earlier, several of the physiologic changes that result from training also take place during the process of growth and maturation in childhood and adolescence, which makes it difficult to determine the specific effects of training. Additionally, like many other physiologic characteristics, an individual's physical fitness is affected by various nonmodifiable (i.e., innate biological differences) and modifiable (i.e., environmental) factors. Accordingly, it is to be expected that the extent to which physical fitness is enhanced by training vary from individual to individual. These factors including for example genetics (Schutte et al., 2016), age, sex, race/ethnicity (Mcmurray et al., 2002), physical activity and dietary patterns (Júdice et al., 2017), sedentary time (Júdice et al., 2017), built environment (Vanhelst et al., 2013), and socioeconomic status (Wolfe et al., 2020).

There is a reasonable body of work that indicates that children and adolescents can significantly increase their physical fitness through regular physical activity (Piercy et al., 2018). According to the WHO, children and adolescents (aged 5–17 years), including those living with disability, should do at least an average of 60 minutes per day of moderate to vigorous intensity, mostly aerobic, physical activity, across the week. Also, vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone should be incorporated at least 3 days a week (Bull et al., 2020). Also, the Guidelines on Physical Activity, Sedentary Behavior and Sleep for Children Under 5 Years of Age, indicated that children aged 3–4 years should spend at least 180 minutes per day in a variety of types of physical activities at any intensity, of which at least 60 minutes is moderate to vigorous intensity physical activity (WHO, 2019).

Specifically, cardiorespiratory endurance seems to increase through school-based interventions (Dobbins et al., 2009; Pozuelo-Carrascosa et al., 2018), exercise training (Baquet et al., 2003), even with high-quality physical education classes (García-Hermoso et al., 2020a). Turning now to the experimental evidence on cardiorespiratory endurance, an individual participant pooled analysis of 20 controlled trials and 6621 children and adolescents aged 4–18 years assessed the impact of school-based physical activity interventions on cardiorespiratory endurance, demonstrated the positive effects previously noted, especially in boys and younger students. Changes in vigorous, but not moderate intensity, physical activity explained a small amount (~5%) of the intervention effect on cardiorespiratory endurance (Hartwig et al., 2021).

There is a growing body of literature that recognizes the importance of vigorous-intensity physical activity for improving youths' cardiorespiratory endurance. For example, published experimental studies and meta-analysis report that vigorous-intensity physical activity is as effective, or even superior, to moderate-intensity physical activity for improving cardiorespiratory endurance among healthy children and adolescents (Costigan et al., 2015) and with obesity (García-Hermoso et al., 2016). A recent meta-analysis which included longitudinal studies examined the associations between device-measured vigorous physical activity (e.g., accelerometers, heart rate monitors, or similar) and health-related factors in children and adolescents shows positive association with cardiorespiratory endurance later in life (García-Hermoso et al., 2021b). This result was also observed in preschoolers (Leppänen et al., 2017). Additionally, programs that incorporate resistance training with skill-based exercises (i.e., primarily jumping, balancing, throwing, and catching) have also been shown to improve cardiorespiratory endurance (Faigenbaum et al., 2015).

Strong evidence demonstrates that children and adolescents can significantly increase their muscular fitness in response to resistance training with low injury rates if the activities are performed with an emphasis on proper technique and are well supervised (Stricker et al., 2020). Like in cardiorespiratory endurance, muscular fitness interventions delivered in a school-based environment have benefits in effects in muscular fitness outcomes, specifically in adolescent boys (Cox et al., 2019). Traditional (e.g., such as weight machines and free weights) and plyometric methods (i.e., exercises that involve a jumping or explosive movement) of resistance training appear to be the most effective form of exercise delivery. Additionally, Smith et al. confirmed that physical activity at vigorous intensity is positively related to muscular fitness in children and adolescents (Smith et al., 2019).

Among children at preschool age, the information available in this regard is much less, although another systematic review and meta-analysis suggest that physical exercise based on primarily gross motor skills (e.g., walking, running, jumping, ball skills, dancing) favors small improvements in health-related physical fitness components, i.e., BMI, waist circumference, body fat, cardiorespiratory endurance, lower-body muscular fitness, and speed-agility (García-Hermoso et al., 2019a). Therefore, kindergarten is an ideal setting that could be used to increase physical fitness given a large number of preschoolers enrolled and the time that children spend there during the day.

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Part VIII

Assessment and Treatment of Challenging Behaviors in Children

36

Defining Aggression: Form and Function

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Aggression, or behavior that is intended to inflict harm or pain (Malti & Rubin, 2018), among youth has long been of concern across cultures. However, aggressive behavior is not unidimensional, with current conceptualizations commonly distinguishing between how (form) and why (function) individuals aggress (e.g., Little et al., 2003). Although some question the need to differentiate between the forms and functions of aggression due to the high intercorrelations between these aggression subtypes (e.g., Bushman & Anderson, 2001), other research clearly establishes that they are overlapping but distinct dimensions of aggression that are associated with different etiologies and developmental outcomes (e.g., Fite et al., 2016; Vitaro & Brendgen, 2011). By establishing and assessing the various forms and functions of aggression, researchers and clinicians can ensure that all aggressive youth are identified and that targeted prevention and intervention efforts can be implemented. This chapter reviews the most common aggression forms (i.e., physical, relational, and cyber) and functions (i.e., proactive and reactive), the various assessment tools to evaluate these subtypes, and implications for intervention. Future directions for understanding aggression forms and functions are also discussed.

Forms of Aggression

The forms of aggression refer to the strategy or method of how one aggresses toward another. There are many delineations regarding the forms of aggression (Ostrov et al., 2018a). For example, there has been a focus on overt versus covert acts of aggression, with overt representing blatant, observable acts and covert representing discrete and hidden acts (e.g., Olson et al., 2013). However, in the current literature, there are three forms of aggression typically referred to (physical, relational, and cyber), which are the focus of this chapter.

Physical aggression refers to (actual or threat of) physical bodily harm, including slapping, kicking, and pushing (Ostrov et al., 2018a). Physical aggression is the most widely studied form, as historically it was the only form of aggression acknowledged. The conceptualization of physical aggression varies somewhat across research, with verbal aggression (which includes yelling and

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name-calling) oftentimes included as physical aggression and some work referring to the combination of physical and verbal aggression as overt aggression (Ostrov et al., 2018a).

It was not until the 1990s that researchers started to pay attention to relational aggression, or non-physical aggressive acts focused on damaging social relationships (Crick & Grotpeter, 1995). Relational aggression includes gossiping, spreading rumors, and excluding others (or threatening to exclude them; e.g., not inviting a child to a party). Relational aggression is tied to social aggression and indirect aggression in the literature (Ostrov etal., 2018b). Social aggression represents verbally insulting and/or engaging in acts (e.g., eye glaring, staring, and brushing off) intended to make an individual feel bad about themselves or damage social relationships. Indirect aggression, in contrast, is characterized as harming an individual in a way that appears unintentional and can include social exclusion but can also include property damage or other behaviors (Ostrov et al., 2018b).

With the growing use of technology, cyber aggression has received increased attention. Cyber aggression refers to the use of technology (e.g., online gaming, text/instant messaging, social media) to cause harm to another individual (Underwood & Bauman, 2018). While cyber aggression can include physical and relational aspects, it is distinct in that it uses technology to inflict harm.

Many theories have been employed to explain the etiology and developmental progression of aggressive behavior, including a developmental psychopathology framework, developmental ecological models, and social information-processing theory, with each of these theories supported by empirical evidence (e.g., Ostrov et al., 2018b). From a developmental psychopathology framework, problem behavior occurs over time due to a failure to reach the developmental steps necessary for appropriate social interaction (Cicchetti & Rogosch, 2002). For example, physical aggression may occur due to poor verbal skill development or an inability to effectively problem solve due to cognitive difficulties. Perhaps one step further, developmental ecological models posit that an individual is embedded within various layers of systems within their environment, and individual and environmental factors interact to contribute to one's development (Bronfenbrenner, 1979). For example, cognitive deficits combined with overly harsh parenting may result in aggressive behavior. In contrast, the social information-processing theory suggests that individuals engage in a six-stage process when interacting with their social world and that errors and biases can interfere in these various stages, resulting in an individual responding aggressively (Crick & Dodge, 1994). This model suggests that individuals who hold hostile attributions respond aggressively due to interpreting situations as threatening.

Aligning with theoretical underpinnings of aggression forms, the rates and developmental trajectories of physical and relational aggression differ throughout development as emotional intelligence, cognitive functioning, and social norms evolve. In early childhood, physical aggression is common, with approximately 80% of toddlers engaging consistently in some form of physical aggression by 17 months of age (Tremblay et al., 1999). Some research indicates that physical aggression peaks in toddlerhood before declining throughout early childhood (Casas & Bower, 2018), while other work finds that physical aggression continues to increase from infancy until youth are about five years of age (Ostrov et al., 2018b). Evidence suggests physical aggression may decline in early childhood because it is partially supplanted by relational aggression, which appears as early as 30 months of age and remains relatively stable throughout early childhood (Casas & Bower, 2018; Fite & Pederson, 2018; Ostrov et al., 2018b). Relational aggression may replace physical aggression because changing social norms and enhanced cognitive and verbal abilities make other, more sophisticated forms of aggression (e.g., excluding and ignoring) more readily available (Casas & Bower, 2018; Ostrov et al., 2018b). Through early childhood, boys engage in higher rates of physical aggression than girls (Fite & Pederson, 2018; Tremblay et al., 1999), while the trajectories of relational aggression are more stable for girls than boys (Ostrov et al., 2018a). These differences may be due to environmental pressures or social norms which tolerate physical aggression at higher rates in boys than girls (Casas & Bower, 2018).

In middle childhood, rates of physical aggression consistently decline (Ostrov et al., 2018b), while research on the trajectories of relational aggression in middle childhood is mixed (Casas & Bower, 2018; Fite & Pederson, 2018; Ostrov et al., 2018b). In general, findings indicate that relational aggression decreases throughout early elementary school but increases in late elementary school and early middle school (Fite & Pederson, 2018). Relational aggression trajectories in middle childhood may vary by gender, with girls more likely to increase their use of relational aggression and boys more likely to remain stable or decline (Ostrov et al., 2018b). Notably, girls engage in higher levels of relational aggression, while boys engage in higher rates of physical aggression throughout this period (Fite & Pederson, 2018; Ostrov, Perry, & Blakely-McClure, 2018b). The decline in physical aggression during this time may be due to school-sanctioned discipline for physical aggression (Ostrov et al., 2018b); while the increase in relational aggression may be due to changing social situations as youth transition to middle school and need to reestablish their social status and friend groups (Casas & Bower, 2018).

During adolescence, relational aggression steadily decreases, while physical aggression increases in early adolescence (11–14 years old) and then decreases before peaking again in late adolescence/early adulthood (i.e., 16–25 years old; Casas & Bower, 2018; Fite & Pederson, 2018; Ostrov et al., 2018b). Relational aggression may decline over the course of adolescence because friendships become more stable and less dependent on aggressive tactics to maintain status (Fite & Pederson, 2018), while physical aggression may increase in early adolescence due to biological changes that result from puberty (e.g., increases in testosterone; Casas & Bower, 2018; Fite & Pederson, 2018).

Research on the trajectories and rates of cyber aggression is limited. Cyber aggression may be closely tied to relational aggression and therefore similar in its developmental trajectory once youth are able to use the Internet somewhat autonomously (Casas & Bower, 2018). Prevalence rates for cyberbullying range from 1% to 79% across studies, with rates varying based on a variety of factors (e.g., age, race, and weight). The general consensus is that about 10% of youth engage in cyber aggression (Gaffney et al., 2019; Underwood & Bauman, 2018). Note, however, that the rates of cyber aggression have steadily increased (Hymel & Espelage, 2018).

While the trajectories discussed above capture general patterns in aggression trajectories, an array of research demonstrates that there are unique trajectories of physical and relational aggression across development (e.g., Fite & Pederson, 2018; Ostrov et al., 2018b). Furthermore, although beyond the scope of the current chapter, individual differences in youth (e.g., parenting, race/ethnicity, gender, and culture) may substantially contribute to differences in trajectories (e.g., Fite & Pederson, 2018; Ostrov et al.,2018b; Underwood et al., 2009).

Similar to aggression trajectories, there are a host of individual (e.g., gender, biological, and physiological) and environmental (e.g., parenting, peers, and neighborhood) etiological factors that contribute to aggression forms. Gender has been implicated as a differential risk factor for aggression, with boys consistently exhibiting higher rates of physical aggression, while gender differences for relational aggression are less distinct (Lansford et al., 2012). For cyber aggression, distinctions by gender are less clear, with mixed (and null) findings found throughout the literature (Navarro, 2016).

Temperament is also linked to various forms of aggression. Temperament is a stable biological predisposition to varying levels of reactivity and self-regulation, which often includes constructs such as negative emotionality, effortful control, and sensation-seeking. Negative emotionality, or the tendency to react with high levels of anger when goals are blocked or high levels of fear in the face of new situations, has been linked to both physical and relational aggression (Atherton et al., 2017; Giancola et al., 2006). Effortful control refers to the ability to regulate attention and behavior to meet one's goals, particularly in emotional situations. Low effortful control is similar to impulsivity, which is strongly associated with all forms of aggression (Bresin, 2019). Finally, sensation-seeking is related to preferring new and risky activities. High levels of sensation-seeking are associated with high levels of physical and relational aggression (Herrenkohl et al., 2007; Wilson & Scarpa, 2011), and are theorized to be linked with cyber aggression (though more research is needed; Runions, 2013).

In line with the social information-processing theory, the primary social-cognitive construct associated with aggression is a hostile attribution bias (HAB), or the tendency to (over)interpret neutral or ambiguous stimuli as hostile. High levels of HAB have been associated with physical and relational aggression (Martinelli et al., 2018). While more research is needed to evaluate links between HAB and cyber aggression, elevated HAB levels have been linked to cyber *victimization* (Pornari & Wood, 2010).

Biologically based research has exponentially expanded the list of hormones, genes, neurotransmitters, and brain structures associated with aggression, a comprehensive list of which is outside the scope of the current chapter. However, the factors with the most research support are mentioned herein. Genetic contributions play a large role in aggression, with 53% (males) – 60% (females) of the variance in physical aggression accounted for by genes (Ligthart et al., 2005). Similarly, for relational aggression, 63% of the variance has been explained by genetic influences (Tackett et al., 2009). Genetic contributions to cyber aggression are not yet clear. Regarding hormones, testosterone is involved in aggressive approach behaviors, while cortisol is involved in fearful withdrawal characteristics; the combination of high testosterone and low cortisol has been implicated in increased physical aggression (Montoya et al., 2012). As for neurotransmitters, serotonin, norepinephrine, dopamine, glutamate, and GABA have all been implicated in violence and aggression, with the connection to distinct forms of aggression being less clear (Miczek et al., 2017).

The key brain regions associated with emotional reactivity, emotion regulation, and cognitive control (i.e., the prefrontal cortex and the limbic systems) are implicated in aggression more broadly (Raine, 2019). Yet, psychophysiological differences are evident across aggression forms. Specifically, physical aggression (measured typically as violence) has been associated with lower autonomic arousal states, which are captured through lower resting heart rates, lower skin conductance, and resting respiratory sinus arrhythmia during times of stress (Raine, 2002a). Note, however, these findings are made complex and sometimes inconsistent by not controlling for functions of the aggression (reacted violently or was calculated and planful with violence), as well as other moderating/mediating factors (Raine, 2002b). As for relational aggression, there is much less research to rely on, but broadly speaking physiological overarousal is implicated as a risk factor (see: Murray-Close et al., 2018). To the authors' knowledge, there have been no examinations of physiological arousal systems and cyber aggression.

Intelligence and executive function (EF) are also implicated in aggressive behavior. While associations of overall IQ to self-report of physical and relational aggression are inconsistent (Duran-Bonavila et al., 2017), deficits in verbal intelligence have been associated with extreme forms of physical aggression. Similarly, lower EF has been associated with physical aggression (Ogilvie et al., 2011), whereas higher EF has been associated with relational aggression (McQuade et al., 2017).

Some of the most studied environmental etiological factors of aggression are parenting, peers, neighborhood factors, and media (Loeber & Hay, 1997). Many facets of parenting have been implicated in childhood aggression, such as insensitive and coercive parenting (e.g., psychological control), corporal punishment, and parental monitoring (Kawabata et al., 2011). Harsh parent-child interactions not only promote aggressive behavior in children but also shape the way children process and respond to social information (Crick & Dodge, 1994). Coercive and psychologically controlling parenting has shown positive associations with physical and relational aggression (Kawabata et al., 2011; Pinquart, 2017), whereas lower levels of parental monitoring have been associated with cyberbullying (Kowalski et al., 2014). Peer relationships play a complicated role in childhood aggression, as aggression can facilitate or disrupt friendships. Peer rejection has shown a bidirectional association with physical and relational aggression in longitudinal studies, though it is unclear if peer rejection acts as an additive risk factor, mediator, or moderator (Lansford et al., 2010). Similarly, being the victim of cyberbullying is positively associated with cyber aggression (Kowalski et al., 2014). Finally, neighborhood disadvantage has been positively associated with physical, but not relational, aggression (Chang et al., 2016; Karriker-Jaffe et al., 2013). The influence of neighborhood context on cyber aggression has not been found, and it has been suggested school districts and social networks used may be more influential (Sainju, 2020).

Both physical and relational aggression have been associated with a variety of similar immediate and long-term negative outcomes. Throughout early childhood, children who engage in relational or physical aggression are likely to be victimized by relational or physical aggression in turn (Ostrov et al., 2018b). Aggressive youth are also more likely to be rejected by their peers in preschool (Evans et al., 2019), perhaps because children can exert autonomy in peer preferences (Casas & Bower, 2018). In middle childhood through adolescence, both physical and relational aggression have been associated with externalizing problems (e.g., ADHD, substance use, and antisocial behavior), internalizing problems (e.g., depression and anxiety), poor academic achievement, and other aspects of psychological adjustment (e.g., social adjustment, personality pathology features, and peer rejection; Casas & Bower, 2018; Ostrov et al., 2018b; Vitaro & Brendgen, 2011; Voulgaridou & Kokkinos, 2015). Similarly, cyber aggression is associated with externalizing symptoms (i.e., conduct problems, hyperactivity, and substance use), internalizing symptoms (i.e., anxiety, depression, and low self-esteem), poor academic achievement, and somatic symptoms (i.e., headaches; Gaffney et al., 2019; Underwood & Bauman, 2018). However, the mechanisms that link forms of aggression with similar negative outcomes may be unique. For example, relationally aggressive youth may be more likely to engage in substance use because they are more socially involved and wish to maintain their status in the peer group, while physically aggressive youth may engage in substance use because they are peer rejected and affiliate with deviant peers (Vitaro & Brendgen, 2011).

While physical and relational aggression are associated with similar negative outcomes, associations are not similarly robust throughout development. For example, peer rejection is more strongly linked with relational aggression in early childhood (Evans et al., 2019) than physical aggression in adolescence (Vitaro & Brendgen, 2011). Moreover, starting in early elementary school, relational aggression is dually associated with peer rejection and social acceptance, while physical aggression is only associated with peer rejection; and these links are stronger for girls than for boys (Bukowski & Vitaro, 2018). Somewhat paradoxically, relational aggression may be associated with positive outcomes in middle childhood and early adolescence (e.g., more prominent social status; Ostrov et al., 2018b). However, these benefits appear to be reserved for individuals who are skilled at using relationally aggressive strategies and may not translate into positive adjustment outcomes (Casas & Bower, 2018).

Physical and relational aggression are also differentially linked with long-term negative outcomes. Childhood physical aggression is associated with antisocial behavior, including violent delinquency and criminality, during adolescence and adulthood (Vitaro & Brendgen, 2011) although associations may differ by gender (Hymel & Espelage, 2018). Alternatively, the continued use of relational aggression in adulthood is associated with increased anxiety, depression, loneliness, stress, anger, alcohol abuse, bulimia, and peer rejection (Casas & Bower, 2018). Meanwhile, the long-term outcomes of cyberbullying are not yet known (Gaffney et al., 2019).

Functions of Aggression

There has been a continued focus on why individuals aggress, which has led to a growing body of research examining proactive and reactive functions of aggression. Proactive aggression represents goal-driven behavior used to obtain a desired outcome (Fite et al., 2016). For example, a child not letting another child sit with a group of friends at lunch until they bought them a snack. In contrast, reactive aggression commonly represents behavior in response to a perceived threat (Fite et al., 2016): for example, a child punching a child that tripped them. Although multiple theories, including the theories above, can be used to explain functions of aggression, social learning theory (learning that aggression can help one achieve goals; Bandura, 1973) is commonly employed to understand proactive aggression, while the frustration-aggression hypothesis (i.e., aggression is a hostile and angry reaction to frustration; Berkowitz, 1978) is most often utilized to conceptualize reactive aggression (Fite et al., 2016).

While reactive aggression is more common during all developmental periods than proactive aggression, proactive and reactive aggression functions tend to follow similar trajectories (Fite et al., 2016; Vitaro & Brendgen, 2011). Research on the developmental trajectories of proactive and reactive aggression in early childhood is limited, perhaps due to the logistical complications that accompany assessing cognitive motivations in toddlers and preschoolers (e.g., Ostrov & Crick, 2007). While the literature is mixed (e.g., Murray-Close & Ostrov, 2009), some work suggests that proactive and reactive aggression are stable as early as 30 months old (Ostrov & Crick, 2007) and remain stable throughout early childhood (Evans et al., 2019). In early childhood, girls may be less likely to engage in proactive and reactive aggression than boys (Evans et al., 2019); however, findings are mixed (Murray-Close & Ostrov, 2009). Research in early childhood demonstrates that proactive and reactive aggression bidirectionally predict one another (Evans et al., 2019); however, research in school-age and adolescent children has found that reactive aggression predicts but does not follow proactive aggression (Fite et al., 2016; Vitaro & Brendgen, 2011). This has led to (perhaps erroneous) theorizing that reactive aggression is a developmental precursor to proactive aggression, with youth unintentionally learning that aggression is adaptive and rewarding through being reinforced for reactively aggressive behavior and then adopting proactively aggressive behavior to attain goals (Fite et al., 2016). However, in light of recent findings (Evans et al., 2019), it may be that proactively aggressive children are simply less likely to begin engaging in reactive aggression until later in development (e.g., middle childhood or adolescence) if they have already internalized proactive aggression as advantageous (perhaps due to lack of underlying correlates with reactive aggression, such as emotion dysregulation; see etiological factors below).

Current research suggests that proactive and reactive aggression levels peak as youth transition from middle childhood to adolescence (i.e., sixth grade) and then decrease throughout adolescence (Fite et al., 2016), with a small portion of youth peaking in aggressive behavior again around 15 years of age (Vitaro & Brendgen, 2011). Aggression levels may peak as youth transition to middle school due to changing social dynamics that induce youth to use aggressive tactics to maintain or establish social status or due to biological changes (e.g., disrupted sleep and puberty; Fite & Pederson, 2018). Research using growth mixture modeling to evaluate specific trajectories of proactive and reactive aggression indicates three general trajectories: stable low (most common), moderately desisting, and high desisting (least common; Vitaro & Brendgen, 2011).

There is a panoply of individual and environmental etiological factors associated with proactive and reactive aggression. Regarding the influence of gender, some studies have found that boys are higher in both reactive and proactive aggression (Rieffe et al., 2016), whereas a large but somewhat dated meta-analysis found no gender differences across functions but cautioned readers on their findings as girls are often underrepresented in studies of aggression (Polman et al., 2007). Note, however, that individuals at the extreme levels of proactive aggression and callous-unemotional traits (often those who act violently) are more likely to be male (Moffitt, 2018).

Recent evidence shows reactive, not proactive, aggression in adolescence is predicted by difficult temperament in childhood (Vitaro et al., 2006). Reactively aggressive children are prone to negative emotionality and low effortful control (Vitaro et al., 2006), whereas proactively aggressive children are more prone to sensation-seeking (Wilson & Scarpa, 2011). As for social-cognitive correlates, HAB is a strong predisposing and maintaining factor for reactive, not proactive, aggression (e.g., attribute a peer's actions as hostile and react aggressively in retaliation; Martinelli et al., 2018).

Genetic contributions are also a decisive predisposing factor for aggression functions, with a moderate portion of variance (41% proactive; 39% reactive) explained by genetics (Brendgen et al., 2006). The largest body of genetic research attributes low-activity monoamine oxidase A (MAOA) to aggressive behavior, particularly reactive aggression (Godar et al., 2016); however, environmental exposure to trauma may play a vital role in expressing this gene (Buckholtz & Meyer-Lindenberg, 2008).

Hormones and neurotransmitters are also differentially associated with aggression functions. Overstimulation in serotonergic and dopaminergic pathways increases aggression. However, recent scholars have posited that dopamine, the "pleasure" neurotransmitter, may be responsible for the increased reward anticipation involved in proactive aggression, whereas the HPA pathway, and thereby serotonin release processes, are involved with the regulation of impulsivity and stress responses and heavily implicated in reactive aggression (Waltes et al., 2016). As stated above, structural and functional differences in brain regions associated with emotional reactivity and cognitive control are heavily implicated in aggression. However, evidence is beginning to emerge that shows that proactively aggressive youth have higher levels of gray matter density in the bilateral dorsolateral prefrontal cortex and lower gray matter density in the posterior cingulate cortex, suggesting different neural underpinnings relative to reactively aggressive individuals (Zhu et al., 2019).

As for psychophysiological differences in aggression functions, reactive aggression is related to autonomic hyperarousal, consistent with frustration-aggression models, whereas proactive aggression is related to autonomic underarousal (Fite et al., 2016). According to stimulation-seeking theories, proactively aggressive individuals may subconsciously compensate for physiological underarousal by engaging in risky and aggressive behaviors to raise their arousal to optimal levels (Scarpa & Raine, 1997).

With regard to intelligence and executive functioning, reactive but not proactive aggression shows a negative association with broad measures of intellectual and executive functioning and also specific deficits in verbal intelligence (Jambroes et al., 2018; Thomson & Centifanti, 2018). It appears as though reactive aggression, in particular, is related to a host of neurocognitive deficits that likely portend greater social-emotional difficulties.

Environmental factors also play a role in the etiology of proactive and reactive aggression. Harsh and abusive parenting is associated with higher levels of reactive and proactive aggression, but it is more robustly associated with reactive aggression, even when temperamental features of negative emotionality are controlled for (Vitaro et al., 2006). Additionally, low levels of perceived neighborhood safety and disadvantage are associated with proactive, but not reactive, aggression (Fite et al., 2009).

Proactive and reactive aggression are linked to similar and unique immediate and long-term negative outcomes. In general, reactive aggression is more strongly linked to peer rejection, internalizing problems, and academic deficits, while proactive aggression is more strongly linked to externalizing difficulties (e.g., delinquency and antisocial behavior; Fite et al., 2016). While both aggression functions are linked with social problems and externalizing issues (Card & Little, 2006; Bukowski & Vitaro, 2018; Vitaro & Brendgen, 2011), the nature of associations may differ across development and by aggression function. For example, while both proactive and reactive aggression are linked with substance use, the underlying mechanisms explaining these links differ: proactively aggressive youth may use substances through associations with other deviant peers, while reactively aggressive youth use substances due to peer rejection, which then leads to association with delinquent peers (Fite et al., 2016).

Similarly, reactive aggression is consistently associated with peer rejection from early childhood through adolescence; however, the association between proactive aggression and peer rejection changes over time (Bukowski & Vitaro, 2018; Card & Little, 2006). Proactive aggression is linked to low risk for peer rejection in preschool, high risk for peer rejection in middle childhood, and low risk for peer rejection in adolescence (Bukowski & Vitaro, 2018; Card & Little, 2006). Moreover, in preschool and early adolescence, youth who are above average (but not high) in proactive aggression are perceived as more popular, with good senses of humor and leadership qualities (Bukowski & Vitaro, 2018; Fite et al., 2016). Conversely, reactive aggression is associated with high levels of interpersonal conflict, low friendship satisfaction, and low likelihood of being selected as a best friend (Fite et al., 2016). While proactive aggression is associated with low levels of conflict with best friends and high friendship satisfaction, proactive aggression may also be associated with declines in friendship quality over time (Fite et al., 2016). Moreover, proactively aggressive youth tend to build relationships with other similarly aggressive peers, which increases their risk for problematic adjustment outcomes (Fite et al., 2016).

Proactive aggression is more strongly linked than reactive aggression to delinquency, antisocial behaviors, and delinquency-related violence in adolescence, as well as criminality in adulthood (Fite et al., 2016; Vitaro & Brendgen, 2011). Proactively aggressive youth are more likely to be involved with similarly proactively aggressive and delinquent peers (Fite et al., 2016) and, therefore, may be more likely to engage in increasingly intense antisocial behavior through a process called deviancy training (Vitaro & Brendgen, 2011). While some work demonstrates an association between reactive aggression and delinquency, these links are not consistent (Fite et al., 2016).

Reactive aggression is more strongly linked than proactive aggression to internalizing symptoms, suicide, academic and cognitive problems, and difficulties in emotional and behavioral regulation (Card & Little, 2006; Fite et al., 2016; Vitaro & Brendgen, 2011). Peer rejection may play a large role in explaining the link between reactive aggression and internalizing symptoms, suicide, and academic and cognitive problems, given that peer rejection results in feelings of isolation, chronic social disconnection, and increased stress for youth as well as deflated confidence in academic abilities and low motivation (Fite et al., 2016; Hartley et al., 2018; Vitaro & Brendgen, 2011). Additionally, reactive aggression may be linked to academic and cognitive difficulties in youth via neurocognitive deficits associated with reactive aggression (Fite et al., 2016). Reactive aggression may be linked with emotional and behavioral dysregulation through a combination of maladaptive social information processing and underlying difficulties with impulsivity and inattention, which may prime youth to interpret ambiguous situations with others in a threatening way and engage in impulsive aggression (Card & Little, 2006; Crick & Dodge, 1994).

Function by Form

Although still relatively limited, there is growing research simultaneously examining both the form and function of aggression (i.e., proactive physical, proactive relational, reactive physical, and reactive relational; e.g., Ostrov et al., 2018b). These four types of aggression have been found to be associated with different trajectories and developmental outcomes. For example, in early childhood, physical and relational aggression appear to be mainly goal-oriented and proactive and direct forms of both physical and relational aggression are more common than indirect forms (Casas & Bower, 2018).

Furthermore, early childhood youth seem to engage in aggression to respond to their immediate environment (Ostrov et al., 2018b). As youth progress into middle childhood, relational proactive and reactive aggression become more indirect and covert, as children become increasingly skilled at delaying their aggressive responses for opportune times (e.g., waiting until a sleepover to spread a rumor; Casas & Bower, 2018). In adolescence, the trajectories of aggression differ by form and function, with early adolescents increasing in instrumental (i.e., proactive) relational, but not physical, aggression, while both forms of reactively aggressive behavior decreased (Fite & Pederson, 2018). The increase in proactive relational aggression in early adolescence may be reflective of the social context of middle and early high school adolescents for which social status is a valuable resource that can be controlled via aggression toward others (e.g., gossiping, excluding; Casas & Bower, 2018; Fite & Pederson, 2018).

Similarly, negative outcomes may differ based on the form and function of aggression. In early childhood, reactive relational aggression has been associated with increases in peer rejection and anger and decreases in emotion regulation skills, while proactive relational aggression has been associated with decreases in peer rejection and anger and increases in emotion regulation skills (Ostrov et al., 2013). Additionally, reactive physical aggression has been associated with functional impairment in early childhood (Hart & Ostrov, 2013). In middle childhood, reactive relational aggression has been more robustly positively associated with internalizing problems than all other subtypes of aggression, while proactive relational aggression has been linked to decreases in internalizing problems (Mathieson & Crick, 2010). Conversely, proactive relational, proactive physical, and reactive physical have all been associated with externalizing problems in middle childhood, with reactive physical aggression more strongly linked to externalizing problems than proactive physical aggression (Mathieson & Crick, 2010). Taken together, these findings may indicate that proactive relational aggression in early and middle childhood is associated with improvements in some aspects of psychological adjustment, which aligns with research indicating that youth who are able to relationally aggress in a skilled manner are able to attain increased social capital and popularity (Casas & Bower, 2018). Research is limited in adolescence, with some work suggesting that evaluating forms and functions separately more robustly predicts negative outcomes (e.g., violence) than analyses that evaluate forms by the function of aggression (Matlasz et al., 2020). However, more research that focuses on delineating aggression by both function and form is necessary to fully understand distinct pathways.

Assessment

There are multiple ways to assess aggressive behavior, which vary by form and function. Broadly, self-, caregiver-, peer-, and teacher-report instruments, as well as observation paradigms and laboratory tasks, are used to assess aggressive behavior. Further diversifying matters, some DSM diagnoses include aggression or related symptoms (e.g., Oppositional Defiant Disorder and Conduct Disorder) and are also utilized in the study of aggression. Additionally, broadband clinical screeners, such as the Child Behavioral Checklist (CBCL; Achenbach, 1999), include aggression subscales that are often used in research. Table 36.1 provides a comprehensive but not exhaustive list of aggression measures that measure various forms and functions of aggression, and a few are highlighted herein.

The most common questionnaire used to assess proactive and reactive aggression was developed by Dodge and Coie (1987). Originally developed for use with teachers, this six-item measure is now widely adapted for use across reporters and has been found reliable and valid. Its biggest criticism is that the items are likely interpreted to assess physical forms of aggression. More recent measures have attempted to capture both form and function of aggression. For example, Little et al. (2003) developed

Table 36.1 Common aggression measures, observations, and tasks

Name of measure	Reporter/type	Item/scale	Form	Function	Reference
Proactive and Reactive Aggression (PRA)	Teacher	6 items	–	Proactive	Dodge and Coie (1987)
	Parents	5-point scale		Reactive	
	Self-report				
	Peers				
Aggressive Behavior Scale	Self-report	25 items	Overt	Proactive	Little et al. (2003)
		4-point scale	Relational	Reactive	
Reactive-Proactive Aggression Questionnaire	Self-report	23 items	–	Proactive	Raine et al. (2006)
		3-point scale		Reactive	
Instrument for Reactive and Proactive Aggression (IRPA)	Teacher	6 items	Physical	Proactive	Polman et al. (2009)
		5-point scale	Verbal	Reactive	
			Covert		
Peer Conflict Scale (PCS)	Self-report	40 items	Overt	Proactive	Marsee et al. (2011)
		4-point scale	Relational	Reactive	
Cyber-Aggression Questionnaire for Adolescents (CYBA)	Self-report	19 items	Cyber aggression	–	Álvarez-García et al. (2016)
		4-point scale			
Cyber-Aggression Typology Questionnaire	Self-report	4-point scale	Cyber aggression	Impulsive-aversive, controlled-aversive, impulsive-appetitive, controlled-appetitive	Runions et al. (2017)
Observation of Aggression	Observation	10 min observations	Physical	–	See Ostrov et al. (2008) for review
		8 times	Relational		
Taylor Aggression Paradigm	Task	Fictitious competitive task, administered shocks	Physical	Proactive	Taylor (1967)
				Reactive scores calculated by later users (Brugman et al., 2015)	
Point Subtraction Aggression Paradigm (PSAP)	Task	Fictitious game to earn, steal, or protect points	Aggression total score	–	Cherek (1981); see Geniole et al. (2017) for recent review

a child self-report measure to assess proactive and reactive functions as well as physical/verbal and relational forms of aggression.

Observational measures of aggression have also become increasingly popular and add robustness to studies that include informant assessments. Ostrov et al. (2008) have developed a classroom observation protocol with trained observers that involves children being observed eight times over a total of 160 min. Instances of physical and relational aggression are recorded and coded by independent coders. While the training and infrastructure of this paradigm is certainly costly and time-consuming, it has advantages of ecological validity and allowing for multi-method assessment.

Laboratory tasks are also utilized to assess aggression across forms and functions. Laboratory tasks have the advantage of real-time assessment of aggression, particularly of usefulness while the participant is undergoing brain scans or wearing psychophysiological monitoring devices. These tasks typically involve a fictitious competitive game that can include punishing the other participant who is thought to be in the other room or is a confederate. For illustration, in the Taylor Aggression Paradigm (Taylor, 1967), participants are told they are playing a competitive reaction time game against another participant sitting in the room next door, and the winner of a trial could administer a loud noise to the looser as feedback. The volume/intensity of the noise and the number of provoked (other person administered a loud noise to them) versus non-provoked trials are used to assess for total aggression scores as well as proactive and reactive functions.

If possible, multi-method or multi-informant methods should be administered. For example, some youth may underreport aggressive behavior for social desirability or have a poor memory of their behavior. Further, historically excluded groups, such as Black youth, are seen as less innocent and angrier and are subjected to harsher school punishments (Goff et al., 2014), which may impact teacher-report or observational measures of aggression (Jackson et al., 2006).

Intervention Implications

Current aggression (including bullying) prevention and intervention programs have mixed results, with many finding only small reductions in aggressive behaviors, and are not equally effective across all subtypes of aggression or populations (e.g., gender and race; Kennedy, 2020; Leff et al., 2018). The majority of aggression interventions rely on targeting risk factors for aggression and/or focus on providing youth with skills so that they can navigate their world without resorting to aggression (Leff et al., 2018; Lochman et al., 2018); however, the types of risk factors and the requisite skills to reduce aggression differ by each aggression subtype. While most aggression interventions purport to address aggression generally, in practice most aggression interventions target factors associated with reactive, rather than proactive, aggression, and physical, rather than relational, aggression (Leff et al., 2018). Not surprisingly, these aggression interventions tend to be more effective at reducing reactive, rather than proactive aggression (Vitaro & Brendgen, 2011), and physical, rather than relational, aggression (although some work suggests interventions are equally effective for both aggression forms; Kennedy, 2020; Leff et al., 2018). Over at least the last decade there has been a call to tailor interventions for specific aggression subtypes, genders, and cultural groups (Kennedy, 2020; Vitaro & Brendgen, 2011).

Current aggression interventions are rooted in an array of theoretical conceptualizations of aggression (see above; Leff et al., 2018) and can be delivered in a variety of formats (e.g., school-based, community-based, group, individual, and family therapy); however, there are several key components that are consistent across interventions depending on the developmental period. Most aggression interventions are designed for youth in middle childhood and focus on increasing empathy for victims, pro-social problem-solving (e.g., conflict resolution skills), social-emotional skills (e.g., anger management and friendship skills), and cognitive reframing (e.g., attribution retraining and perspective taking) as well as reduction of social risk factors (e.g., changes in classroom policies and expectations, and improved parenting; Leff et al., 2018; Lochman et al., 2018). In early childhood, aggression interventions are sparse: individual programs are behavioral in nature and focus on improving parents' abilities to manage aggressive behaviors (e.g., Parent–Child Interaction Therapy; Eyberg, 1988), community-based programs focus on improving social-emotional and cognitive deficits that may contribute to aggression (e.g., Head Start), and school-based interventions focus on training youth how to engage in positive behaviors (e.g., social inclusion; Leff et al., 2018). There is also a notable lack of aggression interventions for adolescent youth, but existing programs are heavily cognitive-behavioral in nature and focus on helping youth communicate assertively, repair damaged relationships, and reduce environmental risk (e.g., problematic peer groups and parenting; Leff et al., 2018; Lochman et al., 2018). Furthermore, some adolescent interventions incorporate material related to issues that are specific to adolescents, such as cyberbullying and social media use as well as homophobia, sexual assault, and gang violence (Leff et al., 2018; Lochman et al., 2018). While the common components of these interventions may be appropriate for each developmental period, these components are not equally effective for each aggression subtype.

An intervention based on social learning theory, which focuses on teaching youth that aggression is not an adaptive strategy, may be most appropriate for youth struggling with proactive aggression (Bandura, 1973). Interventions targeting proactive aggression may be warranted as early as toddlerhood, with a focus on teaching children to use non-aggressive means to attain goals and behavioral rewards and consequences for aggressive behavior, perhaps through improved parenting (e.g., time-out and labeled praise). As youth progress into middle childhood and adolescence, proactively aggressive youth may benefit from interventions centered on problem-solving, emphasizing how non-aggressive solutions positively impact the aggressors (rather than focusing on how aggressive actions negatively impact the victims) and recognizing domineering behavior (Vitaro & Brendgen, 2011).

Surprisingly, there is a notable absence from current aggression interventions on how non-aggressive solutions positively impact the aggressor, despite strong theoretical foundations and empirical evidence that this approach would reduce both proactive and reactive aggression (Vitaro & Brendgen, 2011). However, outside the scope of traditional therapy modalities, there are a few pilot programs that pay a motivational monthly stipend to juveniles at risk for violent (re)offending to incentivize desistence from violent behavior and criminogenic peers as well as engage in community programs (Wolf et al., 2015). While this public policy is controversial, it has the potential to be highly cost-effective and increase public safety as well as target the more intransigence characteristics of proactive aggression (Pickett et al., 2020).

Of equal importance, interventions for proactive aggression would benefit from excluding empathy training. Data suggests that empathy training for youth who are proactively aggressive may actually enhance the dexterity with which youth proactively aggress, making them more skilled at manipulating others' emotions (Day et al., 2010; Sutton et al., 1999; Tampke et al., 2020).

For reactive aggression, on the other hand, an intervention based on the frustration-aggression hypothesis or social information-processing theory, which focuses on enhancing social-emotional skills and behavioral regulation, may be most appropriate (Berkowitz, 1978; Crick & Dodge, 1994). Youth who are reactively aggressive would likely benefit from many of the factors already being implemented in current aggression interventions, including empathy training, problem-solving, social-emotional skills, cognitive reframing, improved parenting, and improved school climate. In early childhood, youth would benefit from emotion regulation skills, pro-social skills training, and improved parenting. Reactive aggression interventions may be especially important for youth in early middle childhood given that effectively reducing reactive aggression may prevent the development of proactive aggression (Fite et al., 2016). Moreover, reactively aggressive youth may also benefit from programming that emphasizes the positive consequences of non-aggressive behaviors (Vitaro & Brendgen, 2011).

Similar to aggression functions, different underlying mechanisms and risk factors are important to target for both relational and physical aggression. From a developmental psychopathology framework, physical aggression may occur due to poor verbal skill development or an inability to effectively solve problem due to cognitive difficulties (Cicchetti & Rogosch, 2002). Therefore, interventions for physical aggression would benefit from focusing on enhancing communication and problem-solving skills. Given that physical aggression spikes in toddlerhood, youth 17–30 months old may benefit from being taught non-aggressive ways to ask for desired objects, even when language skills are not fully developed (e.g., sign language, soft touches, and pointing). These interventions may be particularly salient for boys given that they consistently engage in a higher rate of physical aggression than girls. Physical aggression is also important to target during its peaks in early and late adolescence. Some researchers have suggested that sports provide boys with a valuable outlet for physical aggression (Casas & Bower, 2018); however, many adolescent boys have reduced access to outdoor recess and organized sports in middle and high school. Daily physical education classes, outdoor recess, or participation in organized sporting activities in late middle childhood through adolescence may have valuable impacts on reducing physical aggression for youth.

Alternatively, from a social information-processing perspective (Crick & Dodge, 1994), youth may engage in relational aggression because they have a cognitive schema that values damaging social relationships of others (e.g., rumor spreading) to gain social status, take revenge on enemies, or cope with negative emotions. In early childhood, relational aggression may be easy to target because it is overt and obvious (Ostrov et al., 2018b). Early childhood youth would benefit from programming on positive social skills (e.g., sharing and including) and behavioral consequences for relational aggression (Leff et al., 2018). Targeting relational aggression in middle childhood is more complex because it is more covert and associated with both positive and negative outcomes (Casas & Bower, 2018). However, the short-term benefits of relational aggression (e.g., popularity) do not necessarily translate into positive long-term adjustment outcomes (Casas & Bower, 2018). Interventions for relational aggression would benefit from pro-social problem-solving skills, social-emotional skills, cognitive reframing, and a school climate that emphasizes accountability for bullying and promotes bystander intervention (Leff et al., 2018). These interventions may be particularly valuable as youth transition to middle school and could be enhanced by including material specific toward romantic relationships.

Given that cyber aggression seems to be closely tied to relational aggression, and that youth have access to social media and online gaming at increasingly younger ages, interventions would benefit from incorporating material regarding social media and online gaming in middle childhood, rather than only in adolescence (Casas & Bower, 2018; Lochman et al., 2018; Underwood & Bauman, 2018).

Although a large body of scientific literature on differences between aggression subtypes, most aggression treatment programs do not explicitly address aggression forms and functions. Therefore, it is important to consider which aggression intervention components are beneficial across aggression subtypes, such as enhanced emotion regulation, problem-solving, communication skills, and emphasis on consequences for the aggressor. Streamlined interventions may benefit from adopting a multi-component cognitive-behavioral approach including these elements (e.g., Coping Power; Fite et al., 2016; Lochman et al., 2014). Early childhood may be an important period to target proactive and reactive physical aggression in youth via enhancing communication and non-aggressive problem-solving skills. Late elementary school and early middle school may be particularly important developmental time periods for universal aggression interventions that target both proactive and reactive relational aggression (Fite et al., 2016; Vitaro & Brendgen, 2011). Moreover, middle childhood youth would benefit from preventative material on homophobia, xenophobia, sexual violence, and gang pressure. While most youth desist in aggression over adolescence, a small portion of youth do not, and their continued use of aggression is associated with serious negative outcomes. Therefore, early and late adolescence may be an appropriate period to assess for youth who continue to engage in proactive and reactive physical and relational aggression and provide more tiered, targeted interventions (e.g., Friend to Friend Program; Leff et al., 2018).

Despite research supporting the utility, cost-effectiveness, and positive outcomes of some aggression interventions, effective dissemination of treatments is an ongoing issue (Hymel & Espelage, 2018). Researchers have called for policy changes to incorporate social-emotional learning in schools as well as an expansion of mental health coverage in Medicare so low-income families can access requisite services (e.g., Stormshak & Garbacz, 2018). Telehealth may be an important new frontier for the effective dissemination of interventions. However, telehealth interventions may be a "double-edged sword" for accessibility, making services more easily available for families with stable and consistent access to the Internet and more difficult for families with inconsistent Internet and electricity. Future aggression interventions would benefit from incorporating screening for aggression forms and functions within manuals and directing clinicians to different treatment modules based on the subtype of aggression experienced (perhaps in a format similar to the MATCH-ADTC Protocol; Chorpita & Weisz, 2009). Additional research on aggression interventions would benefit from examining which components of interventions are most effective for specific subtypes of aggression for which youth as well as the examination of aggression interventions by independent research groups (Leff et al., 2018).

Future Directions

There are many topics for future studies to address to fully understand the forms and functions of aggression. For example, the aggression literature would benefit from further examining the stability and trajectories of the subtypes of aggression, particularly in early childhood, as extant literature in this area is limited and somewhat mixed (Casas & Bower, 2018; Murray-Close & Ostrov, 2009; Ostrov & Crick, 2007). Our understanding of the development of aggression may be improved by utilizing statistical analyses that evaluate unique trajectories (e.g., growth mixture modeling), allowing researchers to determine consistent individual trajectories (e.g., Vitaro & Brendgen, 2011).

There are many areas of cyber aggression that need further study. Research on the risk factors and trajectories of cyber aggression is limited and future work would benefit from further examining the true onset of cyber aggression, its development over time, its association with other forms and functions of aggression, and its rates across development (including whether it desists in adulthood; Gaffney et al., 2019; Hymel & Espelage, 2018; Underwood & Bauman, 2018). Research on the longitudinal negative outcomes associated with cyber aggression is also limited (Gaffney et al., 2019; Underwood & Bauman, 2018). Further, as technology is ever evolving, it will be important for researchers, parents, and clinicians to keep up with the latest technology and the specific platforms youth use to aggress to intervene effectively (e.g., researchers adequately updating measures).

There is also a need to better understand the biological and neurological underpinnings of aggression as well as the interactive effects between biological factors and environmental factors that contribute to the development of aggression. Although these are growing areas of study, the literature is full of mixed and inconsistent findings, making it difficult to draw conclusions. Hypotheses-free, genome-wide sequencing and epigenetic analyses across multiple developmental groups that accurately account for forms and functions of aggression are particularly of need (Waltes et al., 2016).

Further, research examining the intersectionality of the forms and functions of aggression remains limited. More research specifying proactive and/or reactive relational, cyber, and physical aggression may help to clarify inconsistent findings and help better inform how to intervene.

Additionally, future work may benefit from examining aggression within the social and cultural contexts, especially in lower-income and racially diverse groups, as there may be some adaptive aspects of aggression for self-preservation. This may be particularly important given the systemic biases in aggression assessment across informants (Jackson et al., 2006; Morris, 2016). Additionally, further research operating from the framework that not all aggression is necessarily bad, and how that fits with our conceptualization of forms and functions of aggression (e.g., self-defense; Hawley et al., 2007), is warranted. This may be particularly salient in the judicial system, in which even self-defensive aggression can have implications for sentencing because it is difficult to assess.

Additionally, girls are underrepresented in studies examining aggression, and many of the measures used to assess aggression were adapted (e.g., Little et al., 2003; Raine et al., 2006) from a measure that was originally developed through behavioral observations of boys (i.e., Dodge & Coie, 1987). Additional work with underrepresented groups may lead to more updated assessment tools and more refined interventions.

Finally, there are also quite a few interventions alternative to traditional therapy that warrant more research attention. Pharmacological interventions for childhood aggression are one potential route, particularly in the case of comorbid diagnoses (e.g., conduct disorder, ADHD; Bassarath, 2003). Further, benign biological interventions such as omega-3 supplementation and transcranial direct current stimulation have shown increasing promise in reducing aggression (Choy et al., 2018). Computerized cognitive bias modification programs have recently emerged as a cost-effective way to target HAB and thereby reduce aggression – and may have particular utility in detention or residential settings (Ren et al., 2021). Finally, public policy interventions provide a potent avenue for reducing aggression and violence on a large scale if and when public opinion approves of such measures (Pickett et al., 2020; Wolf et al., 2015).

Summary

While aggression has long been acknowledged and evaluated, it is evolving and continues to impact many youths. Aggression emerges in toddlerhood and declines, persists, or increases throughout development depending on the form and function of aggression considered. Proactive and reactive aggression change together throughout development, peaking in late middle childhood and then generally desisting throughout adolescence. Physical and relational aggression follow different developmental trajectories, with physical aggression peaking in early childhood and then declining for both boys and girls as it is partially supplanted by relational aggression. It is theorized that cyber aggression follows similar trajectories to relational aggression; however, more research is needed.

A host of etiological factors dispose youth to aggression with individual (e.g., gender, genetics, physiological, and temperament) and environmental (e.g., parenting factors, peers, and neighborhood) factors all interacting to confer risk for aggression. Some factors like genetic vulnerability and peer difficulties are associated with most forms and functions of aggression, whereas other factors like gray matter density in certain brain regions are selectively associated with only one type of aggression. Physical, relational, and cyber aggression are all associated with externalizing symptoms, internalizing symptoms, and other maladaptive adjustment outcomes. However, physical aggression is more strongly linked with antisocial behavior, while relational aggression is more strongly linked with internalizing problems. Similarly, proactive aggression is more strongly linked with externalizing symptoms, while reactive aggression is more strongly linked with internalizing symptoms.

It is important to assess for the various forms of aggression so that behaviors are not missed, with assessment options including self-, teacher-, and parent-reports, behavioral observations, peer nominations, and more. Further, from a prevention and intervention perspective, programs targeting aggression may need to become more specialized by focusing on the function/motivations for the behavior, which can include evaluating function by the form of aggression. Alternatively, universal aggression interventions can be improved by including elements that are effective in reducing multiple forms and functions of aggression, such as enhanced emotion regulation, problem-solving, communication skills, and emphasis on consequences for the aggressor.

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Self-Injurious Behavior

37

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Self-injurious behavior (SIB) refers to repetitive or persistent behavior that has the potential to cause physical harm or injury to oneself (Huisman et al., 2018; Tate & Baroff, 1966). Among individuals with intellectual and developmental disabilities (IDD), common topographies of SIB may include the following: head banging, head hitting, self-biting, self-hitting, and eye-poking (Buono et al., 2020; Kahng et al., 2002; Kurtz et al., 2012; Patton, 2004). SIB can also include repetitive behavior such as skin picking, trichotillomania (i.e., hair pulling), or body rocking against hard objects. Less common, but severe, topographies may include aerophagia (air swallowing), bruxism (teeth grinding), and rumination (self-induced vomiting) (Kahng et al., 2002). SIB can be categorized based on the specific action (e.g., biting self) or the location on the body that the action targets (e.g., hand biting; MacLean et al., 2020). For some topographies, the location of the behavior may be associated with increased risk of injury. Specifically, SIB directed at one's head (e.g., banging head against the floor), sensory organs, or bony areas has more potential for immediate and long-term injury than SIB directed at some other parts of the body (e.g., thigh pinching or slapping). Therefore, it is common to separate head-directed SIB topographies (e.g., Rooker et al., 2018b) from body-directed ones. SIB can also be characterized in terms of its severity, which is often based on the likelihood and nature of the injury caused by it (e.g., Huisman et al., 2018; MacLean et al., 2020; Rooker et al., 2018b, 2020). SIB may be classified as "severe" when it occurs regularly, results in harm to the individual, restricts or limits participation in developmentally appropriate activities, and requires higher or more restrictive levels of care (Newcomb & Hagopian, 2018).

SIB not only affects the individual that engages in the behavior but also has a large impact on the entire family. Often, there is a large financial burden to secure appropriate treatment in either an outpatient or inpatient setting. Treatment could include years of therapy, sometimes resulting in alternative or more restrictive placements (Newcomb & Hagopian, 2018). The level of caregiver stress related to managing SIB can also be quite high, especially when the risk of harm is imminent (Kurtz et al., 2020; Stewart et al., 2020).

Injuries produced by SIB can include bruising, swelling, bleeding, fractures, concussion, permanent disfigurement, nerve damage, secondary infections, and other serious injuries (Patton, 2004; Rooker et al., 2020). Although function-based behavioral treatment is essential to produce lasting

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change in SIB, additional management techniques are sometimes needed to protect against injury. Behavior management techniques may include the use of response blocking to interrupt SIB, as well as protective equipment covering areas of the body that are targeted to reduce physical trauma produced by SIB (e.g., helmets, arm guards; Dorsey et al., 1982; Moore et al., 2004). For individuals with head- or face-directed SIB for whom other methods are insufficient to prevent injury, the use of arm splints that limit elbow flexion is sometimes necessary (Deshais et al., 2015; Fisher et al., 1997; Morgan et al., 2017; Wallace et al., 1999). Despite these protections, studies have found SIB-related injury to be present in approximately 50–75% of individuals at the time of admission to an inpatient program (Hyman et al., 1990; Rooker et al., 2018b).

Injuries due to SIB can be tracked and measured. The most used standardized tool for measurement of injury reported in the literature is the Self-Injury Trauma Scale (SIT Scale; Iwata et al., 1990). The SIT Scale quantifies the location, number, type, and severity of injuries and provides the estimated risk for further injury. Although a potentially useful tool for quantifying SIB-related injury, the SIT Scale has some limitations. It is relatively time-consuming to score and requires specialized training; it involves some subjective judgment; and it does not identify the exact cause of the injury (unless directly observed). A recent review of the literature suggested that the SIT Scale is not widely used within the published SIB treatment literature as a quantitative measure (Shawler et al., 2019). Nevertheless, the SIT Scale (and other measures of injury) is useful for documenting injuries and its inter-rater reliability is acceptable (Iwata et al., 1990). Its use as a primary outcome measure for treatment for SIB, however, is greatly limited because protective equipment and/or restraint procedures are often used concurrently with medications or behavioral interventions. Therefore, reductions in injuries are likely the product of a combination of behavior-altering interventions and protective equipment. The most commonly used measure of SIB reported in the behavioral literature for the purpose of assessment and evaluation of treatment outcomes involves recording the frequency of behavior via direct observation.

SIB and Intellectual and Developmental Disabilities

Approximately 10–20% of individuals with IDD engage in at least one form of SIB (Didden et al., 2012; Hoch et al., 2016; Huisman et al., 2018; MacLean et al., 2020; MacLean & Dornbush, 2012; Steenfeldt-Kristensen et al., 2020). However, prevalence estimates of comorbid SIB and IDD vary widely based on the specific diagnosis, severity level, and other factors. For example, SIB may be less prevalent among individuals with mild intellectual disabilities than those diagnosed with profound or severe intellectual disability (Furniss & Biswas, 2012; Rojahn et al., 2008; Shawler et al., 2019). In addition, certain disorders are associated with a higher prevalence of SIB. In particular, the prevalence of SIB in Autism Spectrum Disorder (ASD) has been reported to be between 30 and 50% of individuals (Soke et al., 2016). Within ASD, prevalence rates vary widely, from as low as 6% to as high as 71%, suggesting more research is needed (Baghdadli et al., 2003; Bartek & Rutter, 1976; Billstedt et al., 2005; Bodfish et al., 2000; Cooper et al., 2009; Folch et al., 2018; Richards et al., 2016; Soke et al., 2016). Some genetic disorders are also associated with specific SIB phenotypes. For example, Prader-Willi syndrome is characterized by repetitive self-picking and scratching (Symons et al., 1999), Lesch-Nyhan syndrome presents with self-biting, particularly around the mouth and lips (Robey et al., 2003), whereas nail removal and inserting foreign objects into the body is more likely to be reported in Smith-Magenis syndrome (Greenberg et al., 1996).

SIB is far more common among children with an IDD diagnosis relative to their neurotypical peers. Among preschool-aged children, 59.1% of children with IDD exhibited SIB, whereas 28.5% of neurotypical children did (Hoch et al., 2016). In addition, children with IDD display more frequent and more severe topographies of SIB as compared to neurotypical peers (MacLean et al., 2020). For example, MacLean et al. (2020) reported that typically developing children only exhibited mild SIB, whereas children with IDD exhibited mild SIB at a higher rate as well as moderate and severe SIB across eight different SIB topography categories.

Emergence and Classification of SIB

Among individuals with IDD, SIB is a heterogeneous phenomenon thought to be caused by a combination of biological and environmental variables (Furniss & Biswas, 2020). Although a discussion of biological variables' influence on SIB is beyond the scope of this chapter, it is important to acknowledge their role as a contributing factor in the occurrence of SIB (for a thorough discussion, see Furniss & Biswas, 2020). Environmental variables are also implicated in the emergence and maintenance of SIB. Children with IDD may engage in proto-injurious behavior—stereotypic behavior that is not injurious but looks topographically similar to some forms of SIB (e.g., body rocking, hand flapping that makes contact with the head; Berkson, 2002; Richman & Lindauer, 2005). In some cases, proto-injurious behavior can evolve into SIB (Richman & Lindauer, 2005). This transition may occur, in part, due to operant reinforcement processes. That is, instances of proto-injurious behavior may be intermittently reinforced and shaped into more injurious presentations. In the context of deficits associated with IDD, these behaviors may become established as an effective means of producing sensory stimulation, accessing attention, or avoiding non-preferred situations. Once SIB emerges, it typically continues to occur (i.e., it is chronic; Furniss & Biswas, 2012). Research suggests that SIB can start in the first two years of life and can be treatment-resistant (Buono et al., 2020; Hyman et al., 1990; Kurtz et al., 2003; MacLean et al., 2020; Richards et al., 2016; Taylor et al., 2011). Individuals with IDD also tend to display multiple topographies of SIB and often engage in other types of problem behavior, such as aggression or destructive behavior.

One way to classify SIB is based on psychiatric diagnostic systems. Individuals who engage in SIB can be diagnosed with Stereotypic Movement Disorder with SIB, which is classified as a neurodevelopmental disorder in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (DSM-5; American Psychiatric Association, 2013). The diagnostic criteria include repetitive, "seemingly driven, and apparently purposeless motor behavior" that causes injury, interferes with normal activities, and cannot be attributed to another condition (e.g., seizure disorder, substance use). The diagnosis of Stereotypic Movement Disorder with SIB may be useful to document the presence of clinically significant SIB (e.g., funding treatment services), but this diagnosis is largely descriptive and does not provide any information that would inform treatment selection.

An alternative approach to the classification of SIB is based on its operant reinforcing function, which can be identified via functional behavior assessment. Decades of behavioral research have indicated that SIB is typically an operant behavior shaped and maintained by reinforcement contingencies (Beavers et al., 2013; Iwata et al., 1994a, b). A detailed discussion on functional behavioral assessment is provided in Chap. 21. Briefly, functional assessment methods include the following: (a) indirect methods that rely on the report of others to identify events that are believed to evoke and reinforce SIB (e.g., surveys and interviews), (b) descriptive methods which include observations of SIB in the environment to make inferences about what events may have evoked and reinforced SIB, and (c) functional analysis, in which SIB is observed under highly controlled analog conditions where relevant antecedents and consequences are manipulated to test specific hypotheses. Functional analysis is the most rigorous method in that it produces objective and quantifiable data and requires the least amount of inferences. Regardless of the method, the underlying goal is the same: to identify antecedent events that occasion or evoke SIB and consequences that reinforce it.

The gold standard method is to complete a functional analysis (Iwata et al., 1994a, b). Indirect assessments are easy to administer and may be beneficial when it is not possible to directly observe SIB (e.g., behavior is low rate or is covert), or as a first-line method in cases where SIB is relatively mild. However, results from indirect assessments vary across informants and correspondence between indirect methods and functional analysis results is variable, ranging from 33% to 75% agreement (Healy et al., 2013; Tarbox et al., 2009; Zaja et al., 2011). Descriptive assessments involve direct observation and post hoc analysis of antecedent and consequent events surrounding SIB. However, they rely on correct identification of the relevant antecedents and consequences. Moreover, correspondence with functional analyses is limited (Thompson et al., 2007). The functional analysis, where antecedents and consequences are systematically manipulated, is the only method that demonstrates a functional relation between potential reinforcers and SIB. Using this method, the occurrence of SIB in a control condition is compared to one or more test conditions where specific hypotheses are tested. This analysis is performed using a single-case design (often in a multi-element design) which permits one to make more definitive conclusions about the function of SIB. The primary downsides to the functional analysis are that it requires specialized training to conduct and interpret, and it is more time-consuming than other methods.

The function(s) of SIB falls into three broad categories: social positive reinforcement (e.g., access to attention, access to tangible stimuli), social negative reinforcement (e.g., escape from demands), and automatic reinforcement (i.e., SIB itself produces reinforcement; Hagopian et al., 2015a, b, 2017; LeBlanc et al., 2000). Research has found that SIB can also have many other functions dependent on unique learning histories (see Schlichenmeyer et al., 2013 for a review). In a functional analysis, a function is identified when the rates of SIB for one (or more) test conditions are elevated compared to the control condition. In the control, the individual has free access to highly preferred toys and attention and no instructions are presented. Table 37.1 describes common procedures for functional analysis test conditions for social reinforcement.

Large-scale reviews of the literature reporting on the functional analysis of SIB suggest that 75–80% of SIB is sensitive to and maintained by social reinforcement (Beavers et al., 2013; Hanley et al., 2003; Kahng et al., 2002). For the remaining cases, SIB is classified as automatically main-

Table 37.1 Common functional analysis social reinforcement test conditions

Condition	Antecedents to SIB	Consequence for SIB	Function	Example study
Attention	Adult attention is restricted; therapist acts busy; limited or no toys available to child	Brief statement of concern: "Don't do that, you are going to hurt yourself"	Social positive (access to attention)	Iwata et al. (1994a, b)
Tangible	Highly preferred item (e.g., toy, food) is removed and restricted	Brief return of tangible item	Social positive (access to tangible)	Day et al. (1988)
Demand or *escape*	Academic or daily living instruction or demand is presented	Brief escape and removal of demand	Social negative (escape from demand)	Iwata et al. (1994a, b)
Social avoidance	Therapist talks to child in close proximity	Brief escape from interaction	Social negative (escape from social interaction)	Harper et al. (2013)
Mand or *social control*	Therapist stops complying with child's request; therapist engages in activity that is incompatible with child's request	Brief return of compliance of child's requests	Social positive and negative[a]	Bowman et al. (1997)

[a] The contingency in the mand test is set up such that the reinforcer is dependent on what the child requests. This often involves both positive (getting the adult to do something that the child requests) and negative reinforcement (getting the adult to terminate doing something that the child does not want)

tained (ASIB), in that it occurs independent of social reinforcement contingencies. The test condition for ASIB is a no interaction condition (the individual is alone, or with another person, but there is no interaction). In this condition, there is no social consequence for SIB. It is likely that ASIB produces its own reinforcement through unspecified biological processes; however, it has been hypothesized that it could be a product of motor or sensory dysfunction in some cases (Hagopian & Crawford, 2018). Compared to socially maintained SIB, ASIB is more difficult to treat and often requires more intensive interventions (Hagopian et al., 2015a, b, 2017). However, subtypes of ASIB have been identified based on response patterns in the functional analysis that are differentially responsive to behavioral treatment (Hagopian et al., 2015a, b, 2017; see "Special Section: Automatic Self-Injurious Behavior").

Behavioral Treatments for SIB

Decades of research have demonstrated the effectiveness of behavioral treatment in decreasing SIB exhibited by individuals with developmental disabilities (Haddock & Hagopian, 2020; Kahng et al., 2002; Morano et al., 2017; Shawler et al., 2019), particularly when treatments are based on the results of a functional analysis (see meta-analyses by Didden et al., 1997; and Heyvaert et al., 2014). As a result, behavioral interventions are considered best practice by several government, professional, and academic organizations (Hagopian et al., 2015a, b). Behavioral treatments for SIB rely on operant conditioning principles to modify the relevant environmental antecedents that evoke and the consequences that may reinforce SIB as identified via functional behavioral assessment (Furniss & Biswas, 2020; Kahng et al., 2002). Function-based behavioral treatments are highly individualized as they are designed to directly target the variables maintaining SIB for each case. Therefore, the type of treatment used will vary greatly based on whether SIB is socially or automatically maintained and the particular subtype within that broader type. Thus, treatment for SIB maintained by attention will be very different than SIB maintained by escape from instructional demands, even if the topography of SIB is identical across individuals.

Behavioral treatments are generally designed to prevent events that evoke SIB and rely heavily on teaching adaptive and functional skills to replace it. Behavioral treatment components most commonly include positive reinforcement, discriminative stimuli (signals), and extinction. For those with more severe SIB, the use of response blocking, protective equipment, or response reduction procedures is sometimes necessary to maintain safety. Each of these treatment categories can be implemented alone or in combination. Behavioral treatments can also be prescribed in conjunction with other treatments, such as pharmacological treatment(s) (Hagopian & Caruso-Anderson, 2010; Pyles et al., 1997). In general, behavioral treatments can broadly be categorized as (a) antecedent interventions, (b) consequence interventions, and (c) safety management techniques, all of which are discussed further below.

Antecedent Interventions

Antecedent interventions manipulate environmental variables for the purpose of preventing or minimizing the likelihood of SIB. These types of manipulations are distinct as they involve modifying variables prior to the occurrence of the behavior (i.e., preventative as opposed to reactive). Antecedent interventions may be especially useful in certain environments in which consequences are difficult or impractical to deliver consistently (e.g., classroom, home settings). Many antecedent interventions are considered less restrictive than some consequence procedures and can still effectively decrease behavior (Rooker et al., 2018a, b). A recent review of the SIB behavioral treatment literature from 2001 to 2016 found that antecedent interventions were used in approximately 15% of cases (Shawler et al., 2019), an increase from previous decades that reported their use in only 4% of cases (Kahng et al., 2002).

Antecedent interventions consist of either default or function-based procedures (Smith, 2011). Default interventions refer to the manipulation of variables that are not specifically dependent on the reinforcer(s) that may occasion SIB and can be used for a variety of different sources of reinforcement (Smith, 2011). In other words, default antecedent interventions can be used across all functional classes of SIB. Default interventions include tactics that increase response requirements to obtain reinforcement, stimulus-control procedures to signal the availability of reinforcement for certain behaviors, such as compliance, developing structured routines to increase predictability, and environmental enrichment to provide increased levels of stimulation that may compete with reinforcement that maintains SIB. Default interventions have been more commonly implemented when treating ASIB (e.g., Morrison et al., 2011; Zhou et al., 2000; see "Special Section: Automatic Self-Injurious Behavior").

A growing literature base has demonstrated that discriminative stimuli correlated with the availability and unavailability of reinforcement for alternative behavior can facilitate decreases in SIB and other target behaviors (Saini et al., 2016). For example, in a function-based treatment for attention-maintained SIB, correlating a green stimulus card (discriminative stimulus) with the availability of attention for appropriate replacement behavior, and a red stimulus card (stimulus delta) with the unavailability of attention can help individuals discriminate when reinforcement (i.e., attention) is and is not available. Individuals then learn to discriminate when to ask for specific reinforcers and when to wait for or access other reinforcers. For some individuals, this same tactic can be used with naturally occurring stimuli so they can discriminate when an adult is busy and not able to interact (e.g., talking on the phone), and when an adult is not busy and available to interact (e.g., reading a magazine; Kuhn et al., 2010). This type of schedule, called a multiple schedule, has demonstrated success of decreasing SIB and increasing appropriate functional communication as well as improving adaptive behaviors when reinforcement is unavailable (for a review of multiple schedules, see Saini et al., 2016).

In contrast with default antecedent interventions that can be used regardless of the function of SIB, function-based antecedent interventions directly manipulate the specific reinforcing variable(s) evoking SIB identified from the functional assessment. Function-based antecedent interventions may also include manipulating motivating operations that may influence the occurrences of SIB (Smith, 2011). Motivating operations momentarily alter the value of certain events and stimuli and influence the likelihood of specific behaviors that have produced those consequences in the past (Michael, 1993). Often, functional reinforcers (or stimuli that compete with the functional reinforcer) are delivered on a time-based, response-independent schedule (i.e., noncontingent reinforcement; NCR). For example, NCR for SIB maintained by attention involves providing attention on a fixed-time schedule (e.g., every 30 s) independent of target behavior. Such a schedule arrangement attenuates the motivating operation for problem behavior and may also disrupt the relation between problem behavior and reinforcement because their association is disrupted. This approach also has been shown to be efficacious for problem behavior maintained by escape from instructional demands. Manipulations to various dimensions of instructional demands (e.g., novelty of demands, rate of presentation, duration of sessions) to make them more tolerable can reduce SIB—presumably because they attenuate motivating operations for escape from demands; however, results are idiosyncratic across individuals (Smith et al., 1995).

Research based on behavioral economics and the principle of stimulus substitution has been the basis for reducing problem behavior by identifying stimuli and activities that can substitute for or compete with other reinforcers. This has been applied to the treatment of SIB, and it has been demonstrated that stimuli can compete with reinforcement for SIB (evidenced by reductions in SIB), even if the reinforcers are not functionally equivalent (Payne & Dozier, 2013). For example, for an individual who engages in SIB to access preferred items, attention may be provided during periods when access to the item is restricted, and this attention may compete with the reinforcer for engaging in SIB (e.g., Fisher et al., 2015).

Consequence Interventions

Consequence interventions include presenting, removing, or withholding of a stimulus or event following SIB and providing reinforcement when the individual engages in an appropriate behavior such as communication, compliance, or appropriate interaction. Categories of consequence-based procedures for socially mediated SIB generally include reinforcement, extinction, and response interruption procedures.

Reinforcement Procedures

Reinforcement procedures primarily include differentially reinforcing an alternative behavior (DRA) while withholding reinforcement for SIB (i.e., extinction). Differential reinforcement may also be provided for the absence of SIB (differential reinforcement of other behavior [DRO]). DRA procedures are advantageous over DRO procedures given the focus on teaching a replacement behavior, which teaches the child specific and appropriate ways to access reinforcers and allows the child some control over reinforcer delivery. In general, incorporating functional assessments into treatment development has been found to improve the precision and effectiveness of reinforcement-based procedures (Iwata et al., 1994a, b). One commonly utilized DRA procedure when treating individuals who exhibit challenging behavior includes functional communication training (FCT) to teach a functionally equivalent replacement behavior (Carr & Durand, 1985). FCT has a robust literature base demonstrating its utility in the treatment of challenging behavior by teaching functional communication responses for socially maintained behavior and withholding reinforcement for challenging behavior (Ghaemmaghami et al., 2021; Kurtz et al., 2011; Tiger et al., 2008). Responses are taught by prompting a simple or more complex vocal or motor response (e.g., card exchange, push a button that speaks). For example, if SIB occurs to gain attention from caregivers, a functional way for that individual to gain attention (such as raising one's hand, pushing a button, saying "excuse me") can then replace SIB, as long as the target behavior no longer receives attention (i.e., extinction). Similarly, FCT can teach an appropriate request to gain access to other positive reinforcers (e.g., tangible items) or to remove or terminate an event (e.g., aversive demands or social situations). FCT is often combined with multiple schedules signaling availability and unavailability of reinforcers (as described in antecedent interventions; see Hagopian et al., 2011). For more discussion of FCT to treat challenging behavior, see Chap. 52.

Extinction

Extinction includes the withholding of reinforcement following a response (Cooper et al., 2020). Extinction procedures are typically combined with other antecedent or reinforcement-based procedures. If it is determined that SIB occurs to access attention, extinction procedures would involve not providing attention following the occurrence of SIB. Extinction is rarely used in isolation for the treatment of SIB and other potentially dangerous behaviors as it has the potential for initial increases in the target behavior prior to decreasing (i.e., extinction burst). However, extinction is a necessary component, and when combined with additional antecedent or reinforcement procedures, extinction burst effects may be greatly diminished and even eliminated (e.g., Zarcone et al., 1993).

Response Interruption Procedures

When SIB has the potential to result in injury to an individual, response blocking may be necessary. Response blocking typically includes another individual using their hand or sometimes another object (e.g., pillow, mat) to interrupt the contact between the individual and their body part or surface. Response blocking should be used in cases in which SIB is likely to result in injury (e.g., Phillips et al., 2017). Response blocking procedures should also be combined with reinforcement-based procedures and can be combined with other redirection strategies to promote adaptive behaviors, such as leisure engagement (e.g., Jennett et al., 2011).

Response interruption procedures may include redirection and brief holds to interrupt SIB. Alternative response-interruption procedures, such as time-out from reinforcement and response cost, may also be effective at decreasing SIB (e.g., Manente & LaRue, 2017). However, these procedures should only be considered for treatment-resistant cases or when there is an extreme risk of harm requiring the immediate cessation of SIB (see the Ethics section for more consideration).

Safety Management Techniques

Protective equipment or mechanical restraints deserve particular attention. These types of equipment may be applied prior to bouts of SIB to minimize injury (or prevent further tissue damage to an injured area) associated with severe or high-rate SIB (e.g., hand-to-head SIB; Fisher et al., 1997). Protective equipment may include wearing items, such as helmets, gloves, kneepads, or any other relevant item that protects a frequently targeted area. Protective equipment does not typically limit movement but functions as a response prevention method (Luiselli, 1992); however, devices, such as arm splits, reduce elbow flexion while preventing face-directed SIB (Rooker et al., 2018a, b). Both types of equipment are medically necessary for cases in which SIB poses risks to health and safety, including when injuries are already present, when SIB occurs at high intensity or at high rates, and if alternative less-restrictive procedures have been unsuccessful. The use of such equipment should be regularly evaluated to ensure safety and continued necessity. Clinicians should also plan to systematically fade out the equipment over time.

Treatment Generalization

Generalization of treatment effects is an integral component of treatment planning. Clinicians and researchers should be programming for generalization at the onset of treatment implementation to increase the likelihood of optimal outcomes. Generalization programming consists of incorporating relevant stimuli, people, mediating responses, and stimulus and response exemplars into treatment that may increase the likelihood that the relevant behavior(s) contact naturally occurring contingencies (Stokes & Baer, 1977). However, over the last two decades, treatment generalization probes are rarely reported within the SIB treatment literature (22% of cases; Shawler et al., 2019). When they are programmed, they are primarily focused on generalization across settings and people (Shawler et al., 2019). Programming for generalization is an active process that should occur within the context of treatment development (Stokes & Baer, 1977; Stokes & Osnes, 1989).

One common procedure to promote the transfer of treatment effects from dense reinforcement contingencies in therapy contexts to leaner reinforcement contingencies that can be supported in the natural environment is reinforcement schedule thinning. Schedule thinning is commonly used when employing treatments, such as FCT (Hagopian et al., 2011; Hanley et al., 2001) and NCR (Phillips et al., 2017). When using multiple schedules, schedule thinning is conducted by increasing the duration of the schedule component where reinforcement is unavailable. Often, this period starts with a brief amount of time (e.g., 30 s) but increases systematically until a terminal goal is met. The terminal goal should be selected based on client and caregiver preference for what is feasible and relevant to the natural environment (e.g., 10 min). Individuals are then exposed to relevant periods in which the functional reinforcer is unavailable and they learn to engage in alternative activities or wait until the reinforcer becomes available. Additional modifications to the schedule can also be made, such as incorporating task completion requirements prior to the reinforcer becoming available again (Hagopian et al., 2011) or waiting a specified amount of time. Such modifications may promote relevant conditions (e.g., completing chores first, then earning access to iPad) that allow for treatment gains in the natural environment.

Social Validity

In many cases, treatment of SIB can be complex and difficult to implement. Considering the severity of the behavior and the accompanying risk of harm, it is important to evaluate social validity of treatment effects from relevant caregivers or even the individual themselves, when possible (Wolf, 1978). Social validity can be measured using individualized questionnaires or surveys based on a relevant caregiver report. However, inherent to any qualitative measure, indirect measures may have limited validity and reliability across multiple caregivers or over time. Social validity can also be assessed directly from participants following at least two comparably efficacious treatments using a concurrent-operant procedure (e.g., three treatment choices correlated with different colored stimuli where the individual can make a selection) to evaluate treatment choice (Hanley, 2010). Measures of social validity are especially important when intrusive or response reduction procedures are required for effective behavior change, and caregivers should be actively involved when developing practical and acceptable treatment goals and procedures.

Ethical Principles in the Assessment and Treatment of SIB

The American Psychological Association (APA, 2017) affirms general principles for all psychologists to engage in ethical behavior when interacting with others professionally. These principles are designed to “guide and inspire psychologists toward the very highest ethical ideals of the profession” (APA, 2017, p. 3). In this section, we describe general ethical principles in relation to psychologists’ assessment and treatment of SIB.

Principle A: Beneficence and Nonmaleficence

Psychologists must evaluate the extent to which their assessment and treatment practices benefit or harm their clients. When treating individuals who engage in SIB, it is important to consider the type of interventions. Function-based treatments are effective, evidence-based procedures for treating SIB (Didden et al., 1997; Heyvaert et al., 2014). Further, antecedent strategies and reinforcement-based procedures should generally be attempted first, prior to recommending any type of response reduction procedures. However, more restrictive treatment components may be warranted due to severe SIB or significant imminent risk of harm. Various governing agencies provide recommendations to practitioners regarding the assessment and treatment of SIB and other severe behavior problems that align with the ethical principle of beneficence. For example, the Association for Behavior Analysis International released a position statement on the ethical use of restraint and seclusion as a behavioral treatment for behavior analysts (Vollmer et al., 2011). Restrictive procedures should be a last resort (when nonrestrictive components have failed), combined with other less-intensive procedures, monitored closely by trained professionals, and faded as quickly as possible.

Psychologists should also consider how effectiveness is evaluated for each client. Effectiveness should be based on objective measures of SIB and SIB-related injury and careful evaluation of the necessary and sufficient treatment components. Single-case experimental designs allow clinicians to evaluate intervention effectiveness for a single client through systematic application and removal of the independent variable. Using a single-case experimental design in clinical practice allows the professional to make data-based decisions about treatment course and verify that treatment, and not something else, is responsible for behavior change. When considering the types of experimental designs to evaluate various treatments on the rate of SIB, precautions should be taken to minimize the individual's risk of harm by not exposing them to prolonged baseline or control periods. Further, some single-case experimental designs involve a brief treatment withdrawal (or a reversal to baseline). Cost-benefit analyses should be completed to assess the overall potential gains when considering withholding or removing treatment for SIB.

It is also best practice to monitor for accurate implementation of treatment components through treatment fidelity checks. Monitoring checks should be conducted to ensure that clinicians or caregivers are conducting the treatments as trained. These checks are even more important when there are intricate treatments in place, when dealing with high-risk behavior, or any time caregivers conduct the treatment. By ensuring high treatment fidelity, this may minimize the likelihood for risk of harm to the individual due to possible inadvertent reinforcement for harmful behavior or incorrect implementation of safety procedures, such as response blocking or applying protective equipment.

Principle B: Fidelity and Responsibility

Psychologists working with individuals who engage in SIB often work within interdisciplinary teams to serve the best interests of the patient and their family. Cohesive collaboration across professionals is a critical component of effective treatment (LaFrance et al., 2019). Psychologists have the responsibility of understanding their role as defined by their scope of training and practice. Further, psychologists are required to seek help and collaborate with others when the presentation of or treatment needs for SIB are outside their scope of experience or competence (e.g., high-rate, life-threatening, or very severe SIB, ASIB). For example, when treating an individual engaging in very intense and high-rate SIB, collaboration with a psychologist or Board Certified Behavior Analyst (BCBA) with expertise in functional analysis is highly recommended. Complex SIB cases will also require coordination with medical professionals to monitor for and treat potential injuries. Similarly, many individuals who engage in SIB are often taking psychotropic medications. Thus, collaboration with a psychiatrist is important so that changes in behavior due to medication recommendations can be monitored closely. This transdisciplinary approach to care recognizes that SIB likely has a myriad of causes related to genetic abnormalities, psychiatric, neurological, and motor dysfunction, as well as environmental variables, such as histories of reinforcement (Newcomb & Hagopian, 2018).

Principle C: Integrity

Psychologists should provide accurate and honest recommendations as it relates to assessing and treating SIB. All potential benefits and risks should be clearly explained to clients and their families.

Risks may include potential side effects related to certain procedures (e.g., extinction bursts, response reduction side effects), so that the process is transparent. Those individuals treating SIB should also describe the potential treatment expectations and coordinate with families in regard to practicality and feasibility of implementing the proposed treatment so that caregivers can prepare accordingly and make informed decisions during treatment planning. Professionals should also ensure that they can follow through with their commitments to treatment and training throughout all stages of the process. Training may also include coordinating the use of consistent procedures across other relevant professionals such as teachers or direct care staff.

Principle D: Justice

All professionals should strive to ensure equal access to assessment and treatment development for all patients regardless of race, religion, sexual orientation, disability, age, language, or socioeconomic status. If certain barriers exist (e.g., English is not the primary language, no insurance coverage), psychologists should refer families to more appropriate resources that meet the needs of the family if they are unable to support them. Professionals should also ensure that they are practicing within their scope of expertise and experiences when treating individuals with SIB. If they are faced with complex cases or cases related to medical complications, they should consult and collaborate with the appropriate experts.

Principle E: Respect for People's Rights and Dignity

All professionals should work with families and patients with utmost respect and dignity. Psychologists must obtain consent or assent from caregivers or guardians and the client prior to starting assessment and treatment procedures. Such consents should be voluntary and informational, whereby the individual and guardian are informed of the methods, risks, and effects of possible intervention procedures (Vollmer et al., 2011). When working with nonvocal individuals, professionals must consider alternative methods of communication (e.g., pointing to a picture or following the psychologist to the room) to demonstrate acceptance of therapy. Families should be afforded privacy and confidentiality as it relates to their care. Psychologists should provide culturally competent care by acknowledging individual differences based on race, ethnicity, age, gender, gender identity, sexual orientation, religion, language, socioeconomic status, and disability. Treatment recommendations should also be sensitive to cultural and personal factors. For example, when English is not a client's primary language, psychologists will use a translator when meeting with the family and provide written resources in the client's language (see Dowdy et al., 2021 for other strategies). Treatment for SIB often includes teaching a functional communication response; to that end, psychologists should consider whether the communication response is taught in English or the family's native language (e.g., Dalmau et al., 2011). If families are living in rural or underserved areas and not able to access treatment consistently, telehealth services may be offered (Wacker et al., 2013). In some cases, accommodations, such as providing access to iPads or wireless earpiece devices to assist with telehealth delivery, could be offered for families with limited socioeconomic status through grants or other funding when possible. Professionals should also seek out information from families to incorporate any religious or cultural differences within the assessment and treatment process when relevant (e.g., Neely et al., 2020). For example, in Orthodox Judaism, electronic devices should not be used on the Sabbath. If treating a child whose family observes the Sabbath, the treatment should not include electronic devices—including simple and common devices such as digital timers to keep track of reinforcement intervals. It is the psychologists' responsibility to educate themselves if they are not familiar with the cultural norms that may be relevant to their patient's treatment goals.

Special Section: Automatic Self-Injurious Behavior

Automatically maintained SIB (ASIB) describes SIB that occurs independent of social contingencies, and is thought to produce its own reinforcement. Other non-problematic behavior can also be automatically reinforcing (e.g., reading for pleasure, scratching an itch, thumb sucking). Approximately 20–25% of SIB is assumed to be maintained by automatic reinforcement (Iwata et al., 1994a, b; Kahng et al., 2002). It is often assumed that the reinforcement is some sort of sensory stimulation (e.g., pain attenuation), but the mechanisms are still largely unknown. The broader term "automatically maintained" has been suggested as some subtypes of ASIB could also be the product of motor or sensory dysfunction (Hagopian & Crawford, 2018).

Because the exact source of reinforcement usually cannot be identified, measured, or directly controlled, treatment for ASIB is more challenging. Specifically, extinction, or the termination of reinforcement for SIB, can be difficult or impossible to implement. The primary treatment approaches for ASIB include reinforcer competition, safety procedures, and response interruption procedures (i.e., punishment; LeBlanc et al., 2000; Vollmer, 1994). Response competition involves providing noncontingent access to competing stimuli. Stimuli are said to compete with the reinforcement ASIB produces if SIB is reduced in their presence (relative to when no stimuli are present). Competing stimuli can be empirically identified using a competing stimulus assessment (Haddock & Hagopian, 2020). Safety procedures include the use of protective equipment (pads, dressings, helmets), and arm splints or other devices that restrict engagement in SIB to prevent the body from injury and to allow injured areas to heal. Response reduction procedures may include response blocking to decrease the occurrence of SIB. These procedures can be effective in reducing ASIB, but some ASIB is still resistant to treatment. In an epidemiological report of 121 individuals with SIB, reinforcement-based procedures alone were effective for only 65% of individuals with ASIB, whereas reinforcement only was effective in treating over 90% of socially reinforced SIB cases (Iwata et al., 1994a, b). However, recently, ASIB has been subtyped based on response patterns of responding in the functional analysis across conditions where there are high and low levels of stimulation; and the presence of self-restraint, a self-limiting behavior not only prevents SIB but also interferes with appropriate behavior (feeding, playing, working) (Hagopian et al., 2015a, b, 2017).

Subtype 1 ASIB is characterized by SIB that is elevated in the no interaction condition (where there is low stimulation) relative to the play condition (high stimulation condition where there are toys and attention). For this subtype, SIB tends to occur when there is very little or no external stimulation suggesting it provides some type of sensory reinforcement. Treatment including NCR with competing stimuli (sometimes referred to as an enriched environment) is about as effective as reinforcement only treatment for socially maintained SIB (Hagopian 2015a, b, 2017).

Subtype 2 ASIB is characterized by SIB that is generally high in frequency and undifferentiated in the functional analysis (i.e., it occurs similarly across all functional analysis conditions). Such a pattern indicates that this subtype of ASIB is generally insensitive to environmental stimulation. Hagopian et al. (2015b) hypothesized that the potency or type of reinforcing consequences produced by SIB may differentiate Subtype 2 from Subtype 1 ASIB. It has also been suggested that Subtype 2 may be the product of sensory motor dysfunction (Hagopian & Crawford, 2018). Not surprisingly, Subtype 2 ASIB is highly resistant to treatment. Hagopian, Rooker et al. (2015b) reported treatment outcomes for 24 ASIB cases at a specialized program for severe problem behavior. Reinforcement alone was not effective for any Subtype 2 case. More intensive components, including restraint and punishment, were required. These results were also replicated in a review of published literature (Hagopian et al., 2017). It is possible that reinforcement alone may not be effective because individuals with Subtype 2 ASIB may not have the skills necessary to engage with competing items or never contact reinforcement from the competing stimuli due to the high-rate SIB. To address this possible issue, Hagopian et al. (2020) described an augmented competing stimulus assessment which involves actively promoting engagement with the test stimuli while blocking SIB to help individuals contact reinforcement available through engagement with toys and other leisure activities. Preliminary findings are promising, but further replication is necessary.

Subtype 3 ASIB co-occurs with self-restraint, a behavior that is incompatible with SIB because the individual restricts their own movement. Like SIB, the topography of self-restraint varies, but documented examples include tightly wrapping extremities in a blanket or clothes (e.g., Banda et al., 2012; Smith et al., 1996), placing stuffed animals or other materials between body parts (e.g., Rooker & Roscoe, 2005), sitting on hands (e.g., Scheithauer et al., 2015), and holding others' hands or objects (e.g., Vollmer & Vorndran, 1998). Some individuals even request mechanical restraint (e.g., Saposnek & Watson, 1974). To be categorized as Subtype 3 ASIB, self-restraint must occur during at least 25% of intervals during the functional analysis alone condition, and high rates of SIB must occur in the alone condition or across all conditions (Hagopian et al., 2015a, b). Although self-restraint may minimize injury from SIB, it can also cause its own injury (e.g., muscle atrophy, decreased circulation) and can limit daily activities (Smith et al., 1996). Prevalence estimates of self-restraint among individuals with SIB vary from 9% to 55% (Powell et al., 1996). One possible reason that self-restraint occurs is to escape or avoid aversive consequences produced by SIB (Fisher & Iwata, 1996). Therefore, SIB likely produces reinforcing consequences by one mechanism and aversive consequences by another. Hagopian et al. (2015a, b) reported that Subtype 3 was also highly resistant to treatment and required multiple and restrictive procedures to successfully decrease SIB. Systematic evaluation of treatment approaches for Subtype 3 is limited, but some published reports demonstrate that restraint fading combined with reinforcement-based procedures (e.g., competing stimuli) may be effective for individuals who engage in SIB and self-restraint (e.g., Pace et al., 1986; Rooker & Roscoe, 2005).

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Noncompliance

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David A. Wilder and Ronald J. Clark

Noncompliance – Chapter 61

Noncompliance in children can be defined as doing anything other than what is described in an adult-delivered instruction within a specific time frame (Kalb & Loeber, 2003). Compliance is the inverse of noncompliance, and may be a more preferred term because it requires behavior. Noncompliance doesn't meet the "dead person's test"; a dead person can be noncompliant (Malott & Suarez, 2004, p. 9). That is, depending on how it is defined, noncompliance may not require behavior. Nevertheless, the term noncompliance has a long history in the research literature and is frequently used by caregivers, so it will be used in this chapter. Although occasional noncompliance by young typically developing children and individuals with developmental and intellectual disabilities is common and generally not considered problematic in the long term, persistent noncompliance is correlated with a number of adverse outcomes later in life, including psychiatric diagnoses like oppositional defiant disorder and some personality disorders (Kalb & Loeber, 2003). It is also correlated with slow academic progress (Wehby & Lane, 2009). Compliance is an important skill to learn, because it may function as a behavioral cusp (Bosch & Fuqua, 2001), in that learning to comply makes learning other skills possible.

Noncompliance is among the most common childhood behavior problems (Kalb & Loeber, 2003) and is the most common complaint by parents to pediatricians at well-check visits (McMahon & Forehand, 2003). The prevalence of noncompliance among young children varies widely; estimates range anywhere from 25% to 65% (Kalb & Loeber, 2003). Of course, not all of these children exhibit persistent noncompliance. McMahon and Forehand (2003) reported that about 50% of parents of nonreferred 4- to 7-year-old children report noncompliance at home.

One inconsistency in the definition of noncompliance has been the required latency between instruction delivery and compliance. This post-instruction interval describes when children must initiate a response for their behavior to be considered compliant (Forehand et al., 1976). This interval has ranged from 5 s to 15 s. In an attempt to empirically identify an appropriate maximum interval, Wruble et al. (1991) analyzed compliance among 15 nonreferred preschool children interacting with their mothers during a semi-structured play session. These researchers found that on 85% of opportunities,

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children complied within 5.4 s of the parental instruction. Thus, they suggested about 6 s as the maximum post-instruction interval for a child to be considered compliant. More recently, Shriver and Allen (1997) assessed both referred (i.e., they were referred for behavioral health services) and nonreferred children interacting with their mothers. These researchers found slightly longer compliance latencies; the mean of all children was 5.9 s. Given the inconsistencies in the data and the recognition that variability in settings, instructions, and individuals is to be expected, many researchers allow 10 s for participants to comply (Lipschultz & Wilder, 2017).

Assessment of Noncompliance

The assessment of noncompliance involves describing the frequency of noncompliance, clarifying the conditions under which noncompliance occurs (e.g., the instructions which evoke it, and the people with whom it is likely) and, in some cases, experimentally manipulating the antecedent and consequent events that may support noncompliance to identify the operant function of the behavior. Assessment is conducted using at least one of three methods: informant or indirect assessment, direct or descriptive assessment, and experimental analysis.

Informant (Indirect) Methods

A common method of assessing noncompliant behavior in children and individuals with intellectual and developmental disabilities is indirect assessment. Indirect assessment is quick and easy; it yields information on noncompliance without the need for environmental manipulations or even direct observation of the child. Indirect assessments do not require the assessor to have direct contact with the individual engaging in noncompliance. Indirect assessments often take the form of questionnaires and interviews with a caregiver (Crowther et al., 1981; McMahon & Forehand, 2003; Umbreit & Blair, 1997). During informant-based assessment, the clinician gathers information on various aspects of the child's noncompliant behavior (e.g., frequency, magnitude, severity) by asking the caregiver to describe past events. Clinicians may rely on data from indirect assessments to analyze noncompliance due to the low levels of effort required to gather relevant information. These informant-based methods can provide valuable information about common low-probability tasks associated with the child's noncompliance (Borgen et al., 2017; Hodges et al., 2021).

Of course, informant-based assessments are not without limitations. First, this method provides only correlational information based on caregiver interpretation regarding what is "causing" the noncompliance. These data cannot be used to identify causal relationships. This limitation prohibits the identification of the function(s) of noncompliance (McMahon & Forehand, 2003). Nevertheless, clinicians may use the data from indirect assessments to develop initial procedures that could be useful in the treatment of noncompliance. The data gathered from informant-based assessments allows for a preliminary, although often incomplete, understanding of the variables that may be directly influencing behavior.

A second limitation is the validity of the information obtained via indirect assessment (Kanahara, 2009). Data collected from informant-based methods are subject to the interviewee's own perspective on the behavior, which can lead to concerns about the validity of the results (Fagot & Leve, 1998). To increase the likelihood of obtaining accurate information, clinicians should gather information from multiple caregivers when conducting an informant assessment.

Although indirect assessments have their limitations, they provide a solid foundation for further assessment. Clinicians often use data from these types of assessments to plan more direct and comprehensive follow-up assessments. When informant-based assessments are combined with additional assessments (i.e., direct and/or experimental), a more complete picture of the variables influencing noncompliance can be identified (Keenan et al., 1998; Stuesser & Roscoe, 2020; Wiskow et al., 2017).

Descriptive (Direct) Methods

Unlike informant-based methods, descriptive assessment of noncompliance requires the clinician to directly observe the behavior in a naturalistic setting (Kanahara, 2009). The clinician should observe the individual from a discrete location to avoid reactivity. Clinicians typically observe the individual when noncompliance is most likely to occur. During a direct assessment, the clinician collects data on the events occurring prior to each instance of noncompliance, as well as events occurring immediately following the emission of the behavior (Bijou & Baer, 1978).

There are several types of descriptive assessments used in the assessment of noncompliant behavior. The most common descriptive assessment is narrative or structured Antecedent-Behavior-Consequence (ABC) assessment. In this assessment, the clinician collects direct observation data on events which occur prior to the behavior's occurrence (i.e., antecedents), as well as events which occur following the behavior (i.e., consequences). This data collection continues until the clinician has collected data on several instances of the target behavior (Umbreit & Blair, 1997). The data are then analyzed by the clinician so that functions of the noncompliance can be hypothesized by evaluating patterns in the data. These descriptive methods can be conducted by following an unstructured (Ndoro, et al., 2006) or structured (Matas et al., 1978) methodology. During unstructured observations, the child and caregiver are instructed to play as they typically do at home. The clinician does not provide rules during the observation period which allows noncompliance to occur under completely natural conditions. Structured analyses are designed to occasion the target behavior. The caregiver interaction is natural, but predetermined scenarios are conducted during the observation period. These scenarios involve programmed antecedent arrangements that typically evoke noncompliance (e.g., asking the child to put away the toy they were playing with; Stephenson & Hanley, 2010). Once the antecedent event occurs, the caregiver is instructed to do what he or she typically does following noncompliance. The clinician collects data on the naturally occurring consequence following each instance of noncompliance. The structured assessment increases the likelihood that the target behavior will occur frequently during the observation period.

As examples of structured descriptive assessment, Wilder et al. (2020) conducted a brief structured assessment when evaluating modifications to the three-step guided compliance procedure to enhance compliance in two boys diagnosed with autism spectrum disorder (ASD). The experimenters implemented teacher-nominated instructions over a 30-min period to identify a target instruction to use during the treatment evaluation. During the assessment, no programmed consequences were provided contingent on the child's behavior. Similarly, Lipschultz et al. (2018) used a structured assessment to identify low-probability motor instructions and low-probability vocal instructions when evaluating the high-probability sequence to increase compliance. Following an indirect assessment of teacher identified low-compliance instructions, the researchers conducted a descriptive assessment to further identify instructions for the treatment evaluation.

The advantage of descriptive methods over indirect assessment is that data are collected as noncompliance occurs. This provides more insight into the noncompliant behavior and the events supporting it. However, descriptive methods, similar to indirect assessments, do not provide information on causality. Consequence-based manipulations are withheld during descriptive assessment, preventing identification of casual relationships between the behavior and the environment.

Experimental Analysis Method

Experimental analyses of noncompliance involve systematically manipulating environmental contingencies in order to identify the function of the behavior. Unlike indirect and direct assessments, experimental analyses allow for the identification of the "causes" of noncompliance. Clinicians can then develop interventions that directly target the variables maintaining noncompliance. Although some recent research has directly used experimental analysis, or functional analysis (FA), methodology in the assessment and treatment of noncompliance in children, more research is needed.

Stuesser and Roscoe (2020) conducted an indirect assessment and an FA to address noncompliance during medical routines in four children with ASD and intellectual disabilities. The FA included two test conditions (i.e., medical demand and nonmedical demand) as well as a control condition. The conditions were implemented in a multielement design in rotating order (i.e., medical demand, no interaction, nonmedical demand). In the medical demand condition, the researchers presented the medical exam task via brief vocal statements. Compliance resulted in praise, while disruptive behavior resulted in a 30-s break. The nonmedical demand condition was identical to the medical demand condition with the added exception that a three-step prompting sequence was implemented for completing the demand. The no attention condition began when the researcher stated that she was unavailable and ignored the child for the remainder of the session. The results of the FA showed that all participants' noncompliance was maintained by escape from the medical demands. Intervention components included combinations of differential reinforcement and stimulus fading to decrease disruptive behaviors and increase medical compliance.

Briggs et al. (2019) evaluated the effects of differential reinforcement of alternative behavior (DRA) without extinction for noncompliance. In this study, percentage of compliance was a primary dependent variable and defined as "correctly responding to the therapist's instruction within 5 s of a vocal or model prompt in the absence of disruptive behavior." Four children, aged 4–16 years old, diagnosed with an intellectual and developmental disability, served as participants. Briggs et al. implemented a latency-based FA to determine the variables maintaining noncompliance among the participants. Each session was a maximum of 5 min and was conducted across six conditions which included divided attention, play, social avoidance, escape, tangible (leisure item), and tangible (edible item). Additionally, for one participant, indirect assessment suggested that noncompliance was a result of social-negative reinforcement, so a social avoidance condition was included. All stimuli included in all conditions were specific to the participants and were identified through open-ended caregiver interviews and direct observations. For three of the four participants, latency to disruptive behavior resulting in noncompliance to demands was shorter in the escape condition, identifying escape from demands as the function of their problem behavior. For the remaining participant, all conditions produced a lower latency to disruptive behavior, suggesting all potential reinforcers were maintaining the disruptive behavior leading to noncompliance.

Majdalany et al. (2016) conducted a study examining the antecedents and consequences leading to noncompliance. Two phases were conducted to systematically isolate both antecedent and consequence variables across two young children. In the first phase, the researchers evaluated whether noncompliance was a result of a skill deficit. In this assessment, the experimenter required participants to touch items in an array when delivering the mand (instruction), "Touch the [item]." Following this, the experimenter evaluated whether the participants could accurately respond to the verb presented in the demand. This was done by measuring compliance of the demand across three separate verb frames. This was assessed by altering the demands presented to the child (e.g., "give me the [item]," "bring me the [item]," and "go get me the [item]"). The results of the antecedent compliance assessment suggested that for one participant, noncompliance was due to a skill deficit, but for the other participant, noncompliance was not due to poor stimulus control or a skill deficit, so a FA was conducted. During the FA, the experimenter conducted both a tangible and control condition. In the tangible condition, the experimenter asked for the item. If the child relinquished the item, the experimenter said "thank you" and held the item out of view for 10 s before returning it after 1 min. Noncompliance resulted in the child keeping the item. In the control condition, the experimenter directed the child to "go get the item." If the child complied they were allowed access to the item for 1 min., however, if they engaged in noncompliance, there were no programmed consequences. The results of the FA showed that compliance was at 100% during the control but dropped to 13.3% during the tangible condition. Following the FA, a function-based intervention was developed to increase compliance.

Wiskow et al. (2017) evaluated generalization of compliance across response types. Specifically, they incorporated both indirect and FA methods to assess participants' noncompliance. Three children between the ages of 5 and 6 years served as participants. Two of the participants were diagnosed with ASD. Researchers initially used open-ended interview questions addressing common antecedents and common consequences for their child's noncompliance. Following this information, a FA was conducted for each participant. The FA was inconclusive for two of the participants; it did not produce a clear function for the noncompliance. For these children, the treatment was not based on the results of the FA, but rather, the baseline contingencies were developed based on the results of the caregiver interviews and anecdotal information. For the third participant, the results of the FA indicated that noncompliance was maintained by access to attention. When assessing generalization across response types, the researchers presented the generalization probes across gross motor demands, gestural demands, and vocal demands. Following increases to compliance using DRA, generalization probes showed successful generalization of compliance within response types for one participant and across response types for two participants.

Wilder et al. (2007a) assessed and treated noncompliance among children who had been reported to be noncompliant by their preschool teacher. The researchers initially nominated the student's teachers to choose an activity in which the child seldom complied. Both teachers chose picking items off the floor. Instructions to turn on and off a video were also chosen to be included in the FA and treatment evaluation. The FA was conducted using three conditions in a multielement design: a preferred activity condition, a nonpreferred activity condition, and a control condition. In the preferred activity condition, the therapist instructed the child to "turn off the video." If the child complied, the participant gained access to other low-preferred activities. If the participant did not comply, there were no programmed consequences. This condition tested for maintenance of noncompliance by positive reinforcement. In the nonpreferred condition, the child had access to low-preferred activities and the therapist delivered the instruction, "pick up the papers from the floor." Compliance to the instruction resulted in access to the low-preferred items, while noncompliance resulted in no programmed consequences. In the control condition, the child had access to the low-preferred items and was instructed to "turn on the video." Compliance resulted in access to the video and noncompliance produced access to the low-preferred items only. Both participants demonstrated the highest levels of noncompliance during the preferred activity condition, which suggested that the behavior was maintained by positive reinforcement in the form of access to the video. Treatment consisted of differential reinforcement and a token system in which compliance earned participants a coupon to gain access to a 3-min period of uninterrupted video access.

Rodriguez et al. (2010) implemented a FA to evaluate the effects of attention and escape on noncompliance in three children identified by teacher reports of noncompliance. The instruction delivered to participants was to place paper into a trash bin. All sessions were 5 min in length and consisted of ten 30-s trials. During the attention condition, if the child engaged in noncompliance, the therapist presented attention in the form of verbal reassurance while simultaneously guiding the child to finish the task. In the escape condition, contingent on noncompliance, the therapist removed the task for the remainder of the trial. For all three participants, levels of noncompliance were higher in the attention condition than the escape condition. This study did not implement a treatment evaluation following the FA.

Finally, McKerchar and Abby (2012) conducted an FA of noncompliance for two children. In the FA, McKerchar and Abby utilized a multielement design to compare an attention and an escape condition. These conditions were compared to control conditions in which the contingencies were reversed by allowing noncompliance to occur. During the FA, the therapist presented the child a matching task by placing a sample stimulus (e.g., picture of a cow) in front of the child with two comparison stimuli (e.g., picture of a cow and a picture of a goat). The therapist prompted the child to match the pictures. During the attention condition, if the child engaged in noncompliance, the therapist provided additional attention in the form of encouragement. During the escape condition, if the child engaged in noncompliance, the therapist removed the materials and their attention for 30 s. The results of the FA for both children demonstrated higher levels of noncompliance in the escape condition than the attention condition, suggesting that their noncompliance was maintained by negative reinforcement. A functionally equivalent treatment, escape extinction, was shown to be more effective at treating the participants' noncompliance than a time-out procedure.

Other studies have conducted functional analyses targeting noncompliance as well. Call et al. (2004) conducted an FA for multiple participants to determine the variables maintaining noncompliance. Their study was divided into two experiments separating the antecedent variables to which participants were exposed. In Experiment 1, conditions included demands with altering exposure to parental attention. Experiment 2 extended Experiment 1 by altering the effects of the demand task with parental attention (i.e., amount and difficulty). Kang et al. (2011) used FA procedures developed by Iwata et al. (1982/1994) to conduct an FA of challenging behavior (including noncompliance) across seven children with developmental disabilities. Reimers et al. (1993) also conducted a study utilizing FA procedures to identify maintaining variables of noncompliance across six participants (*M* = 5 years, 1 month). Similar to previous studies, Reimers et al. implemented a control, attention, and escape condition when assessing noncompliance.

Interventions to Increase Compliance

Interventions to increase compliance can be categorized into antecedent-based procedures and consequence-based procedures. Antecedent-based procedures include teaching precursor behaviors, changing the form of the instruction, providing advance notice of an instruction, manipulating the response effort involved in compliance, and the high-p instructional sequence. Consequence-based procedures involve differential reinforcement, guided compliance, and time-out.

Antecedent-Based Interventions

Teaching Precursor Behaviors Precursor behaviors are behaviors that a child exhibits that are correlated with compliance (Beaulieu & Hanley, 2014). These include stopping, orienting to the person delivering the instruction, making eye contact, and saying “Yes” after an adult calls a child's name (Hanley et al., 2007). Kraus et al. (2012) taught children to exhibit precursor behaviors using modeling and differential reinforcement before an instruction was delivered. The training was effective; participants exhibited the precursor behaviors more often. In addition, compliance increased even though the consequences for compliance were unchanged.

Beaulieu and colleagues conducted a series of follow-up studies examining the effectiveness and social validity of precursor behaviors. For example, Beaulieu et al. (2012) evaluated the effect of teaching precursors to a classroom of children. Beaulieu et al. (2013) replicated and extended previous research by evaluating peer mediation to increase the maintenance of the precursors taught. Participants were taught to prompt precursor behaviors among their peers and to praise peer precursor behavior when emitted. Beaulieu et al. (2014) then examined the use of precursors to teach multistep instructions as opposed to single instructions. The participants learned the precursors, and their use was effective to increase compliance to multistep instructions. The authors also used peer mediation, which was again effective to maintain precursors. Many of these studies also evaluated the social validity of teaching precursors. Teachers rated the procedures as acceptable and noted that they would use the procedures with other students.

Changing the Form of the Instruction Interestingly, the form of the instruction delivered by caregivers has been shown to affect noncompliance. Two broad types of instructions have been described. Alpha instructions are often more effective, while beta instructions are generally less effective (Forehand & Long, 2002). Alpha instructions are short, direct, one-step commands followed by a 5-s post-instruction interval. Beta instructions come in a number of forms, including multiple-step directions, vague commands, instructions in the form of a question, instructions which include the word “Let’s,” and instructions followed by a rationale. Numerous studies have shown that alpha instructions are more effective than beta instructions to increase child compliance (Forehand & Long, 2002). In addition, researchers have described the steps which should be taken when delivering alpha instructions. First, the caregiver should make eye contact with the child. Stephenson and Hanley (2010) found that establishing eye contact before instruction delivery increased the probability of child compliance.

Other researchers have examined instructions involving asking a child to do something (e.g., “Walk”) versus refrain from doing something (e.g., “Don’t run”). Neef et al. (1983) suggested that compliance with “do” instructions may be more likely than compliance with “don’t” instructions, due in part to a longer history of reinforcement for compliance to “do” instructions. Ducharme and Worling (1994) provided evidence to support this assertion. These researchers examined both “do” and “don’t” instructions to increase compliance by two children. For one participant, both types of instructions were effective. However, for the second participant, only “do” instructions evoked compliance. Houlihan and Jones (1990) also report that “do” instructions were generally more effective than “don’t” instructions to increase compliance by three children.

Providing a rationale or reason for compliance (e.g., “Clean up your room because your father will be home soon”) is a form of beta instruction. Indeed, research has suggested that rationales are ineffective to increase compliance in many cases. Wilder et al. (2010a) evaluated rationales delivered both before and after an instruction. The researchers found that the delivery of rationales did not increase compliance. In fact, in some cases, the rationale evoked additional problem behavior. Rationales may be ineffective because they distract the child from the instruction itself. In a follow-up study, Wilder et al. (2012b) again evaluated rationales and found them to be ineffective. A guided compliance procedure was implemented, which was effective. Despite these data suggesting that rationales may not increase compliance, some parenting books still recommend the use of rationales to increase compliance, at least under some conditions (McMahon & Forehand, 2003).

Providing advance notice of an instruction or a transition is sometimes used in an attempt to increase compliance. Information about when the instruction is to be delivered is often included in the advance notice statement (e.g., “In two minutes, I am going to ask you to give me the toy”). Research on the effectiveness of advance notice to increase compliance is mixed. Advance notice has been found to be effective to decrease stereotypy exhibited by an adult with autism (Tustin, 1995). The stereotypy interfered with the participant's compliance to other instructions, so the procedure was indirectly effective to improve compliance. However, advance notice has been found to be ineffective in a number of other studies, when increasing compliance was the specific target. For example, Cote et al. (2005) evaluated advance notice to increase compliance among preschool children. The procedure was ineffective; a guided compliance procedure was necessary to increase compliance. Wilder et al. (2010b) evaluated advance notice among slightly older children. Participants were given advance notice of a transition during which they had to relinquish a toy. Advance notice was delivered 2 min and 1 min before the transition. Advance notice was ineffective to increase compliance; all participants required the addition of a guided compliance procedure to improve compliance. Wilder et al. (2007b) found similar results.

Manipulating Response Effort Another antecedent-based intervention that has been evaluated to increase compliance involves decreasing the effort required for the child to do what is requested in the instruction. Fischetti et al. (2012) asked children to put their toys in a toy bin. The participants had to travel various distances (i.e., 0.3 m and 3 m) to comply with the instruction. For one participant, compliance increased in the short distance phase relative to the long distance phase. The researchers then systematically increased the distance required to comply with the instruction until the participant complied at 3 m. However, for two additional participants, the distance required to comply with the instruction had no effect on compliance. The researchers added differential reinforcement plus a guided compliance procedure, which increased compliance for these two participants. Given the lack of research on response effort manipulation and the mixed findings in the one existing study on this topic, caregivers and clinicians might rely on alternative procedures.

High-Probability Instructional Sequence The high-probability instructional sequence, also known as the high-probability request sequence, the high-probability command sequence, or simply the high-p sequence, is one of the most widely used interventions to increase compliance (Belfiore et al., 2007; Lipschultz & Wilder, 2017). The high-p sequence involves the presentation of a series of high-probability instructions immediately followed by the presentation of a low-probability instruction (Mace et al., 1988). Mace et al. (1988) conducted a series of studies in which they evaluated the high-probability sequence with four participants. These researchers found that the high-probability sequence was effective, and that it decreased latency to task initiation and decreased the duration of tasks performed by participants. Mace et al. proposed that the high-probability sequence is effective due to behavioral momentum (Nevin et al., 1983). Behavioral momentum is a metaphor for momentum in physics, in which objects gather speed as they roll down a hill, for example. Behavioral momentum is the tendency for behavior to maintain following a change in environmental contingencies (Mace et al). More specifically, behavior momentum suggests that increasing the rate of reinforcement in a specific context (i.e., in the presence of specific discriminative stimuli) results in greater response strength or more resistance to change in that context (Nevin & Grace, 2000). When it is effective, the high-probability sequence works because multiple instances of the child's compliant behavior have been reinforced immediately before presentation of a low-probability instruction so the likelihood of compliance with the low-probability instruction is increased.

Lee (2005) conducted a meta-analysis of studies evaluating the high-probability sequence from 1987 to 2001. He concluded that, although the high-probability sequence is generally effective, it is less effective for adults with disabilities relative to other populations. This could be because most adults have a longer history of reinforcement for noncompliance than do children. Thus, adults may be more resistant to all interventions to increase compliance, including the high-probability sequence.

Recent research on the high-probability sequence has focused on identifying critical components of the sequence. For example, the ideal number of high-probability instructions has recently been examined. Ertel et al. (2019) compared the effects of the high-probability sequence with one, three, and five high-probability instructions. The low-probability instructions remained constant across conditions. These researchers found that the 5 (low-probability instructions) to 1 (high-probability instructions) ratio was most effective for two of three participants.

Another component of the high-probability instructional sequence which has recently been examined is the inter-instruction interval. Although previous research (e.g., Mace et al., 1988) suggested that shorter intervals were more effective, more recent research has examined inter-instruction intervals in more detail. For example, Pitts and Dymond (2012) found that very short inter-instruction intervals (i.e., 1–3 s) was effective. Wilder et al. (2015) replicated this finding; these data suggest that very short inter-instruction intervals are ideal.

A third component of the high-probability instruction sequence that has been examined is the quality of reinforcement delivered contingent upon compliance with each high-probability instruction. Wilder et al. (2015) compared the delivery of a low-quality reinforcer (i.e., praise for the participants in this study) for compliance with high-probability instructions to the delivery of a high-quality reinforcer (i.e., an edible item for the participants in this study). They found that the high-quality reinforcer was more effective to increase compliance with the low-probability instruction.

A fourth component of the high-probability instruction sequence that has been examined is the topographical similarity of the high-probability and low-probability instructions. High-probability instructions which are topographically similar to the low-probability instruction may be more effective to increase compliance with the low-probability instruction. Meier et al. (2012) evaluated the high-probability sequence to increase food consumption in a young child with a disability. The high-p instruction involved asking the child to take a bite of a preferred food. The low-p instruction involved a request to take a bite of a low-preference food. Thus, the topography of the instruction and the response required in the high-p instructions was identical to that required in the low-p instructions. The procedure was effective to increase food acceptance. However, outside of the context of the treatment of food refusal, research has shown that the topographical similarity between the low-probability instructions and the high-probability instruction may be less important (Lipschultz et al., 2018).

Despite evidence supporting the high-probability sequence, it has been found to be ineffective in some cases. Wilder et al. (2007b) evaluated the high-probability sequence, along with other antecedent interventions, to increase compliance among young children. The procedure was ineffective; a guided compliance procedure was necessary to increase compliance. Rortvedt and Miltenberger (1994) also found that the high-probability sequence was ineffective; these researchers found that a time-out procedure was necessary to increase compliance.

Consequence-Based Interventions

Differential Reinforcement Differential reinforcement involves delivering (more) reinforcement for compliance, while delivering less (or no) reinforcement for noncompliance. Differential reinforcement is commonly used to increase compliance, and has been shown to be effective. A variety of reinforcers have been delivered contingent upon compliance, including praise and attention (Schutte & Hopkins, 1970), tokens (Wilder et al., 2007a), and preferred food (Wilder et al., 2015). When deciding what to deliver contingent upon compliance, clinicians should first interview caregivers and clients about their preferences and then assess the items and activities identified in a stimulus preference assessment (Fisher et al., 1992).

In many cases, extinction for noncompliance is added to differential reinforcement for compliance. Extinction involves breaking the response–reinforcer relationship. For example, if noncompliance is maintained by escape from the task described in the instruction, the parent or clinician would provide reinforcement for compliance with the instruction, and not allow the child to escape the task. This might require re-presenting the task or prompting the child to complete the task. Attention and praise are common caregiver-provided consequences; unfortunately, researchers suggests that parents often provide reinforcement (in the form of attention) for noncompliance and do not provide attention for compliance (Ndoro et al., 2006).

Ideally, the function of noncompliance would be identified before using differential reinforcement. That way, the functional reinforcer could be delivered contingent upon compliance. If the functional reinforcer cannot be delivered, a stimulus preference assessment should be conducted to identify the child's most preferred item or activity, which should then be delivered contingent upon compliance.

Guided Compliance Guided compliance generally involves three steps. The first step is delivery of the instruction. If the child complies within 10 s, the caregiver provides praise. If the child does not comply within 10 s, the caregiver presents the second step. The second step involves re-presenting the instruction while simultaneously modeling performance of the task presented in the instruction. If the child complies within 10 s, the caregiver provides praise. If the child does not comply within 10 s, the caregiver presents the third step. The third step involves re-presenting the instruction while simultaneously guiding the child to comply with the task presented in the instruction. A most-to-least prompting hierarchy is used during guidance. That is, the caregiver begins with hand-over-hand prompting. If the child begins to perform the task, the caregiver fades to a touch prompt and then a gestural prompt.

Guided compliance was introduced by Horner and Keilitz (1975) and has perhaps become the most effective intervention to increase compliance. Wilder and Atwell (2006) evaluated the guided compliance procedure to increase compliance among six children. The procedure was effective for four of the six participants. However, the researchers noted that the guided compliance procedure might have been effective for all participants had they implemented it for a longer duration. A differential reinforcement procedure was necessary to increase compliance for the remaining two children.

Recently, modifications to the guided compliance procedure have been evaluated. For example, Wilder et al. (2012a) evaluated two changes to the procedure. These researchers evaluated the standard guided compliance procedure initially. If it is was ineffective, they evaluated two modifications. The first modification was the elimination of the model prompt. This modification was effective for one participant. The second modification was a reduction in the inter-prompt interval from 10 s to 5 s, which was also effective for one participant. The researchers posited that the elimination of the model prompt was effective because some children don't need a model of the task described in the instruction; they already know how to perform the task. For these children, the model prompt simply delays physical guidance, which may be necessary to increase compliance. The reduction in the inter-prompt interval may also be effective because it results in a decrease in the time to physical guidance. Wilder et al. (2020) evaluated a third modification to the guided compliance procedure; they examined the addition of access to a preferred item contingent upon compliance with the first vocal prompt. The researchers showed that this modification was more effective than the standard guided compliance procedure for the two children who participated in the study.

Time-Out Time-out from positive reinforcement (or simply time-out) involves removing the child from a reinforcing environment contingent upon noncompliance. To be effective, the environment from which the child is removed must be preferred. Also, if the function of noncompliance is escape, the use of time-out is contra-indicated. That is, if the child is engaging in noncompliance in order to avoid or escape the task described in the instruction, delivering a time-out might inadvertently strengthen noncompliance because the child is avoiding or escaping the task described in the instruction. Thus, the utility of time-out for noncompliance is limited to noncompliance maintained by access to attention or tangible items.

Time-out is sometimes added to differential reinforcement or other interventions if they are not effective in isolation. For example, Rortvedt and Miltenberger (1994) evaluated time-out to increase compliance after the high-probability instructional sequence was ineffective. In this study, the parent placed the child in a chair in a different room contingent upon noncompliance. The child was required to remain in the chair for 1 min.; the time-out was effective to decease noncompliance. An alternative form of time-out involves removing preferred items and people from the room (instead of the child) contingent upon noncompliance.

Conclusions

Noncompliance is common among young children and individuals with intellectual disabilities and is a frequent concern among parents seeking mental or behavioral health services for their children (McMahon & Forehand, 2003). As described in this chapter, assessment and intervention techniques have been developed to address it. Assessment techniques include informant methods, descriptive methods, and experimental or functional analysis. Intervention techniques include both antecedent- and consequence-based procedures.

Future research on the assessment of noncompliance should focus on the use of indirect and experimental assessments to identify the conditions under which noncompliance is most likely to occur (Lipschultz & Wilder, 2017). Research on descriptive assessment has been conducted, but comparatively less research has focused on informant and experimental methods. Informant methods of assessment might be most socially valid.

Relative to consequence-based interventions, antecedent-based interventions for noncompliance have received more research attention. That may be because they are often easier to implement and may be more socially valid. Indeed, in some settings (e.g., schools), adults may not be permitted to use some consequence-based procedures (e.g., guided compliance). However, for some individuals, consequence-based procedures may be the only effective intervention. Thus, future research on interventions to address noncompliance should focus on identifying effective, but socially valid interventions which can be implemented in a variety of settings. For example, perhaps some consequence-based interventions, such as guided compliance, can be modified so that they are more socially valid (e.g., see Wilder et al., 2020).

Another topic for future research on noncompliance is to examine the maintenance and generalization of intervention procedures. Very few studies have examined the extent to which interventions for noncompliance generalize across settings and individuals implementing the procedures (Lipschultz & Wilder, 2017).

Finally, future research should examine interventions for noncompliance exhibited by the same person and maintained by multiple sources of reinforcement. A variety of interventions may be necessary to adequately address this type of noncompliance.

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39

Trichotillomania (Hair-Pulling Disorder)

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Introduction

The relationship between the central nervous system and the skin dates back to its common embryological origin, but historical descriptions of the disorder may appear in texts by Aristotle and Hippocrates, in the Bible, in works of art, or in literary works such as Romeo and Juliet (Kim, 2014; Waas & Yesudian, 2018). The occurrence of the illness has been described in moments of outburst or great tension and stress (Franca et al., 2013), and as an expression of disappointment and frustration (Waas & Yesudian, 2018).

The term trichotillomania was coined by the French dermatologist Francois Henry Hallopeau (Hallopeau, 1889) to refer to pulling one's hair, which results in a notable loss of it. For all of us, hair represents an aspect of individuality, identity, and appearance, so it becomes a focus of attention when patients tug their hair repeatedly to the point where it is evinced by areas of absence of hair on the scalp.

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Concept

Trichotillomania is a debilitating mental disorder, currently included in the obsessive-compulsive spectrum, characterized by recurrent hair pulling, leading to significant hair loss and functional impairment in various areas of daily life (academic, social, relational, among others) (Torales et al., 2021).

Although the description of the disorder in the scalp is more frequent, it can also appear in the pubic area (Piquero-Casals & Morgado-Carrasco, 2020), the eyelids (Smith, 1995), and any region populated by hair (Minichiello et al., 1994) or more curiously, only be associated with sleep (9). It can also involve more than one area of the body (Minichiello et al., 1994).

Epidemiology

People who pull their own hair and leave areas uncovered may experience discomfort and avoid social situations and consultations (Miltenberger et al., 2006), so there may be an underreporting in the illness data.

Initially included in the DSM-III-R in 1987, it was added to the chapter of impulse control disorders in the DSM-IV in 1994 (Minichiello et al., 1994) and is currently within obsessive-compulsive and spectrum disorders in the DSM-5 (American Psychiatric Association, 2013). Categorical changes are related to an evolution in the understanding of this disorder. This subject will be expanded upon in the section “Clinic” of this chapter.

A lifetime prevalence of 1–3% is described. Frequently beginning in childhood, with an average age of onset between 5 and 13 years, the proportion in terms of its appearance by sex is usually equal in children, but as they advance in age the difference is inclined towards women with rates that can be up to 10 times higher with respect to males (Stein et al., 2005; Stewart et al., 2018; Torales et al., 2019). Trichotillomania can precede comorbid mental disorders, such as anxiety and disruptive behavior disorders, which are observed mainly in children and adolescents, so its presence takes on added value, in terms of evolution (Torales et al., 2021).

Etiopathogenesis

Like excoriation disorder, it is within the group of repetitive body-oriented behaviors (Torales et al., 2021), included within the spectrum disorders of obsessive-compulsive disorder (OCD) with which it shares overlapping characteristics, although most of the data still come from preliminary studies (Stewart et al., 2018).

There is a familial component, in those people with a family history of trichotillomania, there is a greater chance of recurrences in terms of hair pulling (Grant & Chamberlain, 2016).

In the early 1990s, trichotillomania was hypothesized to be part of the OCD spectrum due to levels of comorbidity, response to drugs such as clomipramine, familiarity, and the phenomenology of the disorder. This hypothesis has expanded the construct to a spectrum of excessive and inappropriate grooming behaviors (Swedo & Leonard, 1992).

As in OCD (Zhu et al., 2015), there is evidence of glutamatergic dysfunction in the cortico-striatal-thalamic-cortical (CSTC) pathway. Symptoms of trichotillomania are associated with increased excitatory metabolism in the pregenual anterior cingulate cortex (pACC) and in the thalamus. The effectiveness of behavioral therapy in relieving the symptoms is associated with the suppression of the activity of the direct CSTC pathway (Peris et al., 2020). The anterior cingulate cortex (ACC) is involved in cognitive control, and it is part of an emotional and sensorial information processing network. If this region acts through an inhibitory emotional control (slowing down emotions) both consciously and unconsciously, an initial unconscious emotion produced by the amygdala would necessarily require of attention, here is where the center of attention, the thalamus, intervenes. In practical terms, the patient, after a stressful and tiring day, is watching television fully immersed in this activity, then almost automatically, they start playing with their hair and notice irregularities in its structure from the root to the tip, which is why they pull it and examine it. The previous emotional state of the patient precedes the change in the attentional focus to another area, the hair. Now that attentional resources have been recruited and the stimuli have entered through the cortex, the CSTS circuit is activated. Therefore, the ACC, as a bridge in this circuit, processes the information, detects an increase in the reward and a decrease in the effort threshold (due to repetition), and plans a response. The cortex initiates an action.

Trichotillomania is conceptualized by some authors as a spectrum of stereotyped or self-injurious conditions (Stein et al., 2005), as a way of distinguishing it from the common aspects of OCD. The neuroimaging studies indicate there is a decrease in volume in the left putamen, not in the caudate, which is consistent with the more motor nature of hair pulling (Stein et al., 2005). In a case series that examined brain changes, patients with trichotillomania showed increases in gray matter density in various brain regions involved in the regulation of affect, motor habits, and top-down cognition (i.e., left caudate/putamen, left hippocampal-tonsil formation, bilateral cingulate cortices, and right frontal) compared to controls (Grant & Chamberlain, 2016).

The evidence about structural changes in the brain from imaging studies is growing, there is evidence of increased thickness of the cortex in the lower right frontal gyrus when compared with healthy controls of the same age, sex, and level of education regardless of the severity of symptoms, measured with the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), and these findings differ from those of OCD (Chamberlain et al., 2018). Changes in the structure could also depend on the mentioned vulnerability and the chronicity of the disease (Grant et al., 2020b).

An interesting pathway comes from animal models in which genetic alterations in SAPAP3 are manifested clinically as compulsive excessive grooming behaviors, increased anxiety, and response to selective serotonin reuptake inhibitors (SSRIs) (Welch et al., 2007). The human counterpart of the Sapap3 gene is the DLGAP3 gene, which encodes proteins that participate in glutamatergic neurotransmission at the postsynaptic membrane level, its alteration has been linked to the OCD spectrum, as well as other psychiatric disorders (Rasmussen et al., 2017). Table 39.1 summarizes some aspects of etiopathogenesis (Chamberlain et al., 2018; Grant et al., 2020b; Grant & Chamberlain, 2016; Peris et al., 2020; Rasmussen et al., 2017; Stein et al., 2005; Stewart et al., 2018; Torales et al., 2019, 2021; Welch et al., 2007; Zhu et al., 2015).

The psychological theories regarding the disorder are varied, some of them referring to loss or separation in childhood, specific types of parents, or neurotic conflicts and internalizing disorders (Torales et al., 2019); others describe the disorder as a behavioral response to negative and unwanted emotions (Anwar & Jafferany, 2019). There is evidence showing that people with hair-pulling behaviors have more difficulty regulating their emotions when compared to healthy controls, which lends credit to the hypothesis that this conduct allows individuals with tendencies toward perfectionism to modulate their emotions and to relieve tension (Torales et al., 2019).

The etiology of trichotillomania is still in the initial stages of study and understanding, although the manifestations are not recent.

Table 39.1 Etiopathogenesis of trichotillomania

Antibodies are generated after a group A β-hemolytic streptococcus infection cross-reacts with neurons, forming antineuronal antibodies. These, at the level of the basal ganglia, can cause behavioral disturbances. This is probably due to a genetic predisposition to specific immune responses to different antigens.
Research has shown dysfunctions in the serotonin and dopamine systems, with genotypic and allelic variants in the distribution of the serotonin 5-HT2A receptor among patients with trichotillomania and people without the disease. Likewise, there is evidence that patients have some response to treatment with selective serotonin reuptake inhibitors and dopamine blockers.
Brain structural abnormalities have been reported, since patients with trichotillomania present a decrease in the volume of the putamen, right ventricle, and cerebellum.
Added to structural abnormalities are abnormalities in brain function, with an increase in glucose metabolism in both cerebellar hemispheres and in the upper right parietal region being observed in some patients.
Research suggests the existence of mutations in the SliTrk5 gene, which is involved in the formation of neuronal connections. These mutations have been shown to generate abnormal neuronal connections, which could lead to trichotillomania. Likewise, alterations in the SAPAP3 gene are associated with hair pulling in humans.
Lastly, a dysfunction of endogenous opioid activity also appears to be involved in the pathophysiology of trichotillomania.

Signs and Symptoms

In 1939, perhaps one of the first case series of patients who pulled their own hair was published, although its description was more focused on trichophagia, one of the complications it can lead to. Most of the subsequent data have come from case reports (Stein et al., 2005).

Although its appearance at younger ages is not uncommon (Torales et al., 2021), the mean age of onset is between 10 and 13 years (Anwar & Jafferany, 2019). Children may not have the emotional expressiveness and the awareness skills necessary to report this type of phenomenon, so they depend on other informants to report it (Torales et al., 2019).

Pulling out hair at an early age can spontaneously fade over time, without any intervention (Stein et al., 2005). The duration of the disorder can be variable, from 3 (King et al., 1995) to even 21 years (Grant & Chamberlain, 2016), so its early diagnosis and intervention are essential to reduce morbidity and more frequent complications.

Trichotillomania was not listed as a mental health disorder in the Diagnostic and Statistical Manual of the American Psychiatric Association until DSM-III-R (1987), when it was classified as an unspecified impulse control disorder. In the fifth edition of the DSM (DSM-5) (American Psychiatric Association, 2013), trichotillomania was included in the chapter of OCD and related disorders along with the excoriation disorder, body dysmorphic disorder, and hoarding disorder. Patients affected by trichotillomania repeatedly pull out their hair, resulting in hair loss, and with marked impairment in various areas of personal functioning. Also, patients repeatedly attempt to decrease or cease behavior without any success. Hair-pulling behavior or hair loss cannot be attributed to another medical condition (e.g., a dermatological condition) or to any another mental disorder (e.g., body dysmorphic disorder) (American Psychiatric Association, 2013).

Since its inception within the impulse control disorder, with the description of the irresistibility of the impulse to pull out hair, the concept has been modified by finding different patterns in practice. Christenson and Mackenzie (Christenson & Mackenzie, 1994) identify two types of patterns according to a person's behavior when pulling hair: "centered," in which the person does it intentionally, or "automatic," in which the person does it unconsciously. The degrees to which people are "focused" or do so "automatically" vary (Flessner et al., 2008).

Flessner et al. (2008) provide some examples of automatic behaviors, such as pulling while performing some sedentary activity, such as driving, reading, or watching television. Here, the pull is not recognized until it has been in progress for some time or has been completed. In focused behaviors,

Table 39.2 Main precipitants of trichotillomania

Hair factors	Hair visual or tactile factors (color, shape, texture, etc.).
Lifestyle	Sedentary lifestyle, watching television, reading, talking on the phone, homework lying down, etc.
Emotional aspects	Situations of psychosocial stress, irritability, altered relationship with parents (especially with the main attachment figure, usually the mother), hospitalization of patient or relatives, parents' divorce, birth of a new brother/sister, sibling rivalry, address changes, school problems, physical or sexual abuse.
Physiological aspects	Menarche, menstrual cycle, pregnancy.
Addictions	Some evidence of association with cocaine use.

episodes appear in which the person actively looks for hairs to pull, such as those that are irregular in their path, or consciously pulls in response to some negative emotion or event (for example, anxiety, stress, depressive feelings). Some investigators have hypothesized that "concentrated" traction distracts an individual from unwanted thoughts and/or feelings and is frequently associated with the criteria of reduced need and stress necessary to confer a diagnosis (Flessner et al., 2008). This difference gives much more value to the triggers when questioning patients and future psychotherapeutic interventions. To emphasize, in a sample of Italians, the legs are the most frequent region from which they pull their hair, Italian men do it more frequently while driving, unlike women (Bottesi et al., 2016b), knowing this allows the therapist to develop training.

In Table 39.2, the main precipitants of trichotillomania are cited (Torales et al., 2019).

The clinical interview is the gold standard for the diagnosis of trichotillomania. On examination of the patient, pseudo-alopecic plaques of various sizes are found (some new hairs and others short and broken), with different degrees of extension (Torales et al., 2019). Some patients have the sign of Friar Tuck, a character in the Robin Hood legend, in which they resemble the features of Christian monks with areas of hair loss on the crown of the head.

It is common for people with this disorder to go to the dermatologist in the first instance, either on their own behalf or accompanied by their parents if they are children (Sah et al., 2008), so in a case of alopecic areas in the absence of other explanations, such as alopecia areata, it is worth investigating more about trichotillomania. The dermatologist can use other instruments, such as the trichoscope, to expand the description.

Hair pulling can be done with the dominant or non-dominant hand, or both are sometimes used. Many patients may not be satisfied with just pulling their hair: They examine it, manipulate it from root to tip, put it in their mouths, and some even chew and ingest it. The diagnosis of trichotillomania is quite simple—a thorough examination is necessary, especially when the person admits to having ingested hair or when such behavior is suspected (Grant & Chamberlain, 2016).

As we had previously pointed out, the disorder can even persist for decades, leaving areas devoid of hair and with scar tissue, which prevents the growth of new hair. This can lead to the development of avoidance behaviors in the patient: wearing hats and resisting going out without them; wearing scarves if it involves the beard region and glasses if it involves the eyebrows and eyelashes region and the use of makeup to cover or hide some areas; they can avoid social situations that may reveal the lack of hair, such as going to hairdressers, frequenting swimming pools, and going to public places; they may avoid having a naked torso if it involves regions such as the thorax or the abdomen.

In addition, people with trichotillomania may have other habits, such as onychophagia, biting of the cuticles or knuckles, sucking on the fingers, slapping, chewing or biting the tongue, bruxism, picking the nose, scratching, hitting the head, or rocking the body. Some of these habits seem unimportant, but interventions to address them (such as intervening on finger sucking in children) can make symptoms of trichotillomania disappear (Torales et al., 2019). When the manipulation of nails, hair, and skin are combined, it is called dermatillomania (Christenson et al., 2001).

It is noteworthy that some means such as tests and others carried out to obtain data online can result in greater clinical richness and reduce discomfort during the interview. For example, Bottesi et al. conducted research in Italy (Bottesi et al., 2016b) with a sample obtained through face-to-face and online group assessments of people with trichotillomania and healthy controls. Patients who completed the surveys virtually with trichotillomania were mostly unemployed, single, and younger than those in the face-to-face group, they pulled their hair from more areas, and in general, they had greater associated disability.

With data obtained from the USA and South Africa and a large sample, Lochner et al. (2019) divided into groups people with trichotillomania, those without comorbidity, with major depressive disorder as comorbidity, and with a combination of comorbidities. Those with greater comorbidity also presented greater symptomatic severity, so assessing comorbidity is central. The greater the chronicity, the greater the comorbidity (Grant et al., 2020a).

Some of the comorbidities associated with trichotillomania are as follows (Duke et al., 2010; Grant et al., 2020a; Houghton et al., 2016; Lochner et al., 2019):

- Obsessive-compulsive disorder.
- Major depressive disorder.
- Substance use disorder.
- Alcohol use disorder.
- Social phobia.
- Excoriation disorder.
- Panic disorder.
- Post-traumatic stress disorder.
- Tics.

Impact and Evaluation Scales

Although it is not categorically coded, trichotillomania can be variable in terms of the severity of its presentation, this depends on comorbidity, chronicity, and social, occupational, academic, and psychological functioning (Woods & Houghton, 2014). We echo the words of some relevant researchers on the topic (Houghton et al., 2015a) about the approach to trichotillomania from the categorical and non-dimensional point of view. Dimension and category are not necessarily exclusive or opposed, and the hierarchical taxonomy model of psychopathology (HiTOP) has emerged as a research effort to address these problems and to try to erase the arbitrary boundaries between psychopathology and normality (Kotov et al., 2017). The growing evidence and the coherence with the clinic will reveal the direction that it will take, but to date, the semi-structural interviews, the effect on functionality, and the scales are useful to measure the impact of the disorder.

As we pointed out previously, the criteria for diagnosing trichotillomania underwent changes from DSM–III-R to DSM-5. Many patients did not present with increasing drive or tension before pulling or attempting to resist, and pleasure, relief, or gratification during or after pulling (Lochner et al., 2011), leading to elimination of these criteria.

The clinical value of the mental health scales for monitoring and measuring severity is known, but in addition to this, it allows people who are new to the subject to know clinical elements validated by people with extensive experience and that are useful in interviews. With their advantages and disadvantages that escape this analysis, there are tools to be applied by the clinician or by the patient himself (Woods & Houghton, 2014).

At the time of preparing this text, in the midst of a pandemic, research is being carried out that uses digital media and those formats to be completed by patients. As we mentioned above, for patients with trichotillomania this may offer an added value.

In the case of children, clinician-completed scales have more value, especially when patients have not yet acquired literacy; if they have acquired it, self-completed scales are available (Harrison & Franklin, 2012; Tolin et al., 2008; Woods & Houghton, 2014):

- Trichotillomania Scale for Children – child and parent versions (TSC-C, TSC-P): self-reported, measures severity, distress, and disability.
- Milwaukee Inventory of Subtypes of Trichotillomania MIST-C: to evaluate hair-pulling styles.
- National Institutes of Mental Health Trichotillomania Severity Scale (NIMH-TSS): applied by the clinician to assess severity, widely used.
- Massachusetts General Hospital Hairpulling Symptom Severity Scale (MGH-HS): widely used, self-administered and measures “severity” as “degree of control and resistance”.

A fundamental element to consider within the evaluation is the cultural aspect of hair pulling. In some cultures, for example, tearing hair can be a normal reaction to pain or extreme loss; in other cultures, hair avulsion is considered a mourning ritual or a rite of passage into adulthood, while in some cultures all hair is pulled from the scalp to denote detachment from grief (Duke et al., 2010). For all these reasons, it is necessary to investigate the cultural system and what is accepted or not found in the act itself.

Already as adults, those who suffer from trichotillomania have a high proportion of mental disorders, in some samples, it represents one in three patients (Houghton et al., 2016). Even a great majority suffer from other repetitive behavior oriented to the body (Anwar & Jafferany, 2019), which increases the impact. Those who suffer from trichotillomania rarely seek treatment, either because of the shame it causes them, because they consider it a bad habit, or because they think it cannot be treated (Torales et al., 2019, 2021).

Physical impact: Some patients ingest their own hair, forming a mass of hair (trichobezoar) in the lumen of the digestive tract, which causes gastrointestinal complications, such as intestinal obstruction, intussusception, ulceration, or perforation (Torales et al., 2019). As with Pica (Khan & Tisman, 2010), trichophagia is described as associated with an iron deficiency, the latter more related to the male gender and more severe presentations of trichotillomania (Grant & Odlaug, 2008). The so-called Rapunzel syndrome is described—a condition in which the body of the hairball is in the stomach and its tail extends to the duodenum, the ileum, or all the way to the colon; the clinical presentation can be varied and the diagnosis is based on clinical grounds, laboratory results that indicate iron deficiency and sometimes a decrease in protein, and by radiological findings (Ullah et al., 2016). Other complications can occur due to the fact of pulling the hair in the areas where it is most frequent: skin irritation, infections, and injuries due to repetitive use of the hands (Harrison & Franklin, 2012).

The emotional impact of trichotillomania can include guilt, revenge, decreased self-esteem (Harrison & Franklin, 2012), depression and anxiety (the most studied), use of alcohol, tobacco, and illicit drugs (Franklin et al., 2008; Lewin et al., 2009). The impact on functionality can be translated into decreased school performance and difficulty studying (Franklin et al., 2008), decrease in social activities, and difficulties making friends; it is hypothesized that depression and anxiety act as mediating mechanisms (Lewin et al., 2009), and the presence of internalizing symptoms plays a central role in the acquisition of skills and the implementation of routines to carry out treatment.

Table 39.3 Differential psychiatric and dermatological diagnoses of trichotillomania

OCD and related disorders	Patients with obsessions of symmetry, in the context of OCD, can pull out their hair as part of their rituals. For their part, individuals with body dysmorphic disorder may pull out hair that they consider to be non-aesthetic, asymmetric, or abnormal. In the cases cited, the diagnosis of trichotillomania is not made.
Developmental disorders	Patients with developmental disorders may pull out their hair, but not in the context of trichotillomania, but rather as stereotypical behaviors.
Psychotic disorders	Patients with a psychotic disorder may pull their hair out in response to a delusion or hallucination. The diagnosis of trichotillomania is not made in this case.
Substance use disorders	Hair pulling can be exacerbated by the use of certain substances (such as stimulants), although it is unlikely that a substance is the cause of persistent pulling.
Dermatologic differential diagnoses	Scarring alopecia: Chronic discoid lupus, papular lichen planus, folliculitis decalvans, among others. Non-scarring alopecia: Alopecia areata, alopecia androgenetica, telogen effluvium.

Differential Assessment and Diagnoses

The clinical interview remains the gold standard in the evaluation of patients with trichotillomania. In the case of children and adolescents, the confluence of data guides the impression, since interviews are usually more difficult due to the inaccuracy of the data, the contrast of the data provided by the patient and that of the informants, the associated shame, the lack of awareness of the pulling behavior, and more specifically the lack of the tension–gratification component (Torales et al., 2019). Hair loss can be the reason for consultation and is due to multiple etiologies, but in the presence of alopecic plaques located within the reach of person's dominant hand, generally in the frontoparietal area (Cisoń et al., 2018), the presence of hair in areas of different sizes, some new and others short and broken, the suspicion of trichotillomania is reasonable. We must remember that they can also pull hair from any part of the body such as body hair, facial hair, pubic hair, eyebrows, and eyelashes.

The interview should be given within the framework of warmth, asking questions that allow the person not to feel ashamed, trying to normalize the event so that the discomfort is reduced. The medical history should focus on what we mentioned earlier as triggers of hair-pulling behavior and styles, but other causes should be included and excluded. Some drugs and cosmetic products can cause hair loss as an adverse effect, so they should be investigated. A higher frequency of disorder has been reported in family members (King et al., 1995), so it is necessary to inquire about a family history of repetitive body-oriented behaviors and similar symptoms. It is possible that both the patients and the relatives are not aware of the disorder and the hair-pulling behavior and there are no other explanations, in which case additional tests may collaborate with the correct diagnosis. Trichoscopy can serve as an aid to evaluate other causes; it is reliable, easy to use, and inexpensive for hair diseases; and it can clarify other causes that explain hair loss (Cisoń et al., 2018).

Trichotillomania is a non-scarring alopecia; differential dermatological diagnoses will be made with these. Trichomalacia (basically misshapen hair) and intrafollicular pigmented casts are considered by some researchers to be the two main elements in making the diagnosis. The differential psychiatric and dermatological diagnoses are summarized in Table 39.3 (Torales et al., 2019, 2021).

Treatment

The decision to treat and the agent and the means used depend on a series of factors: current age of the patient, chronicity and severity of symptoms, associated disability, comorbidity, choice of patient/parents or guardians, and availability of treatments. To date, there are no approved pharmacological treatments; many of them are used based on indirect evidence or on their results in case reports, others based on evidence of neurobiological dysfunction. The evidence for psychotherapeutic interventions seems more encouraging.

In trichotillomania, clinicians can rely on a combination of qualitative and quantitative data to measure improvement, interpreting scores based on clinical judgment. Although improvement in the scales does not mean "response" in all cases, in trichotillomania the percentage reductions in the scales were greater when predicting recovery than when predicting response. As an example, we could consider the case of a patient who enters some modality treatment in the severe range, but exits treatment in the moderate range; it has the same degree of "improvement" as a person who enters treatment in the moderate range and leaves in the mild range or does not meet the score to be diagnosed. However, achieving recovery requires a greater degree of change for those who start treatment in the severe range compared to those who start in the moderate range, meaning that individuals in the latter group have more probabilities of achieving recovery than those in the first group (Houghton et al., 2015b).

Objective and subjective elements must be combined to assess the loss of hair; the most important target is in the behavior of pulling the hair. Identifying the triggers (Duke et al., 2010) and affective states that are part of the cycle together with external stimuli, such as places, situations, and objects (Bottesi et al., 2016a), is central when developing psychotherapeutic strategies.

The first approach to a correct treatment is a proper diagnosis. Dermatologists may be the first to have contact with a person with trichotillomania, so in the presence of a child with this behavior, the conduct should be that of monitoring and accompaniment. Parents may need to simply ignore the behavior until the time comes when it just goes away. They can also evaluate other diagnoses that could start trichotillomania, such as alopecia areata. There may be resistance to referral to psychologists and psychiatrists, so interventions that may occur within consultations, such as increasing awareness of hair-pulling activities or use of tape or Band-Aids on the distal index fingers, may be useful (Sah et al., 2008).

The next step involves non-pharmacological interventions, with Habit reversal therapy (HRT) as the main representative and with better evidence (Bate et al., 2011).

Habit reversal therapy emerged as a necessity in the face of interventions that were not effective and resistant to other forms of treatments designed until the 1970s. It gathered information with high clinical richness from observations and evidence, such as that habits are initially formed from normal reactions or that it may have started as an infrequent but normal behavior, which has increased in frequency and has been altered in its shape (Azrin & Nunn, 1973). He pointed out that these persisted due to the chain of responses, limited awareness of reactions, excessive practice, and social tolerance that ended up reinforcing it. The intervention focused on counteracting these influences: Movements that were "the reverse" of the habit were practiced. The patient became aware of each instance of the habit and differentiated it from their usual chain of response. Social approval was provided for their efforts towards inhibiting the habit.

In the 1980s, the authors of HRT put it into practice for trichotillomania with a 2-hour session and compared it with another behavioral technique in which the patient imitates pulling movements in front of the mirror, but without actually pulling. After 22 months, the participants maintained the positive effects of the therapy (Duke et al., 2010).

Table 39.4 Drugs for the treatment of trichotillomania

Drug	Initial dose (mg/day)	Average dose (mg/day)	Comments
Clomipramine	50	50–250	Significant reduction in severity.
N-Acetylcysteine	600	2400	Promising option, although currently with limited evidence. Reports of substantial improvement in children
Aripiprazole	3	3–15	Evidence from uncontrolled studies and case reports. It is used in cases of failure with serotonergic agents.
Olanzapine	2.5	10–20	Monotherapy and compared to placebo result in effective in reducing symptoms.

HRT paved the way for other interventions that were developed from it, such as other techniques to address repetitive behaviors oriented to the body: training in increasing awareness, role-based interventions, self-control and self-monitoring, aversion, massive practice of the behavior until generating fatigue, relaxation training, social support, and stimulus control (Flessner, 2011).

Training in HRT consists of 3 phases: sensitization and awareness, training in competitive reactions, and social support. In the first stage, the sensations and behaviors that precede the act are described and the repetitive behavior itself is recognized, and an attempt is made to identify those warning signs for the behavior. In the second stage, competitive reactions are developed: a behavior that prevents hair pulling, which must be carried out for 1 min, when the patient identifies a warning sign or that they are pulling hair, directly, for example, crossing their arms, clenching their fists, keeping their hands busy, driving with both hands on the wheel, as mentioned above, or having some tape on their fingertips. In our experience, any conduct can be used as a competitive reaction if it complies with the following criteria (Torales Benítez & Arce, 2014):

- As long as it is carried out, the behavior to be avoided is impossible to carry out.
- It can be used in any situation.
- It is not noticed by other people.
- It is accepted by the patient.

If there are no trained therapists in the model, if patients prefer pharmacological treatments, or if there is associated comorbidity, the pharmacological agents become relevant. We must first emphasize that despite the fact that some drugs, such as selective serotonin reuptake inhibitors (SSRIs), are widely prescribed, they do not have solid evidence in the absence of comorbidity to treat trichotillomania (Torales et al., 2020).

Although we will address the medication prescribed by psychiatrists, dermatologists also prescribe drugs. Some of them modify psychological symptoms, such as antihistamines to reduce anxiety and itching (Sah et al., 2008).

There are no approved drugs for the disorder, the evidence is mixed, and most results come from studies of small samples. Some studies do not compare them with placebo, and some do not show a difference with placebo and, in other cases, the duration of the study is very short.

Having made this reservation, the pharmacological recommendations and comments are summarized in Table 39.4 (Torales et al., 2020).

Conclusion

Trichotillomania is a disabling mental disorder, belonging to the obsessive-compulsive spectrum, characterized by patient’s recurrent behavior of pulling out his/her own hair with significant functional impairment in various areas of daily life. It may be based on negative emotions as well as on supposed neurobiological alterations, although its etiology is still in the initial stages of study and understanding.

Trichotillomania can precede comorbid mental disorders, such as anxiety and disruptive behavior disorders, which are observed mainly in children and adolescents, so its presence takes on added value, in terms of evolution.

The clinical interview remains the gold standard in the evaluation of patients with trichotillomania. In the case of children and adolescents, the confluence of data guides the impression, since interviews are usually more difficult due to the inaccuracy of the data.

The decision to treat and the agent and means used depend on a number of factors: the patient's current age, chronicity and severity of symptoms, associated disability, comorbidity, patient/parent or guardian choice, and availability of treatments. Clinical outcomes, especially among children and adolescents, show an episodic evolution usually followed by a complete remission if adequately treated.

Cognitive behavioral therapy (with habit reversal training) is highly recommended as the first-line intervention, followed by psychopharmacotherapy. A multidisciplinary approach involving a psychologist, dermatologist, pediatrician, and psychiatrist is essential for a correct assessment of the illness' components and its long-term successful treatment.

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Oppositional Defiant Disorder

40

Jordan A. Booker

Introduction

Oppositional Defiant Disorder is one of the most commonly diagnosed disruptive behavior disorders in childhood and is one of the most common reasons for children's referrals for mental health services (Loeber et al., 2000). ODD involves repetitive and persistent displays of defiant, disobedient, and hostile behavior, particularly toward authority figures (American Psychiatric Association, 2013; Loeber et al., 2000). Shown in the ways children are quick to anger and frustration around friends, refuse to comply with teacher requests, and blame family members for their problems within and beyond the home, ODD can be a major challenge for children and those close to them. Children with ODD often struggle with emotion regulation and self-control (e.g., Atherton et al., 2019; Coy et al., 2001; Drabick et al., 2010; Dunsmore et al., 2013, 2016; Greene & Doyle, 1999; Luebbe et al., 2010) and are more likely to have strained relationships with family and peers (Burke et al., 2002; Fite et al., 2013; Tung & Lee, 2014). Further, ODD symptoms are likely to be comorbid with other externalizing (i.e., ADHD) and internalizing problems (depression; Nock et al., 2007). If not addressed, ODD symptoms can persist into adolescence and adulthood (Côté et al., 2006; Leadbeater & Homel, 2015; Loeber et al., 2009). This can be especially worrisome if symptoms become more severe, contributing to other aggressive behavior diagnoses (i.e., conduct disorder (CD)) and criminal and deviant behavior (Rowe et al., 2010; Simons et al., 1994). As such, there is great interest in understanding, assessing, and intervening to reduce ODD symptoms among children and adolescents. This chapter reviews the definitions and concepts regarding ODD, distinguishes ODD from other disruptive behavior disorders relevant to children and adolescents, addresses the etiology and developmental trajectory of ODD, and reviews prevalent assessments and treatments for ODD.

Definitions and Concepts

ODD belongs to the class of disorders labeled as "Disruptive, Impulse-Control, and Conduct Disorders" in the latest edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013). Historically, ODD diagnoses have been based on the presence of eight

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possible symptoms lasting 6 months or more, all regarding forms of poor self-control and reactive aggression among children and adolescents (American Psychiatric Association, 1994, 2013). These include ways children and adolescents may (a) often lose their temper, (b) be easily annoyed by others, (c) often become angry or resentful, (d) argue with or defy authority figures, (e) show non-compliance with rules, (f) deliberately annoy others, (g) blame others for personal mistakes, and (h) show spite and vindictiveness toward others. Children and adolescents are considered to meet these symptom criteria if they show these behaviors more frequently than others of similar age or comparable developmental level (i.e., most days for at least 6 months for children younger than age 5).

Before the use of the DSM-5, children and adolescents who displayed any configuration of four or more symptoms received a diagnosis of ODD. With updates provided in the DSM-5 (American Psychiatric Association, 2013), additional nuances have been added to ODD diagnoses. The previous eight symptoms were retained and have also been organized into three categories within the ODD diagnosis: *Angry/Irritable Mood* symptoms include losing temper, being touchy or easily annoyed, and being angry or resentful; *Argumentative/Defiant Behavior* symptoms include arguing with authority figures, defying rules and requests, annoying others, and blaming others for personal mistakes; and the *Vindictiveness* criterion is placed into its own category. Clinical research studies have supported this re-organization of criteria (e.g., Burke, 2012; Drabick & Gadow, 2012; Liu et al., 2019; Harvey et al., 2016; Ollendick et al., 2018; Stringaris & Goodman, 2009). While children are less likely to meet criteria for all eight ODD symptoms, they are to meet criteria for common symptoms within certain categories (Ollendick et al., 2018). Further, the criteria within these categories differentially inform clinical outcomes for children. Angry/Irritable Mood symptoms inform emotion dysregulation outcomes and comorbid diagnoses (i.e., depression, anxiety; Burke, 2012; Liu et al., 2019). Argumentative/Defiant Behavior criteria best inform risks for disruptive behavior problems such as attention-deficit hyperactivity disorder (ADHD) symptoms and poorer social skills (Harvey et al., 2016; Wesselhoeft et al., 2019). Lastly, the Vindictiveness item is associated callous and unemotional traits, CD symptoms, and risks for future criminal involvement (Wesselhoeft et al., 2019).

Updates to the DSM-5 also include the addition of *severity ratings* for ODD based on the number of major social settings (i.e., home, school, peer groups) where functioning is disrupted. Symptoms are considered *mild* if predominantly displayed in one social setting (e.g., only shown at home, and not disrupting school functioning). Symptoms are considered *moderate* if displayed in two distinct settings (e.g., disruptions to home and school functioning, but not in times spent with peers and friends). Symptoms are considered *severe* if displayed across three or more social settings (e.g., impacting home, school, and friend groups).

Distinguishing ODD from Other Disruptive Behavior Disorders

ODD is rarely diagnosed in the absence of other disruptive behavior disorders. However, ODD shows some distinctions from other childhood behavior and mood diagnoses, including attention-deficit hyperactivity disorder, CD, and disruptive mood dysregulation disorder (DMDD). Those disorders are reviewed below.

Attention-Deficit Hyperactivity Disorder

Attention-deficit hyperactivity disorder is a set of related disruptive behavior disorders involving persistent and disruptive displays of inattention (i.e., trouble organizing tasks, becoming easily distracted) and/or impulsiveness/hyperactivity (i.e., always on the go, trouble waiting her or his turn, talks excessively; American Psychiatric Association, 2013). These behaviors should be present during childhood and typically before the age of 12, and these behaviors should be disruptive across at least two settings (i.e., home, school, with friends). Depending on the presence of inattention and/or impulsiveness/hyperactivity symptoms, children can be diagnosed with a *Combined Presentation* of inattention and impulsivity, *Predominantly Inattentive* presentation, or *Predominantly Hyperactive-Impulsive* presentation. ADHD diagnoses are associated with higher endorsements and displays of aggression among children (see Connor et al., 2002), and ADHD is likely to be comorbid with diagnoses of ODD (e.g., Cuffe et al., 2020; Ollendick et al., 2016; Stringaris et al., 2010) and earlier inattentive and/or impulsive problems may serve as risk factors for later oppositional and aggressive behaviors (e.g., Harvey et al., 2016). However, ADHD diagnoses do not include displays of excessive aggression, unlike ODD diagnoses. Additionally, while both ADHD and ODD can be precursors to other aggressive and deviant disorders (i.e., CD), ODD may be a more robust predictor of deviant behavior risk, particularly for boys (e.g., van Lier et al., 2007). ADHD, but not ODD, tends to be robustly associated with executive functioning challenges (i.e., working memory, planning) when these symptoms are considered simultaneously (Oosterlaan et al., 2005).

Conduct Disorder

Conduct disorder is another common disruptive behavior problem for children and adolescents that involves problems with aggression toward others. ODD shares symptom overlap with CD involving conflict with authority figures (Riley et al., 2016). However, CD can involve more severe and purposeful displays of aggression from children and adolescents, and existing research supports distinctions between ODD and CD diagnoses (see Cohen & Flory, 1998; Frick et al., 1993; Loeber et al., 2000). Current DSM-5 criteria for CD involve displays of criteria from a set of categories: (a) *aggression to people and animals* (i.e., initiating fights, using weapons to harm others, being physically cruel to animals); (b) *destruction of property* (i.e., deliberately setting fires, breaking windows); (c) *deceiving and/or stealing from others* (i.e., breaking into someone's home or car, using lies to avoid obligations to others, shoplifting, forgery); and (d) *serious violations of rules* (i.e., running away from home; being truant from school). The DSM-5 has removed the hierarchical structure between ODD and CD, and children and adolescents can be diagnosed with both disorders, when appropriate. As noted above, children with ODD diagnoses who display vindictiveness may be at heightened risk for comorbid CD diagnosis (Wesselhoeft et al., 2019). Children showing vindictive behaviors and CD symptoms are also at heightened risk for delinquent and criminal activities (e.g., Murray & Farrington, 2010).

ODD and CD are comorbid diagnoses for many children and adolescents, and ODD, which often emerges earlier in development, is viewed as a likely precursor and risk factor for CD (Loeber et al., 2000; Rowe et al., 2010). Before the implementation of the DSM-5, children and adolescents could not have simultaneous diagnoses of ODD and CD—these two diagnoses were specified in a hierarchical structure, with CD given priority over ODD. However, even with changes allowing children to receive concurrent diagnoses, growing evidence supports distinctions between these diagnoses. For example, endorsements of proactive aggression robustly predict later CD symptoms, but not ODD symptoms (Vitaro et al., 1998). When ODD and CD symptoms persist into adulthood, ODD symptoms are more closely associated with emotion dysregulation, whereas CD symptoms are more closely associated with criminality and substance use (Rowe et al., 2010).

Disruptive Mood Dysregulation Disorder

A new diagnosis outlined by the DSM-5 is DMDD (American Psychiatric Association, 2013). This disorder is typified by recurrent temper outbursts that manifest verbally or behaviorally, occur at least three times a week, and are not developmentally appropriate for the child. These outbursts should be recurrent for at least 12 months and occur in at least two settings (i.e., home, school, with peers). Conceptually, the anger outbursts of DMDD should be tantrum-like, unpredictable, and less tied to specific triggering episodes. As a broad reflection of mood disruptions, DMDD may be uniquely useful in informing risks for bipolar disorder among children (see Evans et al., 2017). Yet, there is broad overlap between the criteria for this disorder and the 4 criteria for the Angry/Irritable dimension of ODD (i.e., losing temper, being easily annoyed, being angry, e.g., Burke et al., 2014). Indeed, recent studies suggest there is extensive comorbidity between children receiving diagnoses of ODD and DMDD, and that it is very unlikely for children to meet criteria only for DMDD. For example, in a large study of children aged 6–12 years, 92% of children diagnosed with DMDD also receiving an ODD diagnosis (Mayes et al., 2016). Yet, prevalence rates for DMDD seem to be somewhat lower than those for ODD (Copeland et al., 2013), so while most children who are diagnosed with DMDD tend to be diagnosed with ODD, a subset of children who are diagnosed with ODD would *not* receive a comorbid diagnosis of DMDD (~33%; Mayes et al., 2016). Early findings have yet to show clear ways to distinguish between DMDD and ODD based on symptomatology alone in childhood and adolescence (Burke et al., 2014; Mayes et al., 2016; Dougherty et al., 2014). Further, DMDD and ODD are predicted by many of the same developmental risk factors, including temperamental profiles (i.e., higher negative affectivity, lower effortful control) and higher parental harshness (Dougherty et al., 2014). Into adulthood, persistent DMDD and ODD symptoms appear to show similar implications and risks for experiences with internalizing problems, such as anxiety and depression (Grau et al., 2018; Leadbeater & Homel, 2015).

Etiology and Risk Factors of ODD

ODD etiology is shaped by factors at multiple levels, including genetic influences, parenting and family interactions, peer-level interactions, and environmental assets and influences. Below, heritability, risk factors within the child (i.e., temperament, attachment security), and risks in the child's environment (i.e., harsh parenting behaviors, peer influences) are addressed.

Heritability

Studies have addressed the heritability of ODD and ways variability in ODD symptoms can be informed by genetic sources. Previous twin-based studies support hypotheses of a genetic etiology for ODD with heritability estimates of .61 (Coolidge et al., 2000). That is, children who share greater genetic overlap (identical or monozygotic [MZ] twins vs. fraternal or dizygotic [DZ] twins) are more likely to share a common non-diagnosis of ODD. Recent considerations of heritability regarding the dimensions of ODD (i.e., angry/irritable, argumentative/defiant) also supported views that genetic sources informed individual variability in these focused dimensions of ODD (Mikolakewski et al., 2017). The dimensions of ODD likely share common genetic influences with broader externalizing problems (Mikolakewski et al., 2017).

Temperament

Temperament is a biologically (genetically) based contributor to individual differences in young children's behaviors across settings (Rothbart & Bates, 2006; Thomas & Chess, 1977). Growing evidence suggests early temperamental differences in children's behaviors can explain some risks for the later development of ODD symptoms. For example, higher surgency (i.e., pleasure-seeking, positive mood experiences) higher negative affectivity (i.e., experiences of frustration, anger, sadness), and lower effortful control (i.e., poorer attention control, poorer inhibition of certain behaviors) are each associated with higher concurrent and longitudinal risks of ODD symptoms for young children (Antúnez et al., 2016; Atherton et al., 2019). These temperamental profiles are conceptually related to the major dimensions of irritability and disruptiveness that comprise ODD (Stringaris et al., 2010). Though studied mostly in preschool and early school-age children, temperamental differences continue to inform aspects of behavior throughout childhood and adolescence, with implications for disruptive behavior and conduct problems (e.g., McKinney et al., 2020).

Attachment Security

Attachment involves regulatory processes for support-seeking, based on early experiences with caregiver responsiveness toward infants and young children (Ainsworth, 1979; Bowlby, 1969/1982, 1978). From infancy onward, children's attachment styles shape ongoing mental representations about themselves and their relationships, which have implications for how they operate in the world (Buist et al., 2008; Mikulincer & Shaver, 2012). Attachment styles have implications for emotional and behavioral tendencies among children (e.g., Raikes & Thompson, 2006), with implications for ODD symptoms. Children with more secure attachment styles are more likely to show flexibility and adaptability in the world, being willing to explore new opportunities, being able to turn to a caregiver when distressed, and recovering well following support-seeking to continue building experiences in the world. Children who show insecure forms of attachment are at higher risk for forms of psychopathology (Mikulincer & Shaver, 2012). Regarding ODD, children who show a *disorganized* attachment style show highest risks for ODD symptoms (Theule et al., 2016). This is a style in which children neither are well-balanced in exploring the world and support-seeking, are *anxious* and over-dependent on support- and proximity-seeking with caretakers, nor are *avoidant* and reject support and close involvement from (or even fear) their caregivers. Rather, they show unpredictable and volatile shifts in how they react to and interact with others, likely in response to previous experiences of unpredictability and chaos from caregivers (see van Ijzendoorn et al., 1999).

Harsh Parenting

Caregiver characteristics and forms of parenting are also important for anticipating risks of ODD for children. Harsh and hostile parenting behaviors are associated with children's aggressive and defiant symptoms broadly (e.g., Alink et al., 2009; Romano et al., 2005) and ODD symptoms specifically (e.g., Booker et al., 2019; Roubinov et al., 2020). These harsh approaches, which can include rejecting children's difficulties with negative emotions and using excessive punitive approaches when children misbehave are likely to strain relationships with children and model or reinforce aggressive behaviors with children (e.g., Richmond & Stocker, 2008). Parenting behaviors affect related factors like children's attachment security, with hostile and harsh parenting placing children at risk for insecure attachment styles (e.g., Wang et al., 2019).

Additional Environmental Risk Factors

Additional experiences at home, in the community, and with peers can serve as risk factors for externalizing problems like ODD (Burke et al., 2002; Farrington, 1986). Aside from parenting behaviors, instability in the family unit (i.e., parental separation, divorce, and remarriage) and lower socioeconomic status in the family serve as risks for ODD (Boden et al., 2010). Further, home and neighborhood factors of exposure to violence also exacerbate risks for ODD (Boden et al., 2010; McGee & Williams, 1999). Relatedly, exposure to deviant peer behaviors, including aggression and substance use, exacerbates ODD risks for children (Boden et al., 2010; Simons et al., 1994). With exposure to these risk factors, children may be more likely to meet clinical criteria for ODD and showcase more severe ODD symptoms than peers exposed to fewer risks.

Parent and environmental factors (i.e., inconsistent parenting) may *interact* with child factors (i.e., temperamental surgency) to explain risks for ODD symptoms (e.g., Dunsmore et al., 2013; Hare & Graziano, 2020; Tung & Lee, 2014). Such interactions are in line with the diathesis-stress model (Monroe & Simons, 1991); however, more work is needed to determine consistent support for specific child-by-parent and child-by-environment interactions in the context of ODD.

Comorbidity

Adolescents and adults who have a history of an ODD diagnosis are incredibly likely to be diagnoses with other mental health disorders in their lifetimes, including impulse control, mood, anxiety, and substance use disorders (~90%; Nock et al., 2007). The most common comorbid diagnoses are reviewed below, including disruptive and conduct problems (CD, ADHD), mood and anxiety disorders (depression, social anxiety, DMDD). These comorbid diagnoses are important to consider, as children's global clinical outlook is often impacted by the presence of multiple diagnoses (i.e., ODD + ADHD + Anxiety; Jensen et al., 2001) and children's responsiveness to ODD interventions may face additional barriers given the presence of other diagnoses (e.g., Ezpeleta et al., 2006).

Attention-Deficit Hyperactivity Disorder

Attention-deficit hyperactivity disorder is a disruptive behavior disorder that is often comorbid with ODD. As a result, many assessment surveys ask for both inattentive and hyperactive symptoms, as well as oppositional and defiant symptoms among children (see below). Recent estimates suggest that approximately 40% of children in community/non-referred samples who meet criteria for ADHD diagnosis also meet criteria for ODD, and that approximately 60% of children in clinical settings with an ADHD diagnosis also have a comorbid ODD diagnosis (Bauermeister et al., 2007). More specifically, the argumentative/defiant behavior dimension of ODD is more closely associated with ADHD symptoms (Harvey et al., 2016; Wesselhoeft et al., 2019). Given the potential for early development of ADHD and ODD symptoms, there is increasing interest in addressing the early-emerging risk factors (i.e., temperament, parenting practices) that may be relevant for ODD and ADHD in preschool and early school-age children (Lavigne et al., 2009).

Conduct Disorder

Conduct disorder is another disruptive behavior disorder that is often comorbid with ODD. Approximately 60% of children and adolescents in non-referred/community samples who meet clinical criteria for CD also meet clinical criteria for ODD, and approximately 90% of youths in clinically referred samples who have a diagnosis of CD also have a diagnosis of ODD. (see Rowe et al., 2010). ODD is thought to precede or develop into CD if not addressed (Loeber et al., 2000; Rowe et al., 2010), as issues with reacting with anger, frustration, and defiance (ODD) continue to shift into purposeful uses of aggression to manipulate, intimidate, and gain resources from others (CD).

Disruptive Mood Dysregulation Disorder

As mentioned above, DMDD diagnoses share extensive overlap with ODD diagnoses, with approximately 90% of children with a DMDD diagnosis meeting criteria for an ODD diagnosis, and approximately 65% of children with an ODD diagnosis meeting criteria for a DMDD diagnosis (Mayes et al., 2016). DMDD and the angry/irritable dimension of ODD both capture similar concerns regarding emotion dysregulation and expressions of anger, aggression, and instability (American Psychiatric Association, 2013). Both ODD and DMDD are also associated with additional emotion-relevant, anxiety, and mood disorders.

Anxiety Disorders

Anxiety disorders (ADs), including generalized AD, social anxiety, and separation anxiety, are likely to co-occur with ODD (Albano et al., 2003; Burke, 2012; Liu et al., 2019). While ADs are internalizing, rather than externalizing, these disorders and ODD share overlap in connections to temperamental profiles (i.e., higher negative emotionality, poor executive functioning), challenges in emotion management and competence, and concerns in neurodevelopment and limbic system functionality (Drabick et al., 2010). For example, both ADs and ODD can involve poorer forms of social information processing, wherein children are more likely to make negative emotional assumptions about ambiguous social situations (i.e., assuming a hurtful act by another child was intentional; Coy et al., 2001; Crick & Dodge, 1994; Luebbe et al., 2010). Given the common co-occurrence of ADs and ODD and contrast in diagnostic symptoms (excess fear vs. excess anger), there have been questions on whether the presence of both ADs internalizing symptoms and ODDs externalizing symptoms may counteract and provide some *buffer* for youth with comorbid diagnoses or *exacerbate* risks for each disorder (Drabick et al., 2010). Recent findings support the view of exacerbated risks and a worsening of clinical outlook for children facing both ODD and ADs (see Fraire & Ollendick, 2013).

Depression

Clinical depression and Major Depression Disorder [MDD] are also likely to co-occur with ODD diagnoses (Loeber et al., 2000; Boylan et al., 2007). In fact, comorbidity between ODD and MDD is somewhat more common than comorbidity between ODD and ADs (see Boylan et al., 2007). Comorbidity may be associated with gender for children, as boys with ODD seem to be more likely to also have comorbid MDD and AD diagnoses, whereas girls may be at elevated risk for AD comorbid diagnosis, but not MDD comorbidity (Maughan et al., 2004). Questions remain on the mechanisms that may explain comorbid ODD and MDD diagnoses, and possible mechanisms include common genetic factors with implications for emotion dysregulation, children's social competence, and social information processing, and environmental factors like hostile parenting (Boylan et al., 2007; Loeber et al., 2000; Luebbe et al., 2010). While children with both ODD and MDD may have poorer global clinical assessments before symptoms are treated, children with comorbid MDD diagnoses who complete ODD interventions may show larger clinical improvements at post-treatment than children with

ODD only (see Dedousis-Wallace et al., 2021). That is, despite the additional challenges of comorbidity, MDD may not be interfering systematically with empirically supported ODD interventions.

Prevalence

The lifetime prevalence rate of ODD among community samples of children and adolescents in the US is approximately 12.6%, which is higher than the current prevalence rates of ADHD (8.1%) and CD (Kessler et al., 2012; McLaughlin et al., 2012). These prevalence rates differ by child gender. The prevalence of ODD is higher among boys than among girls, with a 1.6:1 ratio (Demmer et al., 2017). ODD diagnoses are more prevalent among children whose families are lower socioeconomic status (e.g., Boat & Wu, 2015; Lahey et al., 1999). Many of the social and environmental risk factors and forms of disorganization associated with ODD (i.e., hostile parenting, exposure to community violence, peer delinquency), are more prevalent in lower socioeconomic communities and settings (e.g., Simons et al., 1994). Previous cross-cultural reviews suggest there is not considerable variability in ODD prevalence given geographic region, and that ODD remains a widespread childhood behavioral disorder across many countries and cultures (Canino et al., 2010).

Developmental Trajectories

While ODD can emerge early in childhood (~4 years of age; Lavigne et al., 2009), the median age of onset for clinically severe ODD is estimated to be 12 years of age for children in the United States, and the median duration of ODD is 6 years (Nock et al., 2007). Broadly, ODD is believed to take a different developmental trajectory from childhood to early adulthood, relative to the other externalizing problems of ADHD and CD. ADHD symptoms tend to decline as children mature into adolescence. Inversely, CD symptoms tend to increase from childhood into adolescence. ODD symptoms tend to show initial increases into early-to-mid adolescence, followed by declines (Atherton et al., 2019). There is not yet consensus on whether the irritable and defiant dimensions of ODD show markedly different developmental trajectories across childhood and adolescence. Regarding relative timing of symptoms for children and adolescents, ADHD symptoms tend to precede ODD symptoms (e.g., Harvey et al., 2016), and ODD symptoms tend to prevent CD symptoms (e.g., Rowe et al., 2010). For many youths, ODD symptoms resolve by early adulthood. When ODD symptoms persist into adulthood, these symptoms coincide with endorsements of antagonistic personality traits, endorsements of internalizing problems, risky behavior use (i.e., substance use), and increased risks of criminal activity (Leadbeater & Homel, 2015; Johnston et al., 2020; Nock et al., 2007; Rowe et al., 2010).

Screening Tools and Assessments for ODD

There are multiple screening tools for parents, teachers, and other familiar caregiver/authority figures to report on children's ODD symptoms and symptom severity. Many of these tools are applicable for children and adolescents or have tailored child-focused and adolescent-focused variants. Common tools for assessment include the Diagnostic Interview Schedule for Children; Anxiety Disorder Interview Schedule (ADIS); Child Behavior Checklist (CBCL); Disruptive Behavior Disorders Rating Scale; Swanson, Nolan, and Pelham Teacher and Parent Rating Scale; and Vanderbilt ADHD Diagnostic Teacher and Parent Rating Scales. While many of the methods developed for assessing ODD have empirical support, there can be modest agreement on reports from different informants (i.e., parents, teachers, children, Lavigne et al., 2015), suggesting that collecting multiple reports or indices of children's ODD symptoms may provide a more thorough view of children's defiant and oppositional behaviors across multiple settings. Both interviews (i.e., Diagnostic Interview Schedule for Children) and rating scales (i.e., CBCL) are designed below.

Diagnostic Interview Schedule for Children

The Diagnostic Interview Schedule for Children (DISC; Lucas et al., 1998) is a structured interview for assessing a battery of symptoms and disorders for children and adolescents. There are formats for parent/caretaker (P-DSIC) reports on children, as well as for child self-reports (C-DISC). These interviews can be completed face-to-face, in written format, or electronically, and the DISC designed to be readily usable by non-clinician interviewers. The questions in this interview are purposefully short and simple, and typically focused on one clear concept at a time, useful for both epidemiological studies and focused clinical assessments (Shaffer et al., 2000, 2004). The DISC-IV is designed to assess over 30 diagnoses addressed over 6 major modules, including disruptive/externalizing problems of ADHD, ODD, and CD. Items address the presence of symptoms over two time periods: over the past 12 months and over the past 4 weeks. This interview is designed to provide compromise between a standard and comprehensive interview approach and one that can be completed relatively quickly—often in under an hour (e.g., Ezpeleta et al., 2011). The DISC has been shown to be reliable for diagnosing ODD, with acceptable to high scale reliability (αs = 0.65–0.80) and test–retest reliability (αs = 0.59) across the Parent and Youth versions of the interview, for both clinically referred and community samples (Shaffer et al., 2000).

Anxiety Disorders Interview Schedule

The Anxiety Disorders Interview Schedule (ADIS-C/P; Silverman & Albano, 1996) is a structured interview for assessing symptoms that include ODD symptoms and other externalizing and disruptive behavior problems for children and adolescents. There are formats for parent/caretaker reports on children (ADIS-P), as well as for child self-reports (ADIS-C). The ADIS is focused on face-to-face interviews led by trained clinicians and other qualified assessors. Assessors ask about the presence of symptoms and the extent symptoms are disruptive. Assessors also collect open-ended information about reported symptoms. Information about symptoms is collected from children alone and from parents/caregivers alone. The information from these interviews is then combined. Children are assigned a principal or primary diagnoses, as well as additional diagnoses, as appropriate. The ADIS has been shown to be reliable for diagnosing ODD (κ = 0.89), as well as other anxiety and affective disorders, and this interview shows strong inter-rater reliability for diagnosing primary, secondary, and tertiary diagnoses (κs = .77–.89; Anderson & Ollendick, 2012; Lyneham et al., 2007).

Child Behavior Checklist

The CBCL is one of the most widespread parent-report questionnaires for screening ODD and other externalizing (i.e., ADHD) and internalizing (i.e., depression) problems for children (Achenbach & Rescorla, 2001). There are versions of this screener for children (18 months–5 years) and older children and adolescents (6–18 years). This scale has been used successfully with clinically referred and non-referred child samples. The 2001 version of the CBCL includes 113 items addressing externalizing and internalizing problems for children and includes multiple subscales for problem areas, including a subscale for Externalizing Problems comprising Delinquent Behaviors and Aggressive Behaviors items. These items have been standardized, with T-scores indicating the extent children's scores rank above or below the national average for other similarly aged children of the same sex. Externalizing Problems reports—and specifically items about aggression—on the CBCL coincide with diagnoses of ODD based on semi-structured clinical interviews, such as the Diagnostic Interview Schedule for Children (Biederman et al., 2008). The CBCL is a major component of the broader Achenbach System of Empirically Based Assessments. This System includes comparable questionnaires for child self-reports (the Youth Self-Report) and teacher reports (Teacher's Report Form), that are also reliable for assessing externalizing problems for children (Achenbach, 2001; Achenbach & Rescorla, 2001).

Disruptive Behavior Disorders Rating Scale

The Disruptive Behavior Disorder Rating Scale (DBDRS; Pelham et al., 1992) has been used in screening multiple externalizing disorders for children and adolescents. This scale includes forms for parent, teacher, and child reports. The DBDRS includes subscales for symptoms of ODD, CD, and ADHD reported on a (impulsivity/overactivity and inattention). Items are reported on a four-point response scale for how problematic each criterion is for the child (0 = *Not at all*; 3 = *Very much*). This measure has shown excellent internal consistency (as ≥0.90) when used with various reporters for both non-referred and clinically referred samples of youth (e.g., Hulsbosch et al., 2020; Ollendick et al., 2016; Pelham et al., 1992).

Swanson, Nolan, and Pelham Teacher and Parent Rating Scale

The Swanson, Nolan, and Pelham Teacher and Parent Rating Scale (SNAP-IV; Swanson, 1992; Swanson et al., 1983) is a 26-item measure for parents and teachers to report on children's ADHD (inattention and hyperactivity/impulsivity dimensions) and ODD symptoms. Items are completed on a four-point scale for how well each criterion describes the child (0 = *Not at all*; 3 = *Very much*). The scale includes recommended scoring thresholds for the severity of ADHD and ODD symptoms, ranging from symptoms not clinically significant, mild symptoms, moderate symptoms to severe symptoms. This scale has shown excellent inter-item reliability for the overall scale composite (αs = .94–.97) and the ODD subscale (αs = .89–.96) when used with parents and teachers (Bussing et al., 2008).

The Vanderbilt ADHD Diagnostic Parent and Teacher Rating Scales

The Vanderbilt ADHD Diagnostic Teacher Rating Scale (VATPRS; Wolraich et al., 1998) and Parent Rating Scale (VADPRS; Wolraich, 2003) are questionnaires measure that captures reports on ADHD, ODD, CD, anxiety, and depression. Items are completed on a four-point scoring scale for the frequency of children's experienced symptoms (0 = *Never*; 3 = *Very often*). Inter-item reliability has been excellent for the subscales of each scale (as ≥.90; Wolraich et al., 1998).

Evidence-Based Treatments

Given the prevalence of ODD diagnoses, multiple behavioral and pharmacological interventions have been tested to address children's aggressive, disruptive, and defiant behaviors at home, school, and with friends. Multiple empirically/data-supported behavior interventions are reviewed, as well as current insights on the potentials and limitations of pharmacological interventions.

Non-pharmacological or Behavioral Interventions

Behavioral interventions are the recommended first-line of treatment for ODD symptoms (see Ghosh et al., 2017) and many behavioral interventions have been designed to address ODD symptoms among children and adolescents. Most of these interventions focus on providing behavioral strategies for both children and their caregivers, rather than focusing exclusively on parental training of childrearing strategies or socio-emotional skills training for children. Some interventions also provide training and resources for other authority figures, such as teachers. Prominent interventions relevant for ODD include Parent Management Training (PMT), Parent–Child Interaction Therapy (PCIT), Collaborative and Proactive Solutions (CPS), Triple P, Tuning In to Kids (TIK), and The Incredible Years (IY).

Parent Management Training Parent Management Training is a longstanding intervention used for disruptive behavior disorders such as ODD (Barkley, 1997; Brestan-Knight & Eyberg, 1998; Eyberg et al., 2008; Murrihy et al., 2010, Kazdin, 1997). PMT interventions are based on the ways parenting practices fit with operant conditioning (Skinner, 1938) and with social learning theories (Bandura and McClelland, 1977). PMT is centered around three major principles (or ABCs) of antecedents, behaviors, and consequences for changing the behaviors of parents and children (see Kazdin, 1997). Addressing antecedents involves anticipating and establishing certain contexts/settings and stimuli that should promote desired behavior and facilitate or scaffold the use of those behaviors. Behaviors are the desirable, positive, and prosocial behaviors that parents are encouraging children to incorporate more often. The prosocial behaviors should be encouraged even as antisocial behaviors (i.e., arguing with others, blaming others, teasing) are being discouraged. Consequences are the outcomes and events that follow children's behaviors. These consequences can be adjusted in line with operant conditioning views to reinforce and encourage desirable behaviors or punish and discourage undesirable behaviors. Forms of positive reinforcement—involving the introduction of something desirable to encourage a behavior—can be social (i.e., praise or validation toward the child) or instrumental (i.e., points or star system tracking helpful behaviors). Punishing approaches to discourage antisocial behaviors are meant to be secondary to reinforcing approaches to encourage prosocial behaviors. PMT is a gold standard in ODD treatment and has been shown to be effective in reducing children's oppositional and defiant behaviors and promoting constructive parenting behaviors across large-scale reviews of PMT therapies considering different age groups of children and children across different geographic regions and treatment settings (see Colalillo & Johnston, 2016; Michelson et al., 2013).

Parent–Child Interaction Therapy Parent–Child Interaction Therapy (Eyberg & Boggs, 1998; Hembree-Kigin & McNeil, 1995) is an empirically supported intervention that is based on parenting, attachment, and social learning theories (see Ainsworth et al., 1978; Baumrind, 1967; Bowlby, 1978; Bandura & McClelland, 1977) to promote new and more constructive ways for parents to engage with their children. PCIT is aimed at children with conduct and disruptive behavior problems, such as ODD (Brestan-Knight & Eyberg, 1998), and is designed for three age groups: toddlers (12–24 months); younger children (2–7 years); and older children and preadolescents (7–11 years). PCIT addresses three major aims throughout therapy: reducing children's behavior problems; improving parents' skills for engaging with children; and enhancing the quality of the parent–child relationship. As part of treatment sessions, parents are observed playing with children during PCIT sessions and are coached by practitioners on providing responsiveness and warmth for children, as well as treatment-related skills in setting clear rules and limits for children. For sessions conducted over 12 weeks, there is typically a First Phase (Sessions 1–5) where practitioners work closely with parents on encouraging responsive behaviors and practices with children, followed by a Second Phase (Sessions 6–12) focused on clear rule-setting and steps to discourage unwanted behaviors. These practices are in line with views of authoritative parenting styles that are seen as ideal approaches in daily parenting (Baumrind, 1967) and may foster more secure and positive relationships between parents and children, particularly given the increased likelihood for insecure attachment among children with ODD diagnoses (Theule et al., 2016). Indeed, PCIT is shown to promote more positive interactions with children and improve the quality of the parent–child relationship following treatment (Schuhmann et al., 1998; Urquiza & Timmer, 2012). These effects and benefits can extend to other siblings who may not have been the target of treatment (Brestan et al., 1997). PCIT has been shown to promote clinically significant improvements in child outcomes (e.g., McNeil et al., 1999) and improvements in children's oppositional and defiant symptoms appear to be maintained for multiple years (e.g., Nixon et al., 2003).

Collaborative and Proactive Solutions The Collaborative and Proactive Solutions (Greene, 1998) intervention is centered on the view that children with ODD are likely to be experience lagging skills in social, emotional, and behavioral domains (Greene, 1998; Greene & Doyle, 1999). By working alongside and scaffolding these skills for children, caregivers can provide the structure children need to manage problems beyond their skill set and learn how to better manage emotion and behavior problems on their own (Greene et al., 2002, 2003; Higgins, 2021). A major focus of CPS interventions is to provide parents with more strategies so they can identify children's skill deficits in adapting to situations and problem solving and work *alongside* children to scaffold skill demands and ultimately promote skills. CPS involves four major treatment modules: identifying children's lagging skills and difficulties with problem solving; training parents to *prioritize* the most pressing problem-solving steps with children; practicing a framework of problem-solving strategies that parents can select from as they continue engaging with children, with emphases on (a) unilateral parental guidance, (b) collaboration between parents and children, (c) delaying problem solving, and (d) equipping parents to reliably use a set of strategies and behaviors that involve collaborative problem solving with their children. CPS has been shown to reduce ODD symptoms for children (Greene et al., 2004) and has shown similar efficacy to standard PMT therapy methods (Ollendick et al., 2016). CPS may be a more promising method to use when parent–child communication and relationship quality is relatively poor at pre-treatment—when parents may have more room for growth learning about working with their children in a constructive fashion (e.g., Booker et al., 2019).

Positive Parenting Program The Positive Parenting Program, or Triple P, is a parent-focused intervention that has grown from a home-focused intervention tailored to the needs of specific families to a broadly applicable methodology that can be used with larger groups of parents (Sanders, 1999, 2008). Triple P, like PMT, emphasizes social learning theory in its design and implementation. The ways that parents model constructive or deleterious behaviors for children can shape children's dependence on aggressive behaviors (Patterson, 1982). Broadly, Triple P focuses on improving parental competence and self-regulation for parents (as well as for service providers and practitioners; Sanders, 2008). For parents, these improvements in competence should promote constructive forms of parenting that help respond to and reduce children's disruptive behaviors. Triple P aims to promote a network of self-regulatory skills for parents that include (a) self-sufficiency, (b) self-efficiency, (c) self-management, (d) personal agency, and (e) problem-solving strategies. Triple P often involves 10 to 12 sessions between practitioners and individual families, with sessions ranging from 60 to 90 minutes. Early iterations of this intervention were designed for parents and caregivers of preschool-age children who had difficulties with disruptive behavior problems (Standard Triple P). However, this program is noted for its flexibility and has been refined to address multiple family structures and needs, including strategies for parents of older children and adolescents; Teen Triple P), caregivers who have experienced separation or divorce (Family Transitions Triple P), and families of preschool children with disabilities (Stepping Stones Triple P; see Sanders, 2008). Triple P interventions have been shown to have significant short-term and long-term improvements in reducing children's ODD symptom severity (e.g., Bor et al., 2002). Similar benefits have been shown with 10- and 12-session applications of the program, allowing for greater flexibility given families' indicated needs before and during treatment.

Tuning In to Kids The Tuning In to Kids (Havighurst et al., 2010) program is focused on the ways parents' emotion socialization is important for children's socio-emotional competence and functioning: the ways parents *model* positive emotion experiences; the benefits of parents' emotional validation and encouragement toward children; and the drawbacks of parents' emotional dismissing and rejection toward children (see Eisenberg et al., 1998; Trentacosta & Fine, 2010). TIK is partly based on views of parental meta-emotion and the ways parents feel about their children's feelings (Gottman et al., 1997). When parents accept and value their children's positive and negative emotions, parents should be more likely to engage in supportive and constructive behaviors to guide and coach children through uplifting and challenging emotion experiences, which should have benefits for behavior problems such as ODD. TIK focuses on improving parenting behaviors, strengthening parent–child relationships, and promoting children's socio-emotional competence. TIK is typically delivered in a group format for families, with six weekly sessions, followed by two, bimonthly booster sessions. Parents are taught strategies for incorporating emotion coaching and guidance for their children (Gottman et al., 1997) and complete role-playing activities, watch video materials, and receive additional educational materials from trained facilitators. Throughout sessions, parents are trained to better recognize and respond to their own emotion experiences and their children's emotions (Havighurst et al., 2009). Parents are taught a range of strategies for themselves and for use with their children, including self-reflection, empathizing with children, problem solving, relaxation approaches, and self-control. TIK was first developed with community samples and shown to be effective for addressing young children's emotional and behavioral problems (Havighurst et al., 2009). The program has grown to also be used in clinical settings and has been effective at reducing externalizing problems generally and ODD symptom severity specifically for children and adolescents (Havighurst et al., 2013, 2015). TIK has also been revised to address adolescents (Tuning In to Teens; Havighurst et al., 2015) and for focused use in promoting father emotion socialization (Havighurst et al., 2019).

The Incredible Years The Incredible Years (Webster-Stratton, 1981) program is also shaped by social learning theories, as relevant to parenting and children's difficulties with aggressive and defiant behaviors. IY is designed as a *collaborative* group-based program for parents (see Webster-Stratton & Herman, 2010; Webster-Stratton, 2012). This approach allows participating parents opportunities to hear from peers on effective strategies, receive feedback on their approaches, and recognize their parenting skills and areas for growth. IY typically involves parent groups of approximately ten to fourteen adults participating in sessions with reviews of parenting strategies, role-play activities, and at-home assignments for reinforcing program lessons and strategies. Approximately 12 weekly sessions are completed by groups. IY was originally designed for parents with young- to middle-age children (~3–8 years). IY use with clinically referred children have shown benefits for reducing externalizing problems, particularly in randomized study designs comparing IY with control and alternative intervention conditions for families (see Gardner & Leijten, 2017; Pidano & Allen, 2015). IY shows lasting effects for reducing children's conduct problem behaviors (Posthumus et al., 2012).

IY interventions involving children's teachers have also been effective (The Incredible Years Inc., 2012; Webster-Stratton et al., 2008). Like with caregivers, interventions focus on encouraging constructive and supportive behavior management approaches for the classroom. These interventions involve a series of workshops spread over multiple weeks or months (i.e., a series of six, full-day workshop given once per month). Children show improvements when parents or teachers complete the IY program (relative to children and caregivers waitlisted for the IY program, Herman et al., 2011), providing additional options for promoting children's clinical outlook. When involved with IY intervention, teachers report improvements in their confidence managing children's disruptive behaviors in the classroom, greater reliance on constructive strategies for working with children (i.e., praise and incentive use, limit-setting), and high evaluations of the program and its usefulness (Fergusson et al., 2013). This intervention has shown promise in schoolwide applications where risks to ODD symptoms are pervasive for students (i.e., high presence of deviant peers, higher rate of community poverty, widespread poor classroom management; Webster-Stratton et al., 2008).

Additional Factors for Non-pharmacological Therapies

Despite the widespread use of these interventions and average benefits for families who complete treatment, there are many children for whom treatment is not initially successful (Frick, 2001; Kazdin, 2005). There has been growing interest among clinicians and researchers to understand the child, family, and practitioner characteristics that may promote or challenge clinical outlook and responsiveness; however, many of the studied candidate variables have shown mixed findings to date. A review of recent clinical research studies by Dedousis-Wallace and colleagues (2021) found that mothers' endorsements of parenting stress and daily life stress at pre-treatment and mothers' displays of hostile and harsh parenting behaviors during treatment (i.e., sarcastic responses toward the child) predicted smaller/limited improvements across multiple clinical studies. In contrast, higher-quality parent–child relationships at pre-treatment and higher reports of mothers' depression at pre-treatment predicted larger improvements in children's clinical outlook (i.e., steeper declines in symptom count, symptom severity) across multiple studies. Other variables of interest have not had clear support in recent studies. For example, lower socioeconomic status, while associated with a lower likelihood to complete all treatment sessions (Lavigne et al., 2010), was not supported to be closely associated with treatment response in more recent studies, contrasting previous findings (see Reyno & McGrath, 2006). Other candidate variables, like children's self-concepts and self-worth, have shown some potential to inform outlook for treatment response (e.g., Edens et al., 1999), but have not been tested in enough treatment studies of ODD to date.

Pharmacological Interventions There are no FDA-approved medications for the treatment of ODD and current clinical recommendations do not advocate for using medications as a first line and primary means of treating ODD (see Ghosh et al., 2017). However, some medications that have been used in managing ADHD symptoms have been shown to help reduce ODD symptoms, such as methylphenidate (e.g., NICE, 2008). Antipsychotic medications, such as risperidone and aripiprazole, may also reduce aggression and irritability symptoms among children (Safavi et al., 2016). However, it is not clear that the use of such medication would be beneficial for children without ADHD diagnoses. Further, medications, such as serotonin reuptake inhibitors (SSRIs)—at times used for the treatment of anger among adults (see Romero-Martínez et al., 2019)—have not shown the same potential in child populations.

Given broader concerns on possible psychological side effects for children (i.e., abrupt mood change, heightened irritability, Toomey et al., 2012), caution should be expressed, and treatment goals should be clearly, outlined before incorporating pharmacological interventions to address ODD symptoms.

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Part IX

Assessment and Treatment of Childhood Adjustment

Play Skills

41

Sarah Wilkes-Gillan, Yu-Wei Ryan Chen,
and Reinie Cordier

The Importance of Play

Play has been described as all-encompassing and complex behaviour that appears deceptively simple (deRenne-Stephan, 1980; Knox, 1974). Play is well established to be an essential aspect of child development that supports various skills, including communication, cognitive, social, emotional, and physical skills, as well as contributing to self-awareness and problem solving (Ginsburg, 2007; Stagnitti, 2004). Further, play encompasses multiple skills essential for school activities that could enhance children's ability to learn (Milteer et al., 2012).

From a young age, play is the context in which children interact with their world. Play enables opportunities for children to explore their fears, master new skills, express their ideas, and exchange perspectives by taking on the role of others. These play opportunities, in turn, foster flexibility in thinking, adaptability, and learning (Howard, 1986; von Zuben et al., 1991).

Further, play can facilitate skill development, thereby enhancing a child's independent participation in activities of daily life. Moreover, children who display highly developed play skills are increasingly likely to be engaged in play, be more creative and confident, and develop better coping strategies (Bundy, 2012). Thus, children with highly developed play skills will be better equipped for developmental challenges into adulthood (Barnett, 1991).

The Benefits of Play on Children's Social, Emotional, and Mental Health Outcomes

Children are social by nature and engage in social play through interactions with caregivers and peers. Play is the context within which many childhood friendships are formed (Bundy, 2012) and is widely accepted to reflect a child's social competence and skills. Further, play gives children opportunities

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for social learning and has an important role in the short and long-term development of social competence (Ginsburg, 2007). Play is also a natural and ideal context for developing social skills. As children grow, they engage in cooperative and pretend play with peers which involves communication, role-taking, sharing and conflict resolution. This type of play supports children to develop their social-emotional skills as it requires them to perspective-take, to regulate their emotions, and to adapt their actions as the situation unfolds (Rubin, Fein & Vandenberg, 1983).

While there is ample literature noting the benefits of play in child development, there are relatively few longitudinal studies that examine the influence of play on children's future social, emotional, and mental health outcomes in typically developing samples, with links remaining more theoretical than empirical (Schwartz & Badaly, 2010). In this emerging literature, sample sizes are often small, the studies are short-term longitudinal in design, and diagnoses remain a significant focus (e.g. conduct problems, autism spectrum disorders (ASDs)). Despite these limitations, preliminary evidence is encouraging and has identified play as a protective factor for children's mental health. Cross-sectional data show that through play, children are presented with learning opportunities to discover emotions, rehearse emotional regulation, and conquer fears (Dodd & Lester, 2021). Play, particularly with peers, is also considered critical to social development, as it is the platform in which children learn to share, cooperate, negotiate, solve problems, and self-advocate (Ginsburg, 2007). Data from a longitudinal study found that for typically developing children, peer play and friendships at seven–nine years reduced the risk of internalising and externalising difficulties, as well as improving literacy outcomes on national tests at 11 years (Gibson et al., 2021a; Toseeb et al., 2020). Further, evidence suggests sociodramatic play of preschool children was found to be positively associated with math achievement in early elementary school (Hanline et al., 2008). In a cohort study of 3000 children in the UK, Sylva et al. (2004) showed extended play-based preschool experience (i.e. three years) was advantageous to children from disadvantaged households for academic and social development. Similarly, a German study (Darling-Hammond & Snyder, 1992) found by Grade 4 children from 'play-based kindergartens' (n = 50) were more advanced in reading, maths, and social/emotional adjustment in school compared with children who attended 'early learning centres' (n = 50). Likewise, a study conducted in the USA found that playful learning in preschools was associated with better short and long-term academic, motivational, and well-being outcomes by the end of primary school (Marcon, 2002).

While both theorists and therapists from varying disciplines agree on the importance and developmental benefits of play, and there is emerging research into the long-term nature of these benefits, the debate on what constitutes play continues (Barnett, 1991). To understand the complex phenomenon of play, the next section of this chapter will identify key definitions of play and present four prominent play theories.

Definitions and Theories of Play

Defining Play

Theorists have struggled unsuccessfully for years to reach consensus on a definition of play (Sutton-Smith, 1980). While there is some disagreement about the exact characteristics comprising play (Rubin et al., 1983), play is commonly defined by the characteristics that separate it from non-play. Neumann (1971) proposed a simple list: intrinsic motivation, internal control, and suspension of reality. After the work of Bateson (1972), Bundy (e.g. Bundy, 2004; Skard & Bundy, 2008) proposed the addition of a fourth characteristic: framing (giving and responding to social cues). For the purposes of this chapter, play will be defined as a transaction between the individual and the environment that is *intrinsically motivated*, *internally controlled*, *free of many of the constraints of objective reality,* and skills related to *framing* (giving and responding to cues) (Bateson, 1972; Skard & Bundy, 2008). *Intrinsic motivation* is when a child engages in an activity simply because it is fun for them, rather than for an external reward. *Internal control* occurs when children are mostly in charge of their actions and some outcomes of the activity, where they make decisions that influence their engagement in the game. *Freedom from unnecessary constraints of reality* indicates children choose how close to reality their play is and involves pretend play, clowning, and playful teasing. *Framing* refers to a child's ability to give and respond to social cues about how to interact with another.

Play manifests in children as playfulness (i.e. the disposition to play) (Bundy, 2004; Neumann, 1971). While playfulness is known to be the disposition or tendency to play (Barnett, 1991; Bundy, 2004), it can also be thought of as the common characteristics that so frequently define play (Cordier & Bundy, 2009).

Theories of Play

There have been many theories of play developed to define play and its functions, which can be categorised into classical and modern (Mellou, 1994). Classical theories of play originated in the late nineteenth and early twentieth centuries to explain the roles and purpose of play, including the surplus energy theory (Spencer, 1878), the recreation or relaxation theory (Lazarus, 1883; Patrick, 1916), the pre-exercise theory (Groos, 1898;1978), and the recapitulation theory (Hall, 1920). These theories are mainly based in philosophy instead of research evidence. However, they serve as a foundation for the development of modern theories of play. In this section, four well-known groups of modern theories are introduced.

Arousal Modulation Theories of Play – Exploration Vs. Play

Originated in the discipline of psychology, arousal modulation theories of play postulated that the individual's central nervous system attempts to reach or retain an optimal arousal level via interacting with the environment (Berlyne, 1966; Ellis, 1973). Specifically, an individual will reduce the high arousal level associated with anxiety to explore the novel or uncertain situation carefully. Conversely, an increase in arousal through the stimulus-seeking behaviours can be observed when an individual is in a predictable or boring environment (Berlyne, 1971). Ellis (1973) suggested that such stimulus-seeking behaviours are the basis of play. Hutt (1970, 1985) further conceptually differentiated between exploration and play. That is, exploration occurs when the child is engaged in novel situations and asks, 'What can this object do?' whereas play occurs when the child is in familiar situations and asks, 'What can I do with this object?' (Hutt, 1970). This distinction between exploration and play suggests that play is associated with exploration; however, not all the exploration should be considered as play (Burghardt, 2005).

Psychodynamic Theories of Play – Play and Emotional Development

The psychodynamic theories of play (Freud, 1961; Erikson, 1963) focus on the role of play in a child's emotional development, highlighting the importance of early childhood experience in later development of personality. These theories considered play as the means for children to express themselves and feel in control. In addition to wish fulfilment, play can also facilitate children to demonstrate mastery and actively cope with anxiety-provoking situations. During play, children create situations where they can master and cope successfully with anxiety and uncertainty, which will support children's ego development. Thus, the psychodynamic theories of play encourage children to engage in play and express their emotions, leading to the ability to master reality.

Cognitive Developmental Theories of Play – Play and Cognitive Development

Cognitive developmental theories of play explain the relationship between play and cognitive development. Piaget (1962) suggested that play is primarily a joyful cognitive process in interpreting new experience through fitting the information into existing cognitive schema or mental structure (i.e. the cognitive process of assimilation). He further proposed that different developmental stages involve distinct play behaviours, from repeating similar play actions in infant–toddler age period to engaging in games-with-rules play in late childhood. Similarly, Vygotsky (1977) also described play as a developmental phenomenon. However, unlike Piaget, Vygotsky viewed cognitive development from a sociocultural perspective, where play provides a context for children to develop self-regulation, language, and cognitive and social skills via interactions with more experienced peers or adults.

In contrast to Piaget's view of play as an expression of the cognitive process of assimilation, Bruner (1972) suggested that play is the origin of creative problem solving. He proposed that play is a voluntary activity performed in a stress-free environment in which children can combine cognitively guided behaviours in novel ways without considering the consequences of their behaviours. Thus, play promotes innovation and flexibility in behaviours and thinking, leading to cognitive development, including problem solving and creativity (Sutton-Smith, 1980).

Sociocultural Theories of Play – Play as Socialisation and Communication

Sociocultural theories posit play as a context for children to learn social norms, values, roles, and behaviours (Schwartzman, 1978). To engage in games with rules in which social rules and norms are applied, Mead (1934) suggested that children must understand other playmates' thoughts, actions, and roles, and be able to adapt their own accordingly. The changes in roles and perspectives lead to the development of a sense of self and an awareness of a 'generalised other' to understand how people who belong to certain groups may think and behave.

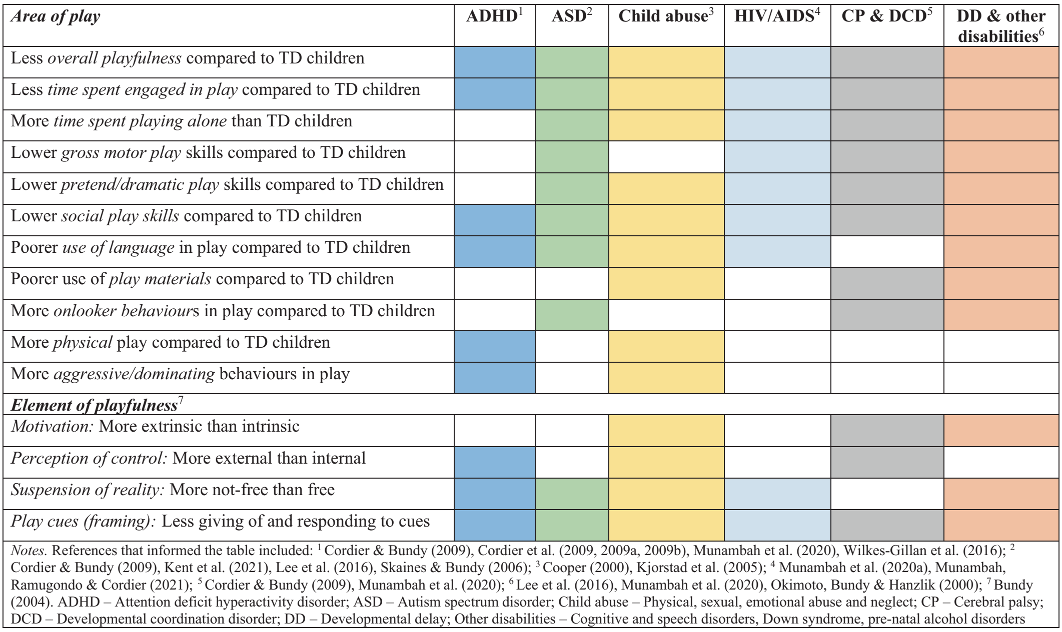
However, some sociocultural theorists suggested that play is a type of communication and an interpretation of society. For example, Bateson (1955, 1972) proposed 'metacommunication', meaning communication about communication, within play. Before the beginning of play, children need to communicate about what play is and how they want to be treated to create a 'play frame'. Thus, children will frame or re-frame the role they pretend in play in line with reality, rather than learn how to become the role (Rubin et al., 1983). In addition to the notion of play as communication, Schwartzman (1978) further suggested that play can reflect and interpret the culture from the perspectives of children because they may question the assumptions of social roles or systems in their play.

The theories of play contribute to the development of models of play to characterise play and to discuss the factors influencing play. For example, Bundy suggested framing as one characteristic of play in her model of playfulness (Skard & Bundy, 2008), which originates from the sociocultural theories of play (Bateson, 1955, 1972). Similarly, Cooper (2000) proposed a model that illustrates the contribution of children's developmental skills and behavioural elements to play based on the sociocultural and cognitive developmental theories of play. These models serve as a useful base to guide the lens in which we view play skills and difficulties in children's play and to inform assessment and intervention. The next section of this chapter will explore a range of childhood conditions where delays in the development of play skills occur.

Delays in the Development of Play

There is evidence to support that children who have neurodevelopmental disorders, who have experienced trauma, or who have physical conditions experience substantial delays in a range of developmental outcomes in the short and long term (Munambah, Cordier, Speyer, Toto & Ramugondo, 2020;

Table 41.1 Delays in the development of play



Area of play	ADHD[1]	ASD[2]	Child abuse[3]	HIV/AIDS[4]	CP & DCD[5]	DD & other disabilities[6]
Less *overall playfulness* compared to TD children	■	■	■	■	■	■
Less *time spent engaged in play* compared to TD children	■	■	■	■	■	■
More *time spent playing alone* than TD children		■	■	■	■	■
Lower *gross motor play* skills compared to TD children		■		■	■	■
Lower *pretend/dramatic play* skills compared to TD children		■	■	■	■	■
Lower *social play skills* compared to TD children	■	■	■	■	■	■
Poorer *use of language* in play compared to TD children	■	■	■	■		■
Poorer use of *play materials* compared to TD children			■		■	■
More *onlooker behaviour*s in play compared to TD children		■			■	■
More *physical* play compared to TD children	■		■			
More *aggressive/dominating* behaviours in play	■		■			
Element of playfulness[7]						
Motivation: More extrinsic than intrinsic			■		■	■
Perception of control: More external than internal	■		■		■	
Suspension of reality: More not-free than free	■	■	■	■		■
Play cues (framing): Less giving of and responding to cues	■	■	■	■	■	■

Notes. References that informed the table included: [1] Cordier & Bundy (2009), Cordier et al. (2009, 2009a, 2009b), Munambah et al. (2020), Wilkes-Gillan et al. (2016); [2] Cordier & Bundy (2009), Kent et al. (2021), Lee et al. (2016), Skaines & Bundy (2006); [3] Cooper (2000), Kjorstad et al. (2005); [4] Munambah et al. (2020a), Munambah, Ramugondo & Cordier (2021); [5] Cordier & Bundy (2009), Munambah et al. (2020); [6] Lee et al. (2016), Munambah et al. (2020), Okimoto, Bundy & Hanzlik (2000); [7] Bundy (2004). ADHD – Attention deficit hyperactivity disorder; ASD – Autism spectrum disorder; Child abuse – Physical, sexual, emotional abuse and neglect; CP – Cerebral palsy; DCD – Developmental coordination disorder; DD – Developmental delay; Other disabilities – Cognitive and speech disorders, Down syndrome, pre-natal alcohol disorders

Notes. **References that informed the table included: [1] Cordier & Bundy (2009), Cordier et al. (2009), Munambah et al. (2020), Wilkes-Gillan et al. (2016); [2] Cordier & Bundy (2009), Kent et al. (2021), Lee et al. (2016), Skaines & Bundy (2006); [3] Cooper (2000), Kjorstad et al. (2005); [4] Munambah et al. (2020, 2021); [5] Cordier & Bundy (2009), Munambah et al. (2020); [6] Lee et al. (2016), Munambah et al. (2020), Okimoto, Bundy & Hanzlik (2000); [7] Bundy (2004).** *ADHD* **Attention deficit hyperactivity disorder,** *ASD* **Autism spectrum disorder,** *Child abuse* **Physical, sexual, emotional abuse and neglect,** *CP* **Cerebral palsy,** *DCD* **Developmental coordination disorder,** *DD* **Developmental delay,** *Other disabilities* **Cognitive and speech disorders, Down syndrome, pre-natal alcohol disorders**

Potterton et al. 2009). This includes the development of their play when compared to typically developing (TD) children. For example, children who have attention deficit hyperactivity disorder (ADHD) or ASD; children with HIV/AIDS; children exposed to physical, sexual, or emotional abuse and neglect; children with cerebral palsy (CP) or developmental coordination disorder (DCD); and children with developmental delay (DD) and other disabilities, such as cognitive and speech disorders, Down syndrome, and pre-natal alcohol disorders, have difficulties in play (see Table 41.1).

Across literature, children with (1) ADHD, (2) ASD, (3) exposure to abuse, (4) HIV/AIDS, (5) CP and DCD, and (6) DD and other disabilities were all found to be less playful compared with TD children. This is supported by broader research indicating these childhood conditions impact a child's developmental trajectory across multiple domains. Surprisingly, while children exposed to abuse are likely to experience the most delays in the development of their play, there is relatively little research into their play compared to children with other conditions (see Table 41.1).

Children with ADHD

ADHD is the most common neurodevelopmental disorder in school-aged children and characterised by developmentally inappropriate levels of inattention, impulsivity, and hyperactivity. These core characteristics and associated behaviours of the disorder are well established to cause impairment in children's academic and social functioning (American Psychiatric Association, 2013). Children with

ADHD have been found to be significantly less playfulness when compared to TD children (Cordier et al., 2009). They have been found to have difficulty when playing with friends, including engaging in more rule violations and play interruptions and demonstrating more aggressive/dominating play behaviours (Normand et al., 2017). Children with ADHD have also been found to spend less time engaged in play, with increased transitions between activities (Cordier et al., 2009). Children with ADHD also have well established difficulty with social play interactions (Cordier et al., 2010; Wilkes-Gillan et al., 2016).

Regarding the playfulness of children with ADHD, Cordier and Bundy (2009) identified children with ADHD are intrinsically motived to engage in play for the process, rather than for external reward. They are particularly motivated to engage in social play and seek out interactions with others. However, they do have noted difficulty with remaining engaged in play (Cordier et al., 2009). Children with ADHD have marked difficulty with internal control demonstrated by decreased skills in sharing with and supporting the play of others, transitioning between activities, and the intensity in which they engage in social play. These skills require inter-personal empathy and the ability to perspective-take and taking on others' viewpoints (Cordier et al., 2010; Wilkes-Gillan et al., 2016). Children with ADHD have difficulty suspending reality and demonstrate lower pretend play skills and have difficulty with framing, which requires they respond to cues given by the person they are playing with (Cordier & Bundy, 2009). Children with ADHD have also been found to have particular strengths in play or relatively harder skills. This included negotiating to have their own needs met, in the area of internal control. In the area of freedom from constraints of reality, they were also skilled in their use of mischief, clowning, and playful teasing to keep their playmate engaged (Cordier & Bundy, 2009; Cordier et al., 2009, 2010).

Children with ASD

Autism spectrum disorder is a pervasive neurodevelopmental disorder characterised by deficits in social communication skills and restricted and repetitive behaviours or interests (American Psychiatric Association, 2013). The play of children with ASD has been extensively investigated in research and is reported to be significantly different to the play of TD children (see Table 41.1). Children with ASD were found to have lower play skills overall and have play that is more restricted and repetitive than TD children. The play of children with ASD also involves stereotypical responses and lacks repertoire, complexity, and diversity (Skaines et al., 2006). Several studies have found pretend, social, and cooperative play skills to be lower in children with ASD. While there are noted similarities in the play of children with ASD and there are also differences in their play (Skaines et al., 2006). During pretend play, children with ASD produced fewer novel play acts and engaged in less elaborate pretend play (Desha et al., 2003). Further, they exhibited less playfulness compared to children with DD (Lee et al., 2016). Lee et al. (2016) found that compared to TD children and children with DD, the play children with ASD relied more on others to generate novel ideas of how to play. Further, the more children with ASD imitated others' actions, the less they were able to engage in the suspension of reality (Lee et al., 2016).

Regarding their playfulness, Cordier and Bundy (2009) noted children with ASD demonstrate intrinsic motivation in their preference to play by themselves and in activities of their choice which hold high interest to them. Children with ASD have noted strengths and difficulties in the area of internal control. While they have been found to be more skilful in deciding which play activity they engage in and to remain engaged, they have difficulty sharing control with others in play (Cordier & Bundy, 2009; Kent et al., 2021). In relation to suspension of reality, children with ASD have known difficulties with pretend play and clowning/humour in play (Kent et al., 2021). This is likely due to their more literal interpretations of situations and object use. Children with ASD are also more likely to have difficulty with framing, which involves both giving cues and responding to cues given by others in play. This may be explained by children with ASD having difficulty with identifying the emotional state of others and responding to others' emotions and non-verbal cues (Cordier & Bundy, 2009).

Children Exposed to Abuse

Childhood abuse and neglect occurs in the context of a relationship of responsibility, trust, or power and includes all types of physical and/or emotional ill-treatment (i.e. sexual abuse, neglect, negligence, and commercial or other exploitation) that causes actual or potential harm to the health, survival, development, or dignity of a child aged under 18 years (World Health Organisation [WHO], 2001). There are different forms of child abuse which can include physical, sexual, or emotional abuse or neglect (Cooper, 2000). While child abuse is an international issue that occurs in developed and developing countries and across socioeconomic and ethnic groups, child abuse remains relatively hidden (Cooper, 2000). Over the last two decades there has been an increase in research into the negative outcomes associated with child abuse. These include social and psychological maladjustment and delayed development, including children's play skills. Research on the play of children exposed to abuse has received relatively little attention (Kjorstad, O'Hare, Soseman, Spellman & Thomas, 2005). Alessandri (1991) found maltreated children engaged in more solitary or parallel play rather than group play and engaged in more functional and constructive play rather than pretend play. Cooper (2000) critically examined literature on the impact of child abuse on children's play, through a descriptive model of children's play as a conceptual framework. Research has demonstrated that children exposed to abuse are at increased risk of developmentally delayed play skills and overall playfulness and have higher behavioural disturbances in their play.

In a conceptual model Cooper's (2000) conceptual model posits children exposed to trauma have substantial delays in all areas of playfulness as well as in cognitive, physical, and social play skills (see Table 41.1). Regarding internal control, the play behaviour of physically abused children has been described as poorly controlled and impulsive with increased transitioning between activities (Gil 1991). In regard to suspension of reality, children exposed to abuse were less likely to engage in pretend play, and physically abused children were more likely to demonstrate aggression and conflict in their pretend play (Cooper, 2000). Regarding intrinsic motivation, the play of children exposed to abuse is marked by decreased exploration, aimless activity, little sustained interest in toys and objects, and lack of expressed enjoyment in play (Cooper, 2000).

Children with HIV/AIDS

HIV/AIDS is a chronic disease and remains a major global health problem. Children living with HIV/AIDS face ongoing comorbid illnesses, such as tuberculosis, heart problems, and malnutrition; experience trauma and stigma; and often live in poverty (Munambah Cordier, Chiwarido & Ramugondo, 2021). Children living with HIV/AIDS also experience neurocognitive deficits and DDs in their social and language development that impact their play. However, the play of children with HIV/AIDS has rarely been investigated (Munambah et al., 2020; Munambah, et al., 2021; Potterton et al., 2016).

Munambah et al. (2021) found children with HIV/AIDS had lower overall play skills than TD children, especially in outdoor play. Further, they were found to spend less time engaged in play and more time playing alone. As reported by parents, this is likely due to the reduced opportunities to play in community outdoor spaces, such as playgrounds, and more time spent with caregivers. Children's opportunities to develop social play skills and engage in play with other children are likely restricted in parents needing to provide additional caregiving and wanting to protect their child from stigma (Munambah et al., 2020).

When investigating the play profile of children with HIV/AIDS compared to TD children, Munambah et al. (2020) found children with HIV/AIDS demonstrated similarities to TD children on elements of intrinsic motivation and internal control, yet performed significantly poorer on suspension of reality and framing in both indoor and outdoor play. Munambah et al. (2020) concluded this could be due to these aspects of play requiring higher cognitive demands, making it more difficult for children with HIV/AIDS who have neurocognitive impairments. Framing and suspension of reality are dependent on social interaction during play, understanding and social rules and being able to support others in play. These elements of play were likely harder for children with HIV/AIDS due to their reduced opportunities to engage in social play in safe and emotionally supportive environments with other children (Munambah et al., 2020).

Children with CP and DCD

In a recent systematic review that compared the play of children with disabilities to TD children, Munambah et al. (2020) found children with physical disabilities, including CP and DCD, had lower overall play skills compared with TD children. From the 18 included studies which had a total of 1608, 79 participants had CP and 99 had DCD. Collectively these studies found children with CP and DCD spent less time engaged in play, were less independent in play, and had more onlooker play behaviours and more time playing alone. They were also found to have lower gross motor, pretend and social play, and decreased emotional expression during play (see Table 41.1).

Cordier and Bundy (2009) note that children with physical disabilities, such as CP, may have decreased internal control, observed through children's decreased engagement with an activity as well as their ability to persist with an activity that is difficult for them. These difficulties could arise as children with CP receive less feedback from the environment, which can result in a restricted capacity to influence their environment. Framing is also impacted as children can also experience restrictions in their ability to give their peers effective non-verbal cues (Cordier & Bundy, 2009; Okimoto, Bundy & Hanzlik, 1999). This may result in children seeming passive or unresponsive and caregivers and peers having difficulty in responding to them appropriately. Further, children's intrinsic motivation is decreased when there are barriers to them being able to access the physical environment and to independently move to or choose which activity to play (Okimoto, Bundy & Hanzlik, 1999). For children with physical disabilities, this impacts their ability to make decisions about the direction of their play and interact less with objects in a skilled way, all elements of internal control (Harkness & Bundy, 2001).

Children with Developmental Delay and Other Disabilities

In the systematic review investigating differences in children's play by Munambah et al. (2020), 125 of the 1608 participants across the included studies had DDs. In terms of other disabilities, 31 had cognitive and speech disorders, 15 had pre-natal alcohol exposure, and 14 had Down syndrome. Children with DD and other disabilities were found to have lower overall play skills and lower social play skills when compared to TD children (Hamm, 2006; Munambah et al., 2020; Okimoto, Bundy & Hanzlik, 1999). They were also found to engage more in solitary or parallel play (see Table 41.1).

While the play profile of children with DD has been described as similar to children with ASD (Thiemann-Bourque et al., 2012), a key difference may be the increased ease at which children with DD and other disabilities demonstrate suspension of reality and internal control. When investigating the play patterns of children with DD, ASD, and those who were TD, Lee et al. (2016) found children with DD engaged more in pretend play actions, particularly symbolic play. Increased internal control was demonstrated in children with DD who were more able to control their own play actions and interact with objects.

The play difficulties of children with a range of diagnoses are extensive and varied. Further the child's capacity to play is interconnected with their environment. Given these factors and the complexity of different types of play, an array of assessments has been developed with the aim to identify children's individual challenges. The next section of this chapter outlines five important dimensions of play assessment and ten different assessments that can be used to assess children's play.

Assessment of Play

To promote play for children who have difficulties in play, health practitioners require knowledge of play. However, play is complex, and it is difficult to describe its essence and characteristics. While the selection of play assessment depends on how play is characterised, standardising and quantifying play for evaluation is challenging (Bundy, 2012; Stagnitti, 2004). The only clear understanding is that play is multi-dimensional. To examine play, Bundy (2005, 2011, 2012) proposed five important dimensions of play assessment:

1. Environmental supportiveness for play.
2. Play activities.
3. Source of motivation for play.
4. Approach to play (play manner).
5. Skills used in play.

These five dimensions can be categorised into extrinsic (i.e. the aspects related to the play context, which include the first two dimensions) and intrinsic (i.e. the characteristics inherent within the person, referring to the rest of the dimensions) dimensions. When there is concern about a child's play, the assessment should focus on the fit between the child's intrinsic and extrinsic dimensions of play (see Fig. 41.1), that is, examining whether the environment and play activity meet the needs of the child, and whether the child's motivation, approach, and skills match the demands of the activity and environment. Further, in addition to directly observing the child's play, the assessment should involve collecting information from both the child and caregivers regarding their subjective perspectives and experiences to have a holistic and comprehensive understanding of play. The following section provides an overview of each play dimension, followed by examples of assessments associated with each dimension in terms of the purpose and methods for evaluation. Table 41.2 summarises the assessments.

Supportiveness of the Play Environment

A child's engagement and enjoyment in play can be observed when there is a supportive environment to facilitate and enable play. To understand and evaluate play, it is critical to examine whether the environment, especially the real-life environment as opposed to clinical settings, supports play, including both human and non-human aspects. The human environment refers to people with whom a child plays and who supports or inhibits the child's play. For infants and young children, the support

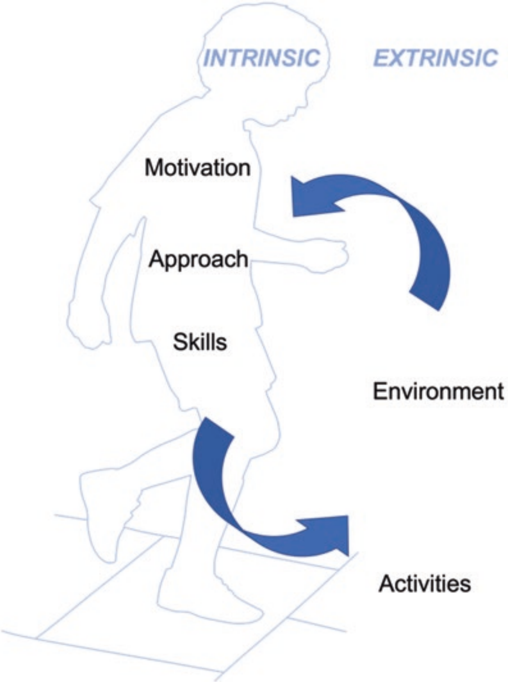


Fig. 41.1 Five dimensions of play assessment

Table 41.2 Common play assessments

Assessment name (author)	Purpose	Orientation	Evaluation format and time	Age range	Reported psychometric properties with examples of evidence
Supportiveness of the play environment					
Assistance to Participate Scale (APS) (Bourke-Taylor et al., 2009)	Identify the assistance a child needs to participate in play and leisure activities	Based on the International Classification of Functioning, Disability and Health (ICF) (WHO, 2001)	Caregiver report, 10 min	5–18 years	**Reliability:** internal consistency, test–retest (Bourke-Taylor et al., 2009; Bourke-Taylor & Pallant, 2013; Joyce et al., 2017). **Validity:** content, construct, concurrent, discriminant (Bourke-Taylor et al., 2009; Bourke-Taylor & Pallant, 2013; Joyce et al., 2017).
Test of Environmental Supportiveness (TOES) (Bronson & Bundy, 2001)	Explore the ways in which a child's play is affected by environment	Previous advocates on person-environment fit (Keihofner, 1995; Magnussen, 1981; Wicker, 1987)	Observational assessment in a 15- to 20-min free play session/natural environment	1.5–15 years	**Reliability:** internal consistency, inter-rater (Hamm, 2006; Bronson & Bundy, 2001). **Validity:** content, construct, discriminant (Hamm, 2006; Bronson & Bundy, 2001; Bundy et al., 2009)

(continued)

Table 41.2 (continued)

Assessment name (author)	Purpose	Orientation	Evaluation format and time	Age range	Reported psychometric properties with examples of evidence
Play activities					
Children's Assessment of Participation and Enjoyment (CAPE)/ Preference for Activities of Children (PAC) (King et al., 2004)	Child's participation/ preference of involvement in leisure activities outside school	Based on definition of participation according to International Classification of Functioning, Disability and Health (ICF; WHO, 2001)	Child self-report questionnaire or interviewer-assisted version; 30–45 min for CAPE and 15–20 min for PAC	6–21 years	**Reliability:** internal consistency, test–retest (King et al., 2004; Potvin et al., 2013). **Validity:** content, construct, concurrent, criterion (King et al., 2004; King et al., 2007; Potvin et al., 2013; Brown & Thyer, 2020; Lugton, Brown, & Stagnitti, 2020).
Kid Play Profile (Henry, 2008)	Child's play Profile of participation, enjoyment and interaction.	Originated from the Model of Human Occupation (Kielhofner, 2007)	Child self-report checklist-pictures and simple words; 15 mins to complete 50 activities	6–9 years	**Reliability:** internal consistency, test–retest (Henry, 2000). **Validity:** content, concurrent (Henry, 2000; Lugton, Brown, & Stagnitti, 2020).
Play History (Bryze, 2008)	Children's play experience, interactions, environments, opportunities	Based on Piaget (1962), Gesell (1945), field of developmental psychology and occupational therapy (e.g. Florey, 1971, Reilly, 1974)	Semi-structured interview with a parent or carer; time not specified	0–16 years	**Reliability:** inter-rater, test–retest (Behnke & Fetkovich, 1984).**Validity:** content, concurrent (Behnke & Fetkovich, 1984).
Play Observation Scale (POS) (Rubin, 2001)	Children's free play preferences	Based on the work of Parten (1932) and Piaget (1962)	Child's behaviour coded in observation, 15 min/ time-sampling method, 10 s	2–6 years	**Reliability:** inter-rater (Rubin, 2001). **Validity:** not identified.
Source of motivation for play					
Pediatric Volitional Questionnaire (Basu et al., 2008)	Volitional behaviours demonstrated playing in natural setting	Based on the concept of volition in Model of Human Occupation (Kielhofner, 2007)	Observation in natural environments (e.g. home); 10–30 min	2–7 years	**Reliability:** internal consistency, inter-rater (Andersen et al., 2005; Tayler et al., 2009). **Validity:** content, construct, concurrent (Andersen et al., 2005; Miller et al., 2014; Reid, 2005).

(continued)

Table 41.2 (continued)

Assessment name (author)	Purpose	Orientation	Evaluation format and time	Age range	Reported psychometric properties with examples of evidence
Approach to play					
Test of Playfulness (Skard & Bundy, 2008)	Evaluate four elements of playfulness in children	Previous work on play and playfulness by Neumann (1971), Lieberman (1977), Rubin et al. (1983) and Barnett (1991)	Observation in free play; 15–20 min	6 months to 18 years	**Reliability:** internal consistency, inter-rater reliability, test–retest (Bundy, Nelson, Metzger, & Bingaman, 2001; O'Brien & Shirley, 2001). **Validity:** content, construct, concurrent (Bundy, Nelson, Metzger, & Bingaman, 2001).
Skills used in play					
Child-Initiated Pretend Play Assessment (ChIPPA) (Stagnitti, 2007; Sarah et al., 2020)	Evaluate the quality of a child's ability to self-initiate pretend play	Based on the cognitive developmental theories of play (Piaget, 1962; Sutton-Smith, 1967)	Observation in two 15 min sessions	3–7 years	**Reliability:** Internal consistency, intra-rater, test–retest, inter-rater (Stagnitti & Unsworth, 2004; Swindells & Stagnitti, 2006; Stagnitti et al., 2016; Lucisano et al., 2021). **Validity:** content, concurrent, discriminant (Uren & Stagnitti, 2009; Swindells & Stagnitti, 2006; Stagnitti et al., 2016; Stagnitti & Lewis, 2015; Lucisano et al., 2021).
Revised Knox Preschool Play Scale (RKPPS) (Knox, 2008)	Child's play capacities from developmental perspective	Based on developmental theory (Schaefer, Gitlin & Sandgrund, 1991)	Observation in free play indoors and outdoors; 30 min for each setting	0–6 years	**Reliability:** internal consistency, inter-rater, test–retest (Lee & Hinojosa, 2010; Jankovich et al., 2008). **Validity:** content, construct, concurrent (Knox, 2008; Lee & Hinojosa, 2010; Jankovich et al., 2008).

from caregivers, such as parents, plays a vital role as parents, the primary people the child interacts with in daily life, offer a secure base from which to explore and play freely (Ainsworth, 1985). Therefore, the assessment focuses on whether the caregivers provide reasonable and consistent boundaries, and whether their attitudes show valuing of play. Here the evaluation may further consider the cultural impacts on play. For example, people with Western cultural background may embrace the important role of play and engage their children in playful activities (Muhonen et al., 2019; Parmar et al., 2004, 2008). However, parents in Asian culture may consider that the child's early academic instruction is more valuable than play, which will then influence the child's opportunities in play (Lin et al., 2019; Muhonen et al., 2019; Parmar, Harkness, & Super, 2008). Thus, it is also important to understand how parents structure time and space for play, what resources and materials they provide, and how they view and use play under the cultural influence on their families. In addition to the caregivers' influences, the supports from peers and playmates will be another social environment for play evaluation in terms of whether they are able to read and give play cues and whether they participate as a playmate. The non-human environment comprises the toys or the materials the child uses in play as well as the space and play settings (e.g. home, community and education settings). Thus, the assessment of non-human environment will focus on the play materials as developmentally appropriate and interesting and the amount and configuration of space, including its safety and accessibility.

Two assessments evaluating the supportiveness for play environment are presented. *The Test of Environmental Supportiveness (TOES)* (Bronson & Bundy, 2001) is an observational assessment tool that can record the extent to which elements of a particular environment support the child's play. The elements include play objects the child use, the play space and sensory environment where the play occurs, and the supports from playmates and caregivers. The *TOES* can also be useful to document any potential changes to the play environment. Another assessment is the *Assistance to Participate Scale (APS)* (Bourke-Taylor et al., 2009). This scale is a caregiver report to identify the levels of assistance that a child needs to participate in eight play and leisure activities.

Engaged and Preferred Play Activities

Another extrinsic dimension of play evaluation is to identify what play activities a child likes and frequently does. There are various ways to categorise play activities in which children engage. For example, Parten (1932) categorised play based on the extent of social involvement from unoccupied play to cooperative play, whereas Takata (1974) developed a taxonomy of play in line with the child's developmental stages (Piaget, 1962). Despite the different categorisation, the play activities need to be intrinsically motivating, freely chosen and controlled by the child, and be free from unnecessary objective constraints (Neumann, 1971; Bundy, 2005), which will further influence how a child approaches play.

There are four commonly used assessments in evaluating play activities: the *Play History* (Bryze, 2008), the *Kid Play Profile* (Henry, 2008), the *Children's Assessment of Participation and Enjoyment (CAPE)/Preference for Activities of Children (PAC)* (King et al., 2004), and *Play Observation Scale (POS)* (Rubin, 2001). The method used in the assessments, except the *POS*, is indirect approach via reports from caregivers or children. The *Play History* aimed to collect the child's play activities and content of play over time via semi-structured interviews with parents or carers. The taxonomy of play development is recorded, which includes five epochs (sensorimotor, symbolic and simple constructive, dramatic and complex constructive, games, and recreational). In each of the play developmental phase, the materials used by the child to play, the child's action in play, with whom and where and when the child play are analysed. The *Kid Play Profile* is a child self-reported checklist, which helps gain a profile of a child's play participation, enjoyment, and with whom they play. There are 50 play and leisure activities in eight categories: Sports, outdoor, summer, winter, indoor, creative, lessons and classes, and socialising activities. To be developmentally appropriate for children aged between 6 and 9 years, the assessment is composed of pictures and simple words so that children who are beginning to read are able to complete the assessment. The *CAPE* and *PAC* are broad assessments covering more than just play. They are designed to measure children's participation and preference for involvement in a wide range of activities outside of school. Both assessments include 55 different activities. As to the *CAPE*, the child needs to report the activities they participated in the previous four months, as well as the frequency of involvement, with whom, when, and how much they enjoyed the activity. For the *PAC*, the child is asked to indicate how much they would like to do the activities if given the opportunity. Lastly, the *POS* is an observational tool to categorise a child's behaviours during free play and determine the type of play activity the child engage in based on the developmental play hierarchy. Before coding the play behaviour, the observer will need to determine whether it is play or non-play.

Source of Motivation for Play

Being motivated is a key characteristic when children engage in play (Bundy, 2005). Thus, understanding the source of motivation for play and why children engage in a particular play activity will help identify the connection between a child's play, their preferences and the play contexts to promote their enjoyment in play. The source of motivation can vary, which influences how play is chosen and formed. For example, children's engagement in play may be simply because of fun, or because they would like to interact with other children. However, there have been no assessments developed to identify why a child engages in a particular play activity. To collect information about the source of a child's motivation for play, health practitioners are encouraged to observe their play and interview caregivers and the child. In addition, the *Pediatric Volitional Questionnaire (PVQ)* (Basu et al., 2008) may help understand the behaviours that indicate the source of motivation when children play in their natural home environment. The *PVQ* uses a direct observation method in a child's natural environment involving 14 items describing behaviours that indicate motivation along with the volitional continuum of exploration (e.g. showing curiosity, trying new thing), competency (e.g. expressing mastery pleasure, trying to solve problems), and achievement (e.g. pursing activity to completion, seeking challenges).

Approach to Play (Playfulness)

The manner in which a child approaches play, or playfulness, is an important dimension for evaluation (Skard & Bundy, 2008). As mentioned earlier, a child should be intrinsically motivated in play, in charge of their actions, and may pretend to be someone else or to tease playfully and engage in mischief. Examining whether a child brings these traits to the play situation will help understand whether the child engage in authentic play and identify areas to promote their play experience. The *Test of Playfulness (ToP)* (Skard & Bundy, 2008) is a play assessment to evaluate a child's playfulness with 29 items representing the four elements of playfulness. It can be scored via either direct observation or videotapes of a child's free play for 15 to 20 min; natural play settings are preferred.

Skills Used in Play

To ensure the assessment focuses on underlying skills used in play instead of general performance skills, evaluation needs to be done in play contexts that consist of toys and/or familiar playmates with minimal intrusion by adults (Bundy, 2005). Two commonly used assessments to evaluate skills used in play via direct observation in play settings are the *Revised Knox Preschool Play Scale (RKPPS)* (Knox, 2008) and the *Child-Initiated Pretend Play Assessment (ChIPPA)* (Stagnitti, 2007). The *RKPPS* includes four dimensions of play skills (space management, material management, pretend/symbolic, participation) from a developmental perspective with 12 categories of play behaviours. The assessment provides a profile of a child's play skills in four dimensions along with a play age. The *ChIPPA* is an assessment that specifically examines cognitive skills in two areas of pretend play: conventional imaginative play using conventional toys and symbolic play using unstructured objects. The observation focuses on the play actions, object substitutions, and imitated actions.

The next section of this chapter focuses on the treatment of play, being play-based interventions. The current evidence-based of play-based interventions is outlined, followed by future directions for research.

Treatment of Play

An array of different play-based intervention approaches has been developed with the aim to support the development of children's play skills, as well as a medium for intervention to improve their social and communication skills. While there are many emerging variations of play-based intervention studies on children with relatively small sample sizes, this section will focus on substantial advances that have been made in recent years in this area of research with the strongest methodological rigour. This included four recent systematic reviews published between 2018 and 2021 (see Table 41.3).

Table 41.3 Systematic reviews of play-based interventions

Study/Aim	Included studies	Participants/Outcomes	Interventions	Main results/Conclusions
Cornell, Lin & Anderson (2018)/ USA Evidence of play-based interventions for students with ADHD	7 studies (single subject design excluded)	127 children with ADHD aged 5–11 years Social play (*n* = 3) ADHD symptoms (*n* = 3) Pragmatic language (*n* = 2)	3 interventions across 7 studies Clinic-based play therapy CBT based (8, 2 x wkly, 45 mins) School-based child centred play therapy (CCCPT; 16, 1 x wkly, 30 mins) Clinic-based play-based intervention (therapist modelling, video modelling, play with TD playmate; 7, 1 x wkly, 1 hr. sessions)	Positive intervention outcomes reported in each of the 7 studies Although findings suggest that play-based interventions for students with ADHD cannot be considered an evidence-based practice, it does appear to be a promising practice
Kent et al. (2021)/ Australia Evidence of interventions to improve play skills of children with ASD	19 studies reporting on play-based interventions All RCTs (inclusion criteria RCT design only) MA (*n* = 11)	1149 Children with ASD aged 2–12 years Play outcome (*n* = 19) Parent-report questionnaire (*n* = 1) Observations of child's behaviour (*n* = 18) – 13 = validated outcome measure with published psychometric properties	Preschool/school-based (*n* = 10) Community based (*n* = 1) Clinic-based (*n* = 5) Home-based (*n* = 2) Clinic and home (*n* = 1)	A small but significant treatment effect was identified (Hedges' g = 0.439) Significant improvement (*n* = 15); no significant difference (*n* = 4) Findings support future development of play-based interventions with focus on social environments
O'Keeffe & McNally (2021)/ Ireland Synthesise play-based interventions for social and communications skills of children with ASD in educational contexts	9 studies RCT (*n* = 3) Multiple baseline (*n* = 3) AB single case (*n* = 2) Within subject (*n* = 1)	107 children with ASD 43 children with ASD in waitlist control groups Aged 3–13 years Social communication outcomes (*n* = 9) – part of inclusion criteria	Special schools (*n* = 3) Mainstream schools (*n* = 6) Within classroom play area (*n* = 4); outside classroom/playground (n = 5) Average duration 21 mins; duration 2–34 wks) Social play with peers (*n* = 6) Guided play, adult involvement (*n* = 9)	Overall, studies in this review provided a promising evidence base for supporting social communication skills through play in education for children with ASD Positive findings (*n* = 3) Mixed findings (*n* = 6) Gaps in research on play-based interventions for the social communication skills of children with ASD within naturalistic educational settings

(continued)

Table 41.3 (continued)

Study/Aim	Included studies	Participants/Outcomes	Interventions	Main results/Conclusions
Gibson, Pritchard & de Lemos (2021)/UK Scoping review Map play-based interventions to support social & communication skills of children with ASD	388 studies 21% RCTs 50% <10 participants	Children with ASD 2–8 years Social play skills most common single intervention target	Other than professionals, most studies included no ($n = 179$) or a parent/carer ($n = 136$) as in intervention agent. Only 32 studies used peers, 25 teachers and 6 siblings. Adult-led interventions were most frequently influenced by a behaviouralist approach or computer based Guided interventions were most frequently feedback based or influenced by a behaviouralist approach	Dimensions for appraisal of play-based interventions should include role of play within an intervention (as a context, a key mechanism, or component of approach), the underpinning philosophy, and role of the practitioner (parent feedback, 1:1 intervention, group facilitation) Research could focus on consolidating the evidence base for existing approaches, rather than further diversification

Play-Based Interventions

Play-based interventions are designed to address a child's developmental needs within the context they naturally develop. Play promotes the development of relationship between a child and therapist and within the therapeutic relationship, and play becomes the medium through which communication, shared understanding, and insight can be facilitated (Ray et al., 2007). Moreover, the therapeutic relationship provides the therapist with the opportunity to model desired behaviours and skills within a context where they are naturally learnt and developed. It is therefore no surprise that play has been used as a therapeutic modality for children diagnosed with several emotional and behavioural disorders. Multiple play-based interventions have shown to be effective in improving children's self-concept, anxiety symptoms and social skills, while decreasing behavioural problems (Bratton et al., 2005; Naderi et al., 2010; Ray, 2004; Ray et al., 2007; Wilkes-Gillan et al., 2016). Usually, play interventions have multiple intervention components, are led by professionals with some level or parent and peer involvement, and are conducted in the clinic or (pre-)school setting (see Table 41.3).

Systematic Reviews of Play-Based Interventions

In four recent systematic reviews, one was a systematic review including a meta-analysis (Kent et al., 2021), two were systematic reviews with a narrative synthesis (Cornell, Lin & Anderson, 2018; O'Keeffe & McNally, 2021) and one was a scoping review (Gibson, Pritchard & de Lemos, 2021b). Of these four reviews, three included play-based interventions for children with ASD and one (Cornell et al., 2018) included play-based interventions for children with ADHD. Across these four reviews, there were a total of 423 included studies. Social play and communication skills were the most commonly reported outcomes, and the interventions were most commonly conducted in the clinic or school setting. Interventions were reported to be led and implemented by researchers or health professionals. In addition, most included no other intervention agents, or included a parent/carer as an intervention agent. Relatively few studies included teachers, peers, and siblings (Gibson, Pritchard & de Lemos, 2021b). This is an important consideration for future research given that most school-aged children play with peers and are supervised and guided by teachers during these interactions (Ginsburg, 2007). This is also an important consideration given the rise of evidence for peer-mediated interventions in supporting children, especially those with ASD to develop their social and communications skills (Kent et al., 2021).

Directions for Future Research

Overall, the results and conclusions from these four reviews conveyed the importance of further consolidating the evidence of existing play-based intervention approaches, rather than developing additional approaches. Additionally, it was noted that while this area of research requires further larger-scale studies, there is emerging evidence to support the use of play-based interventions with children with ASD and ADHD.

A noteworthy finding across the literature is that most play-based interventions are designed and have been evaluated for children with ASD, while other populations of children who experience substantial difficulties in the development of their play skills are largely underrepresented in this area of research. An important area for future research into play-based interventions for children is to extend current approaches to different populations of children. As a first step, the unique play profile of the population should be reviewed and reasons for the underlying play difficulties considered and adaptations of current approaches to be adjusted based on these differences.

Conclusions and Recommendations

This chapter had the following five aims: (1) to provide an overview on the importance of play in a child's development, (2) to describe common play definitions and theories, (3) to explore common childhood diagnoses and disabilities where delays in the development of play skills occur, (4) to summarise the different types of play assessments/outcome measures and their psychometric properties, and (5) to provide an overview of the recent, high-level research evidence of play-based interventions, to identify gaps in the literature of play-based interventions, and to identify directions for future research.

The summary of this chapter is as follows:

- While there is a plethora of literature on the importance and benefits of play and emerging research to support these benefits, further longitudinal research into the role of play on children's social and academic outcomes is required.
- Play is commonly defined by the characteristics that separate it from non-play, including intrinsic motivation, internal control, suspension of reality, and framing. There are four groups of modern theories of play defining the role of play and its functions. First, the arousal modulation theories of play attempted to differentiate play from exploration. The psychodynamic theories associate play with emotional development, whereas the cognitive developmental theories explain the relationship between play and cognitive development. Last, the sociocultural theories suggested play as socialisation and communication.
- Delays in the development of play skills are associated with a number of childhood conditions. While these children all had significantly lower overall play skills than typically developing children, there are differences in the play profiles of children with different conditions. These relative

strengths and weaknesses in different aspects of play should be confirmed through assessment and used to tailor play-based interventions to children's unique needs.

- Play assessment is multi-dimensional. The intrinsic dimension includes the source of motivation for play, the child's approach to play, and skills used in play, while the extrinsic dimension involves the supportiveness of environment and play activities the child engages in. When there is a concern about a child's play, the assessment should focus on the fit between the child's intrinsic and extrinsic dimensions of play.
- Research from four recent systematic reviews demonstrates play-based interventions have emerging evidence-based approach for use with children with ASD and ADHD. Further research on play-based intervention with other conditions (i.e. child abuse, physical and developmental disabilities) is required as these children too have substantial difficulties in play.

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Evidence-Based Interventions to Teach Social Skills

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Evidence-Based Interventions to Teach Social Skills

Social skills are those skills that individuals use to communicate and interact with one another through verbal behavior. Skinner (1957) defined verbal behavior as "the behavior of an individual that has been reinforced through the mediation of another person's behavior in ways in which have been conditioned precisely, in order to reinforce the behavior of the speaker." (p. 2; 225) Verbal behavior allows humans to interact non-vocally through joint attention (Charman, 2003; Volkmar & van der Wyk, 2017) gesturing, writing, drawing (Skinner, 1957), and body language (Mandal, 2014), or verbally through the use of audible language and speech sounds (Skinner, 1957; Vargas, 2013).

Social skills are among the most important life skills, allowing individuals to communicate and interact successfully with others (Deming, 2017; National Research Council [NRC], 2001). Social skills deficits manifest when individuals do not display the social behaviors necessary to develop meaningful relationships (Leaf, 2017), and are characteristic of several disorders. For example, social skills deficits may present as a feature of autism spectrum disorder (ASD; American Psychiatric Association [APA], 2013; Weiss & Harris 2001), intellectual disability (ID; Wilkins and Matson 2009), attention-deficit hyperactivity disorder (ADHD; de Boo & Prins, 2007), anxiety (Angelico et al., 2013), depression (Tse & Bond, 2004), behavioral disorders (Gresham, 1986), oppositional defiant disorder (ODD; Skoulos & Tryon, 2007), and rarer disabilities such as Williams Syndrome (WS; Gillooly et al., 2020). Individuals carrying these diagnoses often lack positive social behaviors such as initiating and maintaining social interactions (Weiss & Harris 2001), understanding non-verbal communication in social situations (Peters & Thompson, 2015), an ability to sustain attention or interest during social interactions (de Boo & Prins, 2007; Weiss & Harris 2001), and development of meaningful relationships (Carter et al., 2005). Persons with these disorders may also present with negative social behaviors and excesses such as hypersociability (Fisher et al., 2016), social avoidance (Angelico et al., 2013; Tse & Bond, 2004), and argumentative and conflict causing behaviors (Skoulos & Tryon, 2007).

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These social skills deficits can have serious consequences. Social deficits may result in difficulties in the area of communication and an avoidance of social interaction, impeding an individual's ability to engage in everyday interactions with others and develop and maintain relationships (Bauminger & Kasari, 2000; Howlin, 2000). This can result in exclusion in both school and community settings (Koegel et al., 2013a, b), overall feelings of loneliness (Bauminger & Kasari, 2000), behavioral challenges (Cowen et al., 1973), and bullying (Ashburner et al., 2019). Social deficits also increase the risk of comorbid disorders, such as anxiety and depression (Howlin et al., 2004; Sterling et al., 2008), sometimes resulting in suicidal ideation (Mayes et al., 2013). Social skills deficits also have a large impact on family functioning as a whole (Herring et al., 2006), including increased parental stress (Baker-Ericzén et al., 2005; Davis & Carter, 2008) and a strain on building positive parent–child relationships (Hoppes & Harris, 1990).

In contrast, a strong social skills repertoire results in language development (Koegel & Frea, 1993), effective communication, and successful social interactions (Deming, 2017; Whitehouse et al., 2001), allowing for the development and maintenance of relationships (Whitehouse et al., 2001). The development of relationships is correlated with increased self-esteem and confidence and a reduction of anxiety, loneliness, and depression (Riggio et al., 1990). Furthermore, social skills are important in acquiring and maintaining a job (Bellstedt et al., 2005). Therefore, social skills are needed to be successful throughout one's life and contributes to an overall increase in happiness (Sturmey, 2017).

Remediation for Social Skills Deficits

Ineffective Procedures and Fad Treatments

DiGennaro Reed et al. (2017) defines evidence-based practice as "the process of using results from high-quality research to inform clinical practice, while also taking into consideration clinical experience and expertise, and the individual characteristics, culture, and preferences of a client." Evidence-based practices involve operationally defined procedures, a specifically defined context for use, implementation fidelity, a demonstration of a functional relation, replication of results, and the presence of empirical evidence (DiGennaro Reed et al., 2017; Horner et al., 2005). The use of evidence-based interventions can reserve valuable resources and result in the most effective and meaningful outcomes (DiGennaro Reed et al., 2017). The importance of the development of social skills emphasizes the need for evidence-based strategies in this domain. Yet due to the complexity of these skills, social skills research is among the hardest research to conduct (Gerhardt & Crimmins, 2013), and therefore, remediation of social skill deficits using evidence-based strategies can be difficult (Weiss & Harris, 2001). These difficulties are perhaps the cause of the myriad of fad treatments for social skills deficits. Ineffective social skills interventions such as social thinking (Leaf et al., 2016a, 2018) and social stories (Garwood & Van Loan, 2019; Milne et al., 2020) continue to persist and gain popularity among professionals and caregivers (Leaf et al., 2016c, 2018). A collection of non-evidence-based social skills interventions are also found online. The first 10 pages in a Google™ search of "teach social skills" outlined information expressing the importance of teaching these skills, but many did not list interventions for doing so. Furthermore, pages that did provide suggestions for social skills intervention suggested general strategies and non-evidence-based ways to teach social skills (i.e., pen pals). This is concerning given the importance of social skills on the quality of an individual's life.

Applied Behavior Analysis and Social Skills Intervention

Despite these challenges in identifying evidence-based practices for teaching social skills, a breadth of articles evaluating a variety of strategies for effectively teaching social skills have been published (Matson et al., 2007), making effective and efficient remediation of social skills deficits possible. A majority of these studies utilize the principles of Applied Behavior Analysis (ABA). ABA is a natural science approach to the study of socially valid human behavior (Wahler & Fox, 1981; Baer et al., 1987). ABA utilizes an individual's reinforcers to help them learn effectively and efficiently (Wolf, 1978). ABA encompasses various evidence-based interventions for improving social behavior (Baer et al., 1968). These procedures typically break down these complex skills into smaller, more manageable steps (Cappadocia & Weiss, 2011) and aim to generalize the learned social behavior to the learner's natural environment (Groskreutz et al., 2015; Haring et al., 1987; Koegel et al., 1982; Stokes & Baer, 1977). This chapter will outline several procedures commonly used within the field of ABA that have been empirically validated to increase social skills in individuals with skill deficits in this area. These interventions include the following: *discrete trial teaching (DTT), video based instruction (VBI), script fading, the teaching interaction procedure (TIP), behavioral skills training (BST), Cool vs. Not Cool™ (CNC), parent-mediated intervention, peer-mediated intervention, and social skills groups*. Each procedure will be described, outlining the research that supports its use, and recommendations for implementation will be provided.

Social Skills Interventions

Discrete Trial Teaching

Discrete trial teaching (DTT) is the use of a single cycle of behaviorally based instructional routine that includes presenting appropriate stimuli, providing a temporary prompt if necessary, waiting for the learner to emit the target behavior, providing a reinforcer, and ending with an intertrial interval (Mayer et al., 2012). The foundation of DTT is repetition. The stimulus is presented in a series of trials to elicit some targeted response. This allows the learner to have multiple opportunities to engage in the desired response. A shallow view of this procedure might look like a young learner sitting at a desk in a very structured setting while learning skills such as imitation. However, this type of teaching arrangement can be used to teach simple (e.g., motor imitation) (Smith, 2001) and complex social skills (e.g., empathy) (LeBlanc et al., 2003). It can also be used with learners of varying ages (Harris et al., 1990; Shabani et al., 2002) and be used throughout environments and settings (Jones & Feeley, 2009). Additionally, DTT can be combined with other behavior analytic techniques to individualize teaching and enhance learning.

DTT has shown to be effective to teach skills such as social initiation with others (Shabani et al., 2002; Zanolli et al., 1996), asking for or offering assistance (Harris et al., 1990), engaging in conversational skills (Peters & Thompson, 2015), sharing (Ledbetter-Cho et al., 2016), and perspective taking (LeBlanc et al., 2003). Early instruction for young learners may target the initial skills of interacting with others to build relationships. This can include social initiations such as greetings or relevant play skills such as sharing. Shabani et al. (2002) used prompting and reinforcement in a discrete trial format to teach three young children with autism verbal initiations and verbal responses to others' social initiations. Shabani and colleagues found that both responses increased for all participants in the study. This is effective with adolescents and adults to teach more complex social skills that require attention to more subtle social nuances such as recognizing when a person needs help (Harris et al., 1990). This is a valuable social skill that can be practiced in vocational settings (i.e., providing customer service at a supermarket or retail store) as this age group transitions into adulthood.

DTT also shows flexibility as it allows for additional procedures and strategies to be used in combination with the discrete trial structure. Research has shown that DTT can be combined with video modeling (LeBlanc et al., 2003), observational learning (Reeve et al., 2007), script fading (Ledbetter-Cho et al., 2016), BST (Peters & Thompson, 2015), and computer-based instruction (CBI; Simpson et al., 2004) to successfully teach social skills. In a study by LeBlanc et al. (2003), video modeling with DTT was used to teach perspective taking and empathy skills to three children with autism. A video of an adult completing the target task was shown to the participants. Once a correct response was modeled in the video, the participants were asked a perspective taking question regarding the task. Reinforcement was provided for the correct response and a review of the video was completed if the participants provided an incorrect response. All participants in the study mastered the tasks and were able to demonstrate perspective taking skills to novel situations. In another example, Peters and Thompson (2015) used BST in addition to DTT to teach conversational skills, specifically, to recognize when the listener was uninterested in the topic to four children with disabilities. Two of the participants in the study were diagnosed with Pervasive Developmental Disorder-Not Otherwise Specified, one participant had a diagnosis of autism, and one participant had a comorbid diagnosis of ASD and ADHD. The participants were required to tact whether or not the listener was interested in a discrete trial format. They were then taught to ask a question or change the topic based on listener behavior (interested or uninterested). The participants acquired these skills during training and were able to demonstrate these conversational skills during follow-up probes.

DTT has been shown to facilitate the acquisition of social skills in conjunction with the different techniques discussed. Research has shown that this an effective procedure to teach social skills that require repeated practice and those skills that do not frequently occur in natural settings (Smith, 2001). This method can also be used to teach pre-requisite skills required to participate in various other interventions (Jones & Feeley, 2009). Additionally, varying levels of technology can be incorporated in this intervention including computers (Simpson et al., 2004) and videos (LeBlanc et al., 2003).

Video Based Instruction

Video based instruction (VBI; Haring et al., 1987) utilizes observational learning by presenting a video model to demonstrate target behaviors to a learner. The learner is then expected to imitate the behavior presented in the video model (Ayres et al., 2017). There are two types of VBI. These include video prompting (Banda et al., 2011) and video modeling (McCoy & Hermansen, 2007). In video prompting, a skill is broken down into several steps, the learner then imitates the target step, and the video continues (Banda et al., 2011). Video prompting is most appropriate for learners that have difficulty attending to longer videos or for skills that have multiple or complex steps (Ayres et al., 2017; McCoy & Hermansen, 2007). In video modeling, the learner watches the video to completion and then attempts to imitate what they watched (Ayres et al., 2017).

Video modeling can be further broken down into three types: basic video modeling, video self-modeling, and point-of-view video modeling (McCoy & Hermansen, 2007). In basic video modeling the learner watches a video of someone else engaging in the target behavior, whereas with video-self modeling the learner watches a video of themself engaging in the target behavior. In point-of-view video modeling, the target behavior is recorded from the perspective of the learner (Ayres et al., 2017; McCoy & Hermansen, 2007). Though appropriate for some skills, point-of-view video modeling may not be the most beneficial for teaching social skills because it only provides a view of the listener's non-vocal verbal language and not the speaker's. Therefore, important social behaviors may be missed when utilizing point-of-view video modeling. For this reason, basic and video self-modeling may be most appropriate for teaching social skills.

VBI is an empirically validated intervention for teaching social skills such as communication (Cihak et al., 2012; Plavnick & Ferreri, 2011), play (MacDonald et al., 2005), conversation and social interaction skills (Charlop & Milstein, 1989; Taylor et al., 1999), social problem solving and making friends (Plavnick et al., 2013), and perspective taking (LeBlanc et al., 2003). While the earliest publication on VBI focused on teaching shopping (Haring et al., 1987), Charlop and Milstein (1989) published the first study utilizing VBI to teach social skills shortly after. Within this study, Charlop and Milstein (1989) evaluated the effectiveness of VBI to teach conversational skills including topic maintenance and eye gaze to three children with autism. Video modeling was used, wherein two adults were filmed engaging in conversational exchanges using questions and comments about objects such as a box and more complex topics such as feelings. The participants viewed the video and then were asked to demonstrate the conversational exchange displayed in the video. The participants were able to demonstrate the conversational exchanges during probes and were also able to generalize these exchanges to novel people and settings. Furthermore, the participants demonstrated response generalization in that they were able to emit novel forms of these exchanges and the conversational skills persisted at 15-month follow-up.

Since the publication of Charlop and Milstein (1989) many other studies have demonstrated the effectiveness of using VBI to teach social skills (Ayres et al., 2017; McCoy & Hermansen, 2007). In a study completed by Nikopoulos and Keenan (2004) three children with autism were taught social initiations and play using video modeling. The participants viewed a video model of an initiation to play with an item and then were given an opportunity to demonstrate the target skill with the item in the video. Following intervention, all participants demonstrated improvements in social initiations and play and participants were able to generalize the target behavior to a novel item. Results were maintained in 1- and 3-month follow-ups.

VBI has also been demonstrated effective for teaching social skills to adults (Morgan & Salzberg, 1992). In a two-part study, Morgan & Salzburg (1992) taught adults with severe deficits to engage in employment related social skills. Study one taught three participants to request assistance from a work supervisor by discriminating accurate and inaccurate responses. While participants were able to demonstrate the skill in the training setting, they were not able to do so in the work environment. In study two, the participants were taught to fix and report work problems. Intervention resulted in an increased ability to determine how to fix and report work problems. However, literature demonstrating the effectiveness of VBI to teach social skills to adults is limited and further studies are needed.

VBI is an empirically validated intervention for effectively and efficiently teaching social skills to a variety of populations (Ayres et al., 2017). VBI also promotes generalization through the ability to easily provide a number of multiple exemplars across a variety of settings. VBI has several other advantages including an ability to enhance attention on critical stimuli by making these stimuli more salient, control of the quality of the model, and the ability to recycle the video(s) to ensure continuity of instruction. Additionally, in situations where in-person treatment is not possible, VBI can be used within a telehealth service model. For example, the instructor could screenshare and show the video to the learner. Prior to utilizing VBI, the instructor should carefully select what type of video instruction will be utilized (i.e., video prompting or video modeling). If video modeling is selected, it should also be decided which type of video modeling would be most effective (i.e., basic video modeling, self-video modeling, or point-of-view video modeling). Furthermore, the instructor should determine if the learner has the necessary visual acuity to see what is depicted on the screen. Additionally, it must be determined if the learner has a generalized imitative repertoire. If the learner does not have this repertoire, they will not be able to imitate the skills demonstrated. However, more research is needed to demonstrate the effectiveness of VBI for learners who do not possess these pre-requisite skills (Ayres et al., 2017). Further research is also needed to identify the most effective type of video modeling for teaching social skills and to determine if video modeling is effective in developing social skills when utilized within a telehealth service delivery model.

Script Fading

Script fading (Krantz & McClannahan, 1993) is another evidence-based practice (Akers et al., 2016) that can be used to improve social skills (Garcia-Albea et al., 2014; Krantz & McClannahan, 1993). Within script fading, social responses are cued using written (Brown et al., 2008; Groskreutz et al., 2015; Krantz & McClannahan, 1993), pictorial (Murdock & Hobbs, 2011), or auditory scripts (Garcia-Albea et al., 2014; MacDuff et al., 2007). The scripts provide a model of contextually appropriate language (Garcia-Albea et al., 2014). After a script reliably cues the targeted response, script fading is implemented to transfer control to the relevant stimuli and increase novel and generalized responding (Akers et al., 2016; Garcia-Albea et al., 2014; Groskreutz et al., 2015). Within script fading, scripts are systematically faded by removing parts of the script. For example, when fading the written script "Come play with me," the last word might be removed and the script faded to "Come play with…." Fading would then continue by subsequently removing each word until the script is completely removed and the stimulus control is transferred to the naturally occurring stimulus (i.e., seeing a peer playing alone).

Script fading is effective for a wide range of individuals with varying disabilities and deficits (Garcia-albea et al., 2014; Groskreutz et al., 2015; Krantz & McClannahan, 1993; MacDuff et al., 1993). It can also be used for learners with different reading levels (Krantz & McClannahan, 1993; Stevenson et al., 2000), including non-readers (MacDuff et al., 2007). Script fading has been demonstrated to be effective for promoting a variety of social skills including joint attention (MacDuff et al., 2007), initiations (Brown et al., 2008; Garcia-Albea et al., 2014), conversational elaborations and exchanges (Brown et al., 2008; Garcia-Albea et al., 2014), and play-related social behaviors (Groskreutz et al., 2015; Murdock & Hobbs, 2011). In their seminal article, Krantz and McClannahan (1993) implemented a script fading procedure to teach four children with severe social deficits to emit appropriate peer initiations. Intervention procedures included three art activities wherein ten scripted statements and questions were presented (e.g., "Hey [name], would you like some candy or chips?"). The participants were manually prompted to point to the script with a pencil and move the pencil below the script as the participant read the script aloud. The participants were also prompted to orient toward the conversation partner. Following the fading of manual prompts, the written scripts were gradually faded in five phases. Intervention resulted in increased scripted peer initiations and unscripted, novel peer initiations across all four participants.

Garcia-Albea et al. (2014) utilized script fading with audio scripts to teach four children with ASD to initiate and engage in vocal initiations and elaborations in the presence of a variety of stimuli. Stimuli were separated into six different categories (i.e., vehicles, instruments, balls, action figures, building materials, and animals) and each participant was trained on three of these six categories. One category was used as a generalization category. In addition, four toy exemplars were assigned to each category and each participant was taught to emit three different scripts for each toy. For example, a red car was assigned to the vehicles category and the scripts taught were "Check out this car!" "Look, it's red!" and "Cars go beep!" Recorded audio scripts were attached to each toy and the toys were interspersed throughout the teaching environment. The participants were taught to press the button on the recorder device, repeat the script presented, and orient toward the conversation partner. Scripts were gradually faded according to systematic fading steps. Following intervention, all four participants demonstrated an increase in the number of scripted and unscripted responses in the presence of the target stimuli.

Groskreutz et al. (2015) taught social skills in the context of play to three preschoolers with developmental disabilities using a novel script-frame procedure. The participants were presented with a toy set that included a variety of components to be commented on. The toy set was placed on a table with several scripts attached to known aspects of the toy set. The instructor prompted the participants to attend to and read the attached script. Two participants were unable to emit a play-related comment without a script so script fading was implemented for these two participants. After intervention, all four participants emitted trained and untrained play-related commenting in the absence of scripts.

Script fading can enhance quantity and quality of social interactions (Cowan & Allen, 2007; Stevenson et al., 2000) by increasing the number and variety of responses without the support of another individual while also resulting in generalized and spontaneous language (Krantz & McClannahan, 1993; Garcia-albea et al., 2014; Groskreutz et al., 2015). Prior to implementing script fading, instructors should consider the skillset of the learner. For example, if the learner is unable to read, the instructor should consider selecting an audio or pictorial script. Furthermore, research suggests script fading might be more effective for older learners and when written scripts are utilized. Therefore, it is important to consider if scripts are the most appropriate intervention for your learner. Finally, in order to achieve the most meaningful outcome, instructors should completely fade the script.

The Teaching Interaction Procedure and Behavioral Skills Training

The Teaching Interaction Procedure (TIP) originated as a part of the Teaching Family Model in 1971 and was originally used to teach appropriate conversation skills to adolescent girls with demonstrated social skills deficits (Wolf et al., 1995). The TIP includes labeling, providing a meaningful rationale, description of the target skill, modeling, role play, and feedback (Leaf et al., 2009). Within the first step, labeling, the instructor describes the target skill (i.e., “we are going to talk about giving a compliment”). The second step of TIP is to provide a rationale that is meaningful for the learner (e.g., “giving compliments is a good way to make a friend”). The instructor should provide multiple meaningful rationales, if necessary. The learner may also provide their own rationale as to why they should engage in the target behavior. After providing the meaningful rationale, the instructor provides a description of the target skill. The description should break the skill down into smaller steps and include all parts of what the learner should do and how they should do it. Following the description, the instructor models the skill for the learner. The instructor should model both examples and non-examples of the target skill so that the learner is able to practice discriminating between the two. Finally, the learner practices the skill in a role-play situation that resembles the natural context in which the skill should be demonstrated. During the role play, the instructor provides specific feedback about correct and incorrect responses.

BST was first described by Yeaton and Bailey (1978). The steps outlined in this study were described in four phases as “tell them,” “show them,” “ask them,” and “let them” and were used to teach pedestrian safety skills to 12 elementary school children. These steps have evolved into instructions, modeling, role play, and feedback. Within BST, an instruction is provided which includes a label and description of the target skill (Miltenberger, 2012). For example, an instructor may say, “Today we will learn about giving compliments. When you give a compliment, you should decide what you like about a person, walk up to the person, gain their attention, and then tell them what you like.” Following instructions, the target skill is demonstrated to the learner. Modeling may occur in person, with a video or audio demonstration, and within the appropriate context where the skill is likely to occur (Miltenberger, 2012). The next step of BST provides the learner the opportunity to role play the skill that was just modeled. This can occur in situ or in a role-play scenario. Feedback for the learner can occur during the role-play stage or following the role-play stage and should include corrective feedback as well as positive reinforcement for portions performed correctly. The learner should continue the role play until the skill is demonstrated correctly (Miltenberger, 2012). The four steps of BST are continued until the learner demonstrates the skills accurately several times. TIP and BST differ slightly in that TIP includes the rationale for engaging in the skill and provides the learner the opportunity to see both correct and incorrect iterations of the target.

BST and the TIP have both demonstrated effectiveness in teaching various social skills including conversation skill components (Leaf et al., 2009, 2012a; Nuernberger et al., 2013), sportsmanship (Leaf et al., 2010), and game play (Oppenheim-Leaf et al., 2012). Ng et al. (2016) used the TIP to teach social skills to four adolescents with Autism and ID. Three target social skills were taught to each of the participants (e.g., basic negotiation, helping someone, responding to comments). The intervention resulted in social skill acquisition for all participants. Nuernberger et al. (2013) taught three adults with ID conversation skills. The experimenters created a list of all the vocal and non-vocal steps involved in approaching someone to begin a conversation. They used BST to teach these steps to their participants, using one step of BST at a time to determine which steps of BST are most necessary. All three participants demonstrated mastery, but required different steps of BST to achieve this, which led the researchers to conclude that it may be more efficient to teach using the entire package.

There are some considerations to keep in mind when implementing the steps of the TIP and BST. First, it is necessary that the learner can attend to instructions given, and that the instructions given are appropriate for the learner's age and functioning level. Second, during the modeling step, the model should possess similar characteristics to the learner, be conducted in the natural context, and be conducted with multiple exemplars. Future research should examine the effectiveness of both procedures for increasingly complex social skills (conflict resolution, maintaining relationships of varying types, etc.) as well as how these teaching methods can be used to address variability in responding that occurs in social relationships (i.e., accounting for individual preferences).

The Cool Vs. Not Cool™ Procedure

The Cool vs. Not Cool™ (CNC™) is an evidence-based procedure used to teach social discriminations (Leaf et al., 2016b). In a seminal article, Leaf et al. (2012b) used CNC™ to teach social skills to three children with ASD. The children were taught to discriminate between cool social behaviors, such as changing the game or conversation when someone is bored, and not cool behaviors, such as continuing with a game or conversation when someone is bored. Performance increased from baseline across all social skills.

As described by Leaf et al. (2012b), CNC™ begins with the instructor demonstrating an appropriate or inappropriate social behavior. For example, when teaching the skill of interrupting others, an inappropriate demonstration might include the instructor going up to someone while they are talking and saying, "Hey! Hey! Hey!" whereas an appropriate demonstration might include the instructor waiting for someone to finish talking and then saying, "Excuse me, may I interrupt?" After each demonstration, the instructor asks the learner to state if the demonstration was "cool" (i.e., an appropriate demonstration) or "not cool" (i.e., an inappropriate demonstration) and why. Praise is delivered for accurate labels and corrective feedback is provided for inaccurate labels (e.g., "That was not cool because I did not wait for her to stop talking and I kept saying, 'Hey!' Instead I should have waited for her to stop talking and said, 'Excuse me.'"). This allows the learner to discriminate between the responses and teaches the learner to recognize behavior that is not cool and adjust accordingly in a social situation. As a final step, the instructor can also ask the learner to role play the behavior the cool way (Leaf et al. 2012b, 2016b). Role play should begin with the instructor but can eventually be completed with peers or in a group setting. This provides the opportunity for additional feedback from peers and also helps aid in generalization.

CNC™ has a growing amount of empirical support and has been demonstrated to be effective with a variety of social skills (e.g., losing graciously, interrupting appropriately, showing empathy, changing a game or conversation). Following the first empirical validation (Leaf et al., 2012a), several other demonstrations have been completed (Au et al., 2016; Leaf et al., 2015; Olcay-Gul & Vuran, 2019) and have been demonstrated effective in a variety of contexts, including telehealth (Cihon et al., 2021) and in the group setting (Milne et al., 2017). Within the group setting, Milne et al. (2017) studied the effects of using CNC™ to teach 16 children with ASD joint attention and peer-to-peer communication skills. All but two participants met mastery criteria (i.e., demonstration of all steps across three consecutive sessions) in both joint attention and peer-to-peer communication. However, the two participants who did not meet mastery criteria demonstrated noticeable improvements. Cihon et al. (2021) utilized CNC™ via telehealth to teach three children diagnosed with ASD to change a conversation when someone is bored. All of the participants met mastery criteria and maintained the skill post-intervention. Furthermore, two of the participants generalized the skill to another adult and additional measures indicated the intervention was meaningful for all the participants.

CNC™ can be implemented to teach simple (Leaf et al., 2012b, Milne et al., 2017) and complex social skills (Leaf et al., 2012b, 2016b) in a variety of contexts (Cihon et al., 2021; Milne et al., 2017). However, CNC™ has only been demonstrated effective with individuals diagnosed with ASD. Future research should evaluate CNC™ across populations. Furthermore, while it seems the modeling and role-play steps are essential because they provide the learner with the opportunity to both observe and practice the target skill in advance of the naturally occurring situation, a component analysis is needed to determine if all components of CNC™ are needed. Additionally, the words "cool" and "not cool" can be adapted to whatever is appropriate to the learner (e.g., "rad" and "not rad") to allow for flexibility with various populations (Leaf et al., 2020). Future research might also evaluate the effectiveness of CNC™ using different labels. Finally, it may be beneficial to use CNC™ in conjunction with other evidence-based strategies to promote acquisition of more complex social skills (Leaf et al., 2012b). Further research is needed to assess treatment effectiveness and efficacy of CNC™ when used in combination with other procedures.

Parent-Mediated Intervention

Parent involvement in social skills interventions is considered best practice (Maglione et al., 2012; Schreibman et al., 2015). One way that parents may become involved in their child's intervention is through participation in a parent-mediated intervention (PMI), which involves providing systematic training to the parent to help their child meet specific goals (Bearss et al., 2015). PMI may be used in combination with another intervention or may be a standalone treatment, depending on the specific circumstances of the family (Casagrande & Ingersoll, 2017). Through the use of PMI, parents have successfully been taught a wide range of evidence-based practices with high fidelity, resulting in an increase in positive outcomes related to managing behavior (Coolican et al., 2010), decreasing ASD symptom severity (Aldred et al., 2004), improving parent–child interactions (Solomon et al., 2014), and strengthening specific developmental skills (Ingersoll & Wainer, 2013). PMI may also result in a decrease in parental stress and depression as well as an increase in positive affect (Koegel et al., 2002; Solomon et al., 2014; Turner-Brown et al., 2016).

There are three main intervention approaches to PMI outlined by Casagrande and Ingersoll (2017), including developmental approaches, traditional behavioral approaches, and Naturalistic Developmental Behavioral Interventions (NDBIs). Developmental approaches provide more subtle opportunities for skill development by focusing on increasing the responsiveness of the parent to communication attempts from the child and improving the overall relationship. Common techniques include extended wait time, contingent imitation, changing the environment to evoke more complex skills, as well as video feedback for parents to help identify communication cues from their child (Casagrande & Ingersoll, 2017). Traditional behavioral approaches differ from developmental approaches in that they include teaching in a highly structured learning environment, feature explicit prompting, and provide contingent reinforcement. NDBIs provide a midpoint between the former approaches, blending together strategies that are naturalistic, developmental, and behavioral. Instruction occurs in natural settings like during typical routines and play scenarios, and teaching is loosely structured and child driven while also providing explicit prompting and contingent reinforcement (Casagrande & Ingersoll, 2017).

PMI has been effective in teaching a variety of social skills including joint attention (Schertz et al., 2013), social communication (Weatherby et al., 2014), imitation (Vismara & Rogers, 2008), functional play (Kasari et al., 2015), expressive language (Aldred et al., 2004), and social initiations (Brian et al., 2015). PMI can be implemented in a one to one or group format. For example, Kasari et al. (2010) utilized individual parent–child sessions to implement a naturalistic developmental intervention aimed at increasing foundational social skills such as joint attention and play behavior in preschool learners with ASD. Alternatively, Wetherby and Woods (2006) implemented a PMI aimed at increasing social communication skills in toddlers by training parents individually in natural settings as well as in scheduled playgroups, during which time other parent–child dyads were present to support peer interactions.

The effectiveness of PMI may be influenced by various parental variables, primarily, the effectiveness of the parents' implementation of the procedures (Ingersoll & Wainer, 2013; Siller et al., 2013). Treatment integrity should be assessed often, to determine how parent behavior affects child outcomes (Ingersoll & Wainer, 2013). Parental stress, well-being, self-efficacy (Karst & Van Hecke, 2012; Wainer et al., 2016), and mental health (Kasari et al., 2014; Siller et al., 2014) may also impact the effectiveness of PMI. Collaborating with families promotes better outcomes for the child and family as a whole (Buschbacher et al., 2004; Casagrande & Ingersoll, 2017), and often results in maintenance of treatment gains (Lovaas et al., 1973) and generalization (Koegel et al., 1982).

Peer-Mediated Intervention

Peer-mediated intervention (PMI) involves systematically training typically developing learners to facilitate improved social interactions in peers with social deficits. This is done through instructor-directed or learner-initiated activities in natural environments (Kamps et al., 2017). Some PMIs involve typically developing peers implementing one or two strategies such as initiating play (Liber et al., 2008), modeling and role play (Mason et al., 2014), or prompting and reinforcement (Kamps et al., 2014), while others involve comprehensive treatment packages that are taught to the peer by an adult over a period of time and then implemented with minimal oversight (Pierce & Schreibman, 1995). The aim is that through increased social opportunities, individuals with social skills deficits will develop prosocial behavior (Zagona & Mastergeorge, 2016).

Research has shown that the selection of peers to assist with PMI is an important aspect in designing such an intervention. Watkins et al. (2015) found that when peers demonstrated an interest in the program, complied with intervention instructions, and exhibited quality language and social skills, the outcomes for socially impacted participants were better. Therefore, these characteristics should be considered when choosing peers for PMI. It has been reported that typically developing peers often benefit academically and/or socially from participating in PMIs and that they find these activities to be both rewarding and educational (Pierce & Schreibman, 1995; Schaefer et al., 2016). Positive attitudes toward the group activities suggest a general rewarding nature of the interactions, including satisfaction in being friends with and helping peers with disabilities (Kamps et al., 1998). Thus, PMI shows the potential to be mutually beneficial for both the individual with social impairments and their typically developing peer.

Many studies have demonstrated the effectiveness of PMI in developing a wide range of social skills (e.g., Chang & Locke, 2016; Zagona & Mastergeorge, 2016). For example, Ganz and Flores (2008) demonstrated an increase in scripted and unscripted phrases, content-related comments, and responses to peers in learners with ASD during a play group by combining (a) visual cues for thematic play, (b) peer training to get the participants' attention, talk to them, hand them a toy, play with the toys they are playing with, and respond when they are talking, and (c) peer prompting of the participants to use the scripts (i.e., hold scripts in front of peers, point to card, verbally model words, tell peers to say what the script said). Additionally, Harper et al. (2008) successfully increased social initiations, turn-taking, and number of recess activities participated in by learners with ASD through a combination of training peers to gain attention, vary activities, narrate play, reinforce attempts, and take turns. A combination of adult explanations, modeling, and role playing with other peers was used, as well as a review each day before recess. PMI has also been effective in teaching social skills such as requesting, sharing, commenting, or using manners in the context of social interactions such as structured play or games (Odom et al., 1992; Trottier et al., 2011), peer imitation skills (Garfinkle & Schwartz, 2002), and joint attention (Kasari et al., 2006; Jones et al., 2006).

Social Skills Groups

There has been an increase in research in recent years to identify evidence-based interventions to teach social skills in a group setting (Ellingsen et al., 2017). Social skills groups (SSGs) typically consist of at least three learners who simultaneously work on behaviors to develop and enhance social interactions. When developing group-based social skill targets, it is important to consider individual deficits as well as group deficits as a whole. Developmentally appropriate and ecologically appropriate skills should also be considered when choosing goals for an SSG. Ecologically appropriate skills are those that would generally be accepted by the target participants peer group. The lack of consideration for ecologically appropriate skills may result in weak outcomes and poor generalization (Leaf et al., 2017).

SSGs can occur in a small or large group format and can involve relevant parties including caregivers or typically developing peers to ensure the inclusion of ecologically appropriate targets. Typically developing peers can provide valuable input toward socially significant targets, model the desired behaviors, and reinforce the social skills practiced during the social skills group in naturally occurring situations. Evidence-based methods, like the ones described in this chapter, should be utilized when creating SSGs to ensure that learners gain social skills at a level similar to that in research. SSGs have demonstrated efficacy using video models (Simpson et al., 2004), role-play techniques (Leaf et al., 2017; Minihan et al., 2011), and parent involvement (Kasari et al., 2010). While there are limited curricula available surrounding teaching social skills (Frankel & Myatt, 2003; Laugeson, 2013), it would be beneficial to use evidence-based curricula as well.

Social skills groups have been effective in teaching greetings, maintaining conversation, how and when to interrupt, rules about rules (Minihan et al., 2011), inferencing, on topic statements, and frustration tolerance (Leaf et al., 2017), as well as empathy and cooperation (Gantman et al., 2012). Minihan et al. (2011) conducted a multiple case study that used social skills groups with adolescents with Asperger's syndrome. Groups were conducted in groups of two and three with an additional two typically developing peers. A variety of social skills were targeted including eye contact, taking turns, and staying on topic during a conversation. The peers in each group demonstrated the targeted social skills in the natural environment and therefore were invited to participate in the program to assist with modeling and role play of the target skills. The Social Responsiveness Scale (SRS; Constantino & Gruber, 2012) was used to assess acquisition of social skills. Scores on the SRS decreased for all participants, indicating an increase in the targeted social skills. Using typically developing peers in SSGs may be effective in teaching skills because the target skills are based on what the peer group finds appropriate and acceptable in common social situations (Laugeson, 2013). This could lead to increased peer acceptance and decreased stigmatization of certain subgroups with disabilities (Frankel et al., 2010; Gantman et al., 2012; Laugeson et al., 2012).

Leaf et al. (2017) examined the effects of behaviorally based social skills groups for learners with ASD. In this study, 15 learners with ASD with an average age between four and five years old were randomly assigned to either an immediate treatment group or a delayed treatment group. The social skills group took place in a room resembling a kindergarten classroom. Changes in social behavior was measured using four social skills assessments including the Social Skills Improvement System (SSIS; Gresham & Elliot, 2008), the SRS (Constantino & Gruber, 2012), the Walker-McConnell Scale of social competence and school adjustment (WM; Walker & McConnell, 1988), and the Adjustment and Aberrant Behavior Checklist (ABC; Aman & Singh, 1986), pre-intervention, and post-intervention. The social skills groups used only evidence-based behavioral practices (e.g., discrete trial, cool vs. not cool™) and the specific practices were individualized to the participants within the group. The social skills targets were chosen based on specific individual deficits within the group, group deficits as a whole, and parent concerns. Some skills targeted included pretend play, inferencing, staying on topic, and flexibility. Targeted prosocial behavior improved for all 15 participants following the implementation of the social skills group. Furthermore, long-term maintenance probes supported that targeted skills were maintained and for some participants improved.

There are some key considerations regarding the implementation of social skills groups. First, a structured lesson plan that outlines the steps of the social behavior and rules surrounding that social behavior should be utilized (Ellingsen et al., 2017). Second, the makeup of the group should be somewhat homogenous with regard to skill deficits and functioning level (White, 2011). Third, social skills groups targeting adolescents or adults should take the level of interest and consent into consideration to foster autonomy in older groups and increase the level of involvement of the participants (Laugeson & Frankel, 2011). Lastly, individuals who exhibit extreme challenging behavior may not be appropriate for a group setting when targeting social skills due to potential safety concerns and interference with learning opportunities.

Conclusion

A growing body of literature has demonstrated effective strategies to teach social skills. It is important that research evidence for social skills interventions continues to grow to avoid implementation of fad treatments that may slow gains in the area of social skills for learners. The majority of effective social skills interventions incorporate strategies utilizing the principles of ABA. The evidence has supported the use of DTT, VBI, script fading, the TIP, BST, CNC™, parent-mediated intervention, peer-mediated intervention, and social skills groups to address social skills deficits.

The interventions discussed allow for a level of flexibility in that they can be implemented in isolation or in conjunction with other strategies. Prior to implementing any of these strategies, instructors should consider the pre-requisite skills required to participate successfully in the chosen intervention.

Those implementing social skills interventions should program for generalization by conducting the intervention in settings where the targeted social behaviors are likely to occur naturally and are therefore more likely to be reinforced in the absence of the intervention (Stokes & Baer, 1977).

Much of the literature focuses on developing social skills for young learners with ASD. Therefore, research on interventions targeting development of social skills for other populations is still warranted, including those with other disabilities and older populations. Practitioners and researchers should work on expanding the use of social skills interventions to populations other than ASD, as there are a variety of disorders that inherently possess social skills deficits or result in deficits as a side effect of their symptomology. Furthermore, research on the effectiveness of social skills interventions should be conducted with other age groups, including adolescents and adults. Foundational social skills such as eye contact and simple social initiations are often emphasized in early intervention and preschool, but social skills relevant in adolescence including skills related to dating or responding to bullying are rarely studied (Kasari & Patterson, 2012). Kasari and Patterson (2012) conducted a meta-analysis evaluating social skills interventions for individuals with ASD and found that only two of 34 identified studies addressed development of social skills in adolescence. Social skills relevant during adolescence are important to consider for future research as they directly relate to building meaningful relationships and self-advocacy. Future research should also consider using randomized controlled trials (RCTs) to demonstrate effectiveness. The majority of studies examining social skills interventions use single subject research designs, but RCTs would test for efficacy while eliminating confounding variables that may affect outcomes using a single subject design (Ellingsen et al., 2017). Lastly, practitioners should work toward the widespread inclusion of evidence-based practices for teaching social skills in public school and community settings.

Social skills are the building blocks to meaningful relationships and success in a variety of contexts across the lifespan. A lack of social skills can result in negative consequences for the individual and their families. Kamps et al. (2017) noted, “Social behavior is more than just play skills or functioning in social groups with peers” (p. 273). Effectively implementing social skills intervention can greatly impact outcomes for individuals with social skill deficits throughout the lifespan, setting the occasion for building meaningful relationships, and improving quality of life (Mason, et al., 2018).

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Language Development and Disorders: Guidelines for Assessment and Treatment

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Communication disorders are characterized by difficulty with verbal and nonverbal communication (American Psychiatric Association [APA], 2013). The APA (2013) states that these difficulties are persistent and cannot be explained by low cognitive ability. The difficulties include challenges in spoken and written language, speech, and social communication skills (APA, 2013) and can be summarized as impairments in the language functioning of an individual in the areas of language form, content, and/or use (Center for Disease Control and Prevention [CDC], 2021c). In the area of language, the APA (2013) categorizes communication disorders as a language disorder and a social (pragmatic) communication disorder (SCD).

A language disorder is defined as difficulties in acquisition and the use of language that persists across language modalities such as spoken, written, or sign language and is demonstrated by comprehension and production deficits and substantially and quantifiably below age expectations (APA, 2013). The APA (2013) characterizes an SCD by persistent challenges with the social use of verbal and nonverbal communication. Difficulties are evidenced by deficits in an individual's ability to understand implicit information (i.e., not explicitly stated), understand nonliteral language, follow conversation rules and storytelling, use communication to match the needs of a listener, and use functional communication in social contexts (APA, 2013; American Speech-Language-Hearing Association [ASHA], n.d.-b). Therefore, communication disorders may be referred to as language disorder, social communication disorder, language delay, language impairment, and other related names (Law et al., 2004; Montgomery et al., 2010). The term language disorder (LD) will be used throughout this chapter.

Symptoms of an LD vary across individuals and may depend upon the language domain affected, severity or level of disruption to communication, age, and stage of linguistic development (ASHA, n.d.-

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c, n.d.-d). An LD may impact phonology (speech sound system of a language), syntax (rules for how words are combined to form sentences), morphology (rules that govern the minimal meaningful units of language), semantics (the meaning of words), and pragmatics (rules associated with use of language in conversation and social situations) (ASHA, n.d.-c, n.d.-d; Berko Gleason, 2005). While these are categorized as different domains, they are not discrete, but are interrelated across each domain.

An LD may present in isolation or accompany autism spectrum disorder (ASD), intellectual disability (ID), developmental disability (DD), attention deficit hyperactivity disorder (ADHD), traumatic brain injury (TBI), learning disability, aphasia and psychological/emotional disorders, and hearing loss (ASHA, n.d.-b, n.d.-c); many risk factors exist as a result of these disorders (ASHA, n.d.-c; Fahey et al., 2018). For example, longitudinal research studies have followed children with an early LD, from preschool through elementary school, and have consistently demonstrated a link between early developmental LD and subsequent academic achievement problems, especially dyslexia, which is characterized by reading, writing, and spelling deficits (Fahey et al., 2018). Research that has compared children classified as "language impaired" with those classified as "reading impaired" has shown that both groups are characterized by a variety of oral language deficits, specifically phonological and memory problems, as well as language comprehension deficits (Fahey et al., 2018). Whether these common deficits derive from speech-specific mechanisms, or from more basic neural processing deficits, has been the focus of considerable research and theoretical debate (Fahey et al., 2018). Other risks associated with an LD include difficulty participating in social settings, developing peer relationships, and being successful in academic and vocational settings (ASHA, n.d.-b). These risk factors shed light on why treatment is so important and the necessity for differentiating between a disorder and a difference as well as identifying the specific language skills that need interventions.

This chapter will broadly define and discuss the process for assessment and diagnosis of an LD. This chapter has been designed to provide an overarching understanding of the various components and skills encompassed under the area of language and how difficulties with these skills may negatively impact daily functioning for individuals in a wide array of settings and situations. Additionally, various intervention techniques, modalities, and service delivery options will be discussed.

Assessment and Diagnosis of Language and Social Communication Disorder

Language and Social Development Milestones

Human behavior is complex, resulting from a varied individual learning history. When assessing for a language disorder, a case history and interview are used to explore all aspects of a child's background to include prenatal and birth history, medical history, early developmental history, and educational history. However, unless there are obvious connections between a cause, such as a traumatic brain injury and the presence of a language disorder, a one-to-one correspondence cannot be made (Fahey et al., 2018). The communication characteristics of each individual child along with environmental or historical factors may account for the disorder. In some cases, factors that perpetuate a disorder, such as hearing loss or low parent interaction, may be addressed and changed through intervention. Other factors that may influence the development of a language disorder include reduced environmental stimulation, poor motivation for learning, and emotional issues that suppress learning (Fahey et al., 2018).

No biological or organic pathology has been identified as the cause of an LD (Reed, 2018). As described by Reed (2018), an organic cause would be related to the pathology of an organ system in the body such as hearing loss and deafness, genetic syndromes, or neurological and intellectual disabilities. A pathology could occur congenitally (being present at birth; CDC, 2020) or be acquired environmentally such as a traumatic brain injury (CDC, 2021a) or a degenerative neurological condition such as Down syndrome (CDC, 2021b). Reed (2018) asserted that understanding the relationship between environmental and biological systems and the resulting effect on language development is important as knowledge of the possible origin determines whether educational interventions and/or a referral for medical management is required.

There are many ways in which the environment plays a role in the prevalence of a language disorder. Premature (i.e., born before 36 weeks gestation) and low-birth-weight (i.e., less than 5.5 pounds) babies have underdeveloped vascular systems, feeding and digestive difficulties, and respiratory problems (Rosetti, 2001). These infants are at risk for language and learning disabilities (Fahey et al., 2018; Turnbull & Justice, 2017). In addition to prematurity and low birth weight, a small group of children have complications at birth leading to neurological damage such as partial (hypoxia) or total (anoxia) lack of oxygen to the brain that can cause severe damage to the cerebral cortex. The damage often results in severe communication disorders, motor disorders, impaired cognition, and feeding and swallowing disabilities (Fogel, 2008). Unfortunately, these problems are not reversible, and the challenges are lifelong. Additionally, when there is deprivation of positive social interaction, abuse and/or neglect of the child, reduced conversational turns and spoken words, and limited opportunities for learning experiences, the child is at risk for an LD (Fahey et al., 2018).

Bowen (1998) explains that language is a learned code or system of rules enabling communication of ideas or the expression of wants and needs. Forms of language include reading, writing, gesturing, and speaking. There are generally two main divisions of language: receptive language, the ability to understand what is said, written, or signed; and expressive language, the ability to speak, write, or sign. Language is acquired through the interaction with people in one's environment. Progress should be steady even though children learn at different rates. Developmental milestones are general guidelines, and each individual may be a little ahead or behind and still be within the typical developmental range. A comprehensive overview of developmental language milestones (e.g., phonology, semantics, play, syntax-morphology, and pragmatics) for children aged zero months through seven years is outlined by Gard et al. (n.d.).

Assessment and Diagnosis

The cause of an LD can be difficult to determine (ASHA, n.d.-c) and currently no known cause has been identified (Fahey et al., 2018; Reed, 2018; Turnbull & Justice, 2017). For an individual to receive a diagnosis of an LD, that individual must display language difficulties significant enough to adversely impact the individual's functioning educationally and socially (Reed, 2018). A referral for an LD evaluation commonly occurs when an individual within the child's life notices a delay in the child's language ability when compared to same-aged peers (ASHA, n.d.-c; Turnbull & Justice, 2017).

Once a referral has been made, a Speech and language pathologist (SLP) will begin to gather data using a screening process to select an appropriate evaluation based on the child's individual needs (ASHA, n.d.-c; Turnbull & Justice, 2017).The screening process assesses what difficulties are present and compares these difficulties with developmental milestones and cultural variances to determine whether or not additional information is needed (ASHA, n.d.-b; ASHA, n.d.-c; ASHA, n.d.-d). Eligibility for treatment depends upon the criteria set by the organization or agency such as a private therapist or public school and to some degree the components of the assessment may be determined by the setting (Reed, 2018). Objectives of assessment include determining whether or not a child has an LD and also whether or not they meet eligibility criteria for treatment within the setting for which they are being evaluated (Reed, 2018).

Assessment Components

The process by which a comprehensive language assessment is conducted includes normative assessments, observational data, and historical data obtained from parents or caregivers (ASHA, n.d.-b). Delayed functioning must be present in more than one of these components for an LD to be determined. The components of a comprehensive language assessment typically include the following: (a) relevant case history, including birth and medical history; (b) family history of speech, language, reading, or academic difficulties; (c) the family's concerns about the child's language (and speech); (d) languages and/or dialects used in the home, including age of introduction of a second language, and as appropriate, circumstances in which each language is used; (e) teachers' concerns regarding the impact of the child's language difficulties in the classroom; (f) a hearing screening, if not available from prior screening; (g) oral mechanism examination; (h) spoken language testing, including phonology, phonological awareness, semantics, morphology, and syntax; (i) pragmatics, including discourse-level language skills (conversation, narrative, expository); (j) literacy assessment; (k) an articulation or speech sound assessment; and (l) an assessment of the potential benefit of implementing augmentative and alternative communication (AAC) strategies (ASHA, n.d.-b).

Norm-Referenced Assessments

Norm-referenced assessments are required as part of the assessment process for determining the presence of an LD. Norm-referenced assessments, sometimes referred to as standardized assessments, may be used to identify broad characteristics of language functioning (ASHA, n.d.-c). Turnbull & Justice (2017) explained:

> These assessments often require the use of commercially available tests, such as the Clinical Evaluation of Language Fundamentals – Preschool-2 (Wiig et al., 2004). This norm referenced test is used with children ages 3-6 years, 11 months and includes six subtests that cover expressive and receptive language skills in the areas of morphology, syntax, and vocabulary. Scores derived from norm-referenced tests demonstrate how a child's language skills in different domains of language compare to those of a large population of children at the same age. These scores are often an important aspect of the diagnosis of an LD, as the diagnosis is based on showing that the child's language skills are underdeveloped relative to age-based expectations. (p. 326).

If a norm-referenced assessment was given with translation, such as with English as a second language learner, the scores should not be reported or used as a basis for diagnosis because they would no longer be valid (ASHA, n.d.-a). ASHA (2016, 2017, & n.d.-b) emphasized that it is imperative that an individual's communication pattern be assessed as it relates to their linguistic background and care should be taken to identify differences that may be related to limited exposure of a new cultural communication pattern rather than labeling these as a disorder. For an LD diagnosis to be provided, the LD must be severe enough to influence effective use of symbols and message processing in the language used by the speaker (ASHA, 2016; ASHA, 2017; ASHA, n.d.-b). A dialectal variation resulting from cultural difference should not be identified as an LD (ASHA, n.d.-c). These cultural differences will be discussed below. Two commonly used norm-referenced tests include the Comprehensive Assessment of Spoken Language Second Edition (CASL-2; Carrow-Woolfolk, 2017) and the Test of Early Language Development Fourth Edition (TELD-4; Hresko et al., 2018).

Comprehensive Assessment of Spoken Language Second Edition. The Comprehensive Assessment of Spoken Language Second Edition provides an in-depth evaluation of oral language skills for children from 3 years old to young adults 21 years old (Carrow-Woolfolk, 2017). The CASL-2 consists of 14 stand-alone tests measuring a specific oral language skill which can be interpreted separately or combined to represent broader areas of oral language function (Carrow-Woolfolk, 2017). The 14 tests include receptive vocabulary, antonyms, synonyms, expressive vocabulary, idiomatic language, sentence expression, grammatical morphemes, sentence comprehension, grammatical-ity judgment, nonliteral language, meaning from context, inference, double meaning, and pragmatic language (Carrow-Woolfolk, 2017).

Test of Early Language Development Fourth Edition. The Test of Early Language Development Fourth Edition assesses oral language abilities for children aged 3 years to 7 years 11 months of age (Hresko et al., 2018). It comprises two subtests, Receptive Language and Expressive Language, and within each of these subtests are items measuring semantics, syntax, and morphology (Hresko et al., 2018).

Observational Measures

While norm-referenced tests provide data which compare the child's language abilities to same-aged peers, these scores cannot be used in isolation to determine qualification as LD (ASHA, 2004). As described by Turnbull & Justice, 2017:

Observational measures examine children's language form, content, and use in naturalistic activities with peers or parents. Two types of observational measures are commonly used in language assessment. The first is *conversational analysis*. In conversational analysis, the professional observes a child during interactions with other people to study his or her ability to initiate conversation, to use different communicative intentions, to take turns, to maintain topics, to identify breakdowns in conversation, and to attend to listener needs. The second type is *language sample analysis* (LSA). With LSA, the professional collects a sample of spontaneous language from the child, typically comprising at least 50 utterances, then analyzes the sample for all aspects of language (p. 313).

Additional Observational Assessments. Additional types of assessments that may be used include systematic observation/contextual analysis, ethnographic interviewing, and curriculum-based assessments. Systematic observation/contextual analysis is an observation conducted in various settings and contexts used to describe overall communication functioning and to identify areas of difficulty within the natural setting (ASHA, n.d.-c). Ethnographic interviewing is a way to obtain historical information from the student, their family/caregiver, and/or teachers and specifically avoids the use of leading questions and "why" questions (Westby et al., 2003). Instead, it uses restatements, open-ended questions, and summarizing for clarification. This type of interviewing is designed to gain information from the child's perspective or that of others in the child's environment. Curriculum-based assessments consist of protocols, probes, and direct assessment which are used to assess the child's ability to successfully participate with and succeed with the language demands of their school curriculum (ASHA, n.d.-a). Potential results of an assessment may include diagnosis of an LD which may include receptive or expressive language or a combination of both, distinguishing a delay (due to environmental factors) from a disorder, a description of the characteristics of the diagnosis, identification of literacy difficulties, identification of hearing problems, and data to support recommendations for interventions and support or a referral to other professionals such as an audiologist or school psychologist (ASHA, n.d.-c).

Cultural Considerations for Assessment

Cultural dimensions influence the way language and social communication are used in communicative interactions (ASHA, n.d.-a). ASHA (n.d.-a) asserted that a failure to understand these varied cultural dimensions may result in crucial miscommunications. Distinguishing between a language difference and an LD is critical for accurate diagnosis of an LD (ASHA, n.d.-a). ASHA (n.d.-a) provided best practice recommendations for distinguishing between a language difference and an LD. Recommendations stated that practitioners should (a) recognize that cultural dimensions and individual variation may influence eye gaze behavior, facial expressions, body language, rules for social interaction, child-rearing practices, perceptions of mental health, illness, and disability, and the patterns of superior and subordinate roles relative to status by age, gender, gender identity, and class; (b) review cultural and linguistic variables influencing communication to determine if the patterns may be related to cultural background; (c) understand that differences may be related to limited exposure to and development of new cultural communication patterns; (d) identify a disorder as a breakdown in communication sufficient to negatively impact the effective use of symbols and message processing in the language of the speaker; (e) identify a communication difference as a variation of a symbol system used by a group of individuals reflected and determined by shared regional, social, cultural, or ethnic factors; and (f) recognize that a regional, social, or cultural variation of a communication system is rule based and should not be considered a disorder of speech or language (ASHA, n.d.-a).

Treatment

Following assessment of a language disorder it is critical for the learner to receive effective, evidence-based, and quality intervention. Typically, SLPs play an essential role in the treatment of an LD by providing specialized and targeted interventions (Selin et al., 2019). This intervention can take place in many different instructional formats, including one-to-one instruction, small-group instruction, and large-group instruction (Law et al., 2017). Additionally, it is common to see intervention being provided in multiple settings, including in the learner's home, community, and school (Law et al., 2017). The interventionist should consider the learner's culture, diagnosis, setting in which they are working, family's involvement, and intensity needed to provide the most effective, affirming, and individualized intervention possible.

One goal of intervention is to stimulate overall language development by teaching language skills in an integrated manner and in context, in order to enhance everyday communication skills and to improve access to academic content (ASHA, n.d.-c). Therefore, goals are generally chosen with consideration for developmental appropriateness and potential for improvement of overall communication, academic readiness, and social skills (ASHA, n.d.-c). The goals of intervention should be functional so that the language will more likely occur in natural settings and result in the learner meeting their needs. As such these goals will hopefully result in the learner generalizing their new repertoire toward their natural environment. As part of a comprehensive approach, ASHA's (n.d.-b) treatment recommendations include addressing phonology, semantics, morphology and syntax, and pragmatics for all age ranges.

Goals of Intervention

ASHA (n.d.-c) recommends that LD intervention goals vary throughout an individual's lifetime. Preschool goals may include phonology, increasing the consonant repertoire and the accuracy of sound productions, phonological awareness, semantic skills, morphology and syntax, and pragmatic skills (ASHA, n.d.-c). For elementary school-aged children ASHA (n.d.-c) recommends targeting functional communication skills, literacy skills, and metacognitive and metalinguistic skills, as well as continuing to target phonological skills, morphology and syntax, and pragmatic skills. LD intervention for middle- and high-school-aged children should continue to target any areas that were previously targeted but not fully addressed at a younger age as well as self-management of language and communication development strategies (ASHA, n.d.-c). Finally, intervention for students in post-secondary school and adulthood should target the social communication skills needed to develop meaningful relationships and gain and sustain employment (Ayers et al., 2017; Dutta et al., 2009).

Preschool

In preschool, intervention typically involves the targeting of phonology. This should include addressing impaired intelligibility because if a child is unintelligible it could result in frustration for the learner (Coplan & Gleason, 1988; ASHA, n.d.-c) and could mask difficulties with other language issues such as semantics and syntax (ASHA, n.d.-c). Another skill that should be targeted is increasing the consonant repertoire and the accuracy of sound productions (Masso et al., 2017). Interventionists should also target phonological awareness, which should be addressed with the acquisition skills of rhyming, blending, and segmenting words by syllable and phonemes (Lyster et al., 2021; Stoel-Gammon, 1988). Targets for semantic skills include vocabulary acquisition with a focus on pronouns, conjunctions, verbs, and basic concept vocabulary (Lyster et al., 2021). Targeting morphology and syntax is also an important goal at this stage of intervention (ASHA, n.d.-c; Lyster et al., 2021). Targets around morphology and syntax should include addressing sentence length, complexity, type of sentences (e.g., statements or inquiries), and facilitation of age-appropriate morpheme usage with a focus on articles, auxiliary verbs, and pronouns (ASHA, n.d.-c). Teaching pragmatic skills is also critical (Bouchard et al., 2020). Specific pragmatic skills that could be targeted would be (a) narrative skills, (b) conversational turn-taking, (c) language flexibility to match the needs of varying contexts, and (d) use of imaginative play (ASHA, n.d.-c). Finally, interventionists should target literacy skills by targeting print and book awareness, understanding of story structure, letter knowledge, and matching speech to print (ASHA, n.d.-c; Masso et al., 2017).

Elementary School

For elementary school-aged children with spoken language disorders, language intervention should focus on acquisition of the key skills necessary to function successfully in the classroom environment (ASHA, n.d.-c). Goals should be based on the curriculum for the child's grade level, which means that a curriculum-based approach should be taken. In the school setting, planning and implementation of goals should be a coordinated team effort with the SLP, classroom teacher, and other pertinent school specialists (Committee on the Evaluation of the Supplemental Security Income (SSI) Disability Program for Children with Speech Disorders and Language Disorders et al., 2016). Literacy skills would be addressed in greater detail than for the younger ages, in order to include improved decoding, reading comprehension, and narrative skills (ASHA, n.d.-c; Cadima et al., 2010). Interventionists should also focus on metacognitive and metalinguistic skills (ASHA, n.d.-c; Roebers et al., 2014). Teaching these skills would consist of increasing the awareness of rules for using various language forms, self-monitoring, and self-regulation, all critical skills for development of higher level language skills (ASHA, n.d.-c).

Interventionists should continue to work on improving phonology skills by working on phonological awareness and eliminating speech error patterns that contribute to unintelligibility. Interventionists should also work on improving semantic skills by (a) increasing vocabulary knowledge, (b) attention to vocabulary depth (e.g., changes in word meaning based on context); (c) abstract and figurative language, (d) multiple meanings, (e) paraphrasing, (f) comprehension, and (g) the ability to ask for clarification (ASHA, n.d.-c).

Morphology and syntax are still important to target during this age. Interventionists can target morphology and syntax by (a) targeting changing words (e.g., medicine to medical), (b) analyzation of prefixes/suffixes, (c) analyzation of complex sentences such as declarative versus questions, (d) use of compound sentences, and (e) the ability to recognize and correct errors of grammar (ASHA, n.d.-c; Nagy et al., 2006).

Interventionists would still want to target pragmatic language with a focus on (a) the ability to use language in varying contexts (e.g., being polite), (b) provide clarifications, (c) persuasiveness, (d) discourse skills (e.g., narrative, academic, expository, and social interaction), (e) making relevant contributions to classroom discussions, (f) repairing conversational breakdown, and (g) knowledge of what to say and not to say in various situations, as well as when to talk or not talk (ASHA, n.d.-c; Feider & Saint-Pierre, 1987).

Middle and High School

For children who are in middle school and/or high school, basic language skills, such as those noted for younger ages, may still need to be addressed (ASHA, n.d.-c). At this stage of development, it may not be possible to close the gap between skill level and grade level, and compensatory strategies may become the focus (Bowen, 1998). Older students should be encouraged to collaborate in the development of goals, as well as learn self-advocacy that could be used in the classroom, such as telling the teacher when they need a direction repeated or do not understand assignments (ASHA, n.d.-c; Downing et al., 2007). The focus for intervention shifts to teaching rules, techniques, and principles needed for acquisition and use of information along a range of settings and situations, with an emphasis on *how* to learn rather than *what* to learn. Instructional strategies include using context to understand meaning and infer or identify main ideas, using checklists and graphic organizers for completing assignments, and using spelling and grammar checks when editing writing (ASHA, n.d.-c; Faggella-Luby & Deshler, 2008).

Post-Secondary School and Adulthood

Transition planning should include students and parents, along with secondary school personnel (Cameto et al., 2004). Sensitivity to the student and family's culture and values should be exercised (ASHA, 2016), and self-advocacy skills should be a priority (Sievert et al., 1988). Families should be made aware of post-secondary services that are available and that might help to maintain previously established social communication skills (Dutta et al., 2009). Social communication skills are important beyond high school and are crucial for development of meaningful relationships and obtaining and maintaining employment (Ayers et al., 2017; Dutta et al., 2009). These skills will be needed throughout an individual's adulthood.

Evidence-Based Interventions for LD

When working with individuals diagnosed with an LD it is critical that the interventionist implement those procedures which are considered an Evidence-Based Practice (EBP) (ASHA, 2005). Per ASHA's policy statement (2005), EBP is the approach wherein an interventionist considers the best research evidence, their own clinical expertise, and the values and preferences of the client to determine which procedure to implement. As such, an interventionist needs to take a response approach to treatment selection, based on the learner's unique needs; however, the interventionist should also ensure the selected approaches are supported by the best empirical evidence (Leaf et al., 2016). Additionally, interventionists should not implement procedures which fall out of their scope of competence (ASHA, 2016a, b; Behavior Analyst Certification Board ® [BACB], 2020, 1.05). Finally, it is imperative that professionals implement procedures in consultation with the direct consumers or stakeholders (ASHA, 2016a, b; BACB, 2020, 2.13).

The use of EBP is consistent with position statements developed by ASHA's Joint Coordinating Committee, in that audiologists, speech-language pathologists, and other treating professionals incorporate the principles of evidence-based practice in clinical decision-making (ASHA, 2005). There are several evidence-based approaches for treating an LD (Geiger et al., 2012). These approaches include but are not limited to shaping (Fleece et al., 1981), discrete trial teaching (Geiger et al., 2012), functional communication training (Carr & Durand, 1985), incidental teaching (Haring, 1992; Hart &

Risley, 1968), pivotal response training (Gengoux et al., 2019), parent-mediated interventions (Ingersoll et al., 2016), and augmentative and alternative communication (Binger & Light, 2007).

Shaping

Shaping is the process of molding desired behaviors through the use of differential reinforcement of successive approximations of a terminal behavior (Cooper et al., 2019). Fleece et al. (1981) used shaping to treat a social communication LD for two preschoolers with low voice volume. The interventionist used a voice volume apparatus and manually adjusted the voice-activated relay throughout phases of the shaping process. For example, in the earlier phases, the device was more sensitive to voice volume and was activated by lower volumes. However, gradually louder voice volume was required for each subsequent treatment phase. Voice volume that met the criteria for the treatment phase was reinforced by illumination of a light up display. Corrective feedback was provided for voice volume that did not meet the criteria. Following intervention, voice volume increased to appropriate levels for both participants. Furthermore, voice volume was generalized to the classroom setting and maintained during a one- and four-month follow-up.

Ghammaeghami and colleagues (2018) evaluated the efficacy of a shaping procedure for treating a social communication LD for two children diagnosed with ADHD. Shaping was used to develop complex functional communication responses (FCRs). The shaping procedure included the use of differential reinforcement and extinction to gradually shape approximations of more complex FCRs. Within this procedure, the criterion for reinforcement was gradually increased, and FCRs that did not meet this criterion (i.e., appropriate volume and tone) were placed on extinction (i.e., reinforcement was withheld). A changing criterion design was employed to assess the effect of this shaping procedure to increase the complexity of the participants' FCR. The shaping procedure successfully progressed simple FCRs to more complex FCRs and replaced challenging behavior with more functional communication across participants.

Discrete Trial Teaching

Discrete trial teaching (DTT) is an instructional approach which breaks the target skill down into smaller steps and teaches those steps one at a time (Bogin et al., 2010; Leaf et al., 2014; Mitsch & Riggleman, 2020). DTT consists of three main components, including an instruction from the interventionist, a response from the learner, and delivery of a consequence contingent upon the learner's response (Weiss et al., 2017). An optional fourth step of DTT is the interventionist providing a prompt (after the instruction) that increases the probability of the learner responding correctly (Leaf et al., 2014; Mitsch & Riggleman, 2020). DTT is typically implemented in a highly structured, one-to-one format (Mitsch & Riggleman, 2020), although it could be implemented in a group instructional format (Leaf et al., 2013). DTT is effective for treating an LD in the areas of expressive language (e.g., speech and sign vocabulary, responding to questions), receptive language (e.g., responding to instructions), and social communication skills (e.g., increasing social initiation and interaction) (Conallen & Reed, 2016; Garcia-Albea et al., 2014; Geiger et al., 2012).

Geiger et al. (2012) used an adapted alternating treatment design to evaluate the efficacy of traditional DTT procedure compared to an embedded DTT procedure to teach responding to instructions (i.e., receptive language) to two preschoolers diagnosed with autism. The traditional DTT procedure consisted of the presentation of a stimulus (e.g., a picture) followed by an instruction. Each participant was provided three seconds to respond and received response-specific delivery of a consequence (i.e., praise and an edible for an accurate response and redelivery of the instruction with a prompt for an incorrect response or no response). The embedded DTT procedure involved the traditional DTT procedure with an embedded instruction. That is, the provided instruction was presented within the context of naturally occurring activities. Results indicated that both traditional and embedded DTT were similarly effective for teaching receptive language discriminations.

A study conducted by Secan et al. (1989) assessed the effect of a DTT picture training procedure to teach generalized responding to wh- questions to four students demonstrating delays in social communication and language skills. Responding was evaluated across persons, situations, and time, using a modified multiple-probe design. During the DTT picture training procedure, the interventionist presented a picture and told the student to attend to the item. The interventionist then asked a wh-question related to the picture presented, and the wh- word was emphasized (e.g., "WHAT is the boy doing?"). The student was provided 10 seconds to respond, and differential consequences were delivered contingently. The consequence for correct responses was the delivery of praise. Incorrect responses (or absence of responding) were followed by the interventionist modeling the correct response and restating the question. If the student then emitted a correct response, praise was delivered. If another error or no response occurred, the interventionist repeated the question and provided a model of the correct response. The trial was then terminated. The DTT picture training procedure successfully resulted in generalized responses to wh- questions.

Functional Communication Training

Functional communication training (FCT) is another evidence-based practice used to decrease challenging behaviors such as aggression, self-injury, and property destruction by increasing appropriate (functional) language and communication skills (Carr & Durand, 1985; Ghaemmaghami et al., 2018; Ghammaeghami et al., 2021; Muharib et al., 2019). In a seminal study, Carr and Durand (1985) taught functional communication skills to four adolescents with diagnoses of brain injury, autism, developmental delay, and hearing impairment. Through the use of FCT (i.e., differential reinforcement of a functional communication response), the participants were taught to either ask for help or recruit adult attention. Participants were taught to use "I don't understand" to recruit assistance during challenging tasks and "Am I doing good work?" to recruit praise during easier tasks. FCT resulted in a decrease in challenging behaviors and an increase in FCRs during the training contexts.

Muharib et al. (2018) investigated effects on challenging behavior of using GoTalkNow on an iPad for two children with ASD who had little or no speech skills and a social communication LD. Muharib et al. (2018) employed least-to-most prompting and natural reinforcement (i.e., delivery of the requested item) to increase the participants' functional communication. The findings suggested a functional relation between the FCT intervention (independent variable) and challenging behaviors (dependent variable) with a decrease in the challenging behaviors.

Incidental Teaching

Incidental teaching is a form of instruction that capitalizes on naturally occurring opportunities within the individual's learning environment (Haring, 1992; Hart & Risley, 1968). When using incidental teaching to treat an LD, the interventionist has to manipulate the environment in a manner which encourages the learner to communicate (Hart & Risley, 1975). The steps of incidental teaching include (a) the manipulation of the environment; (b) an initiation from the learner; (c) an elaboration from the interventionist; and (d) reinforcement. An example of application of this methodology is toward increasing mand repertoires for a learner (Farmer-Dougan, 1994; Rogers-Warren & Warren, 1980). An interventionist might place a desired item (e.g., light up toy) out of reach of the learner and wait for the learner to make a communicative response (e.g., saying "help me" or "toy"). This would be followed by an elaboration (e.g., "You want the toy?") from the interventionist and the learner receiving the item. Researchers have demonstrated that incidental teaching can be effective in mitigating an LD in the areas of expressive language (McGee et al., 1985; Rogers-Warren & Warren, 1980), receptive language (McGee et al. 1986), and social communication (Kohler et al., 2001) and can be used to develop skills such as manding (Farmer-Dougan, 1994; Rogers-Warren & Warren, 1980), using prepositions (McGee et al., 1985), reading (McGee et al., 1986), elaborating language complexity (Hart & Risley, 1975, 1980, 1982), and social interaction (Kohler et al., 2001).

Hart and Risley (1975) used incidental teaching to increase vocabulary and frequency of language for 11 preschool children. The incidental teaching procedure was employed when the child initiated an interaction with a request. The interventionist then used this interaction to provide a learning opportunity for language development through the use of least-most prompting in order to evoke vocabulary growth and language frequency. Once the participant emitted a correct response, a naturally occurring reinforcer (e.g., the item requested) was delivered. Incidental teaching resulted in substantial increases in vocabulary growth and the frequency of language use.

Incidental teaching is also effective in increasing vocabulary, initiations for social interactions, responsiveness to initiations, and the overall complexity of an individual's language skills used within social interactions (Warren & Kaiser, 1986). In 2001, Kohler and colleagues employed an incidental teaching approach for four preschoolers with disabilities. The children's teachers were taught to use naturalistic teaching procedures such as joining the activity, using comments or questions, and using novel materials to evoke the children's interest and facilitate social communication and interaction while engaged in free play. Incidental teaching resulted in increased social interactions for all four participants.

Pivotal Response Training

Pivotal response training (PRT) is a comprehensive intervention model that is used to increase language and social behavior, decrease challenging behavior, and improve the overall quality of lives for their learners (Vernon, 2017). PRT is considered a naturalistic and child-initiated behavioral treatment (Koegel et al., 1987). There are five critical motivational variables in PRT: choice, interspersal, task variation, use of natural rewards, and rewarding attempts to emit a target behavior (Vernon, 2017). The research behind this model supports that increasing pivotal behaviors may lead to collateral skill acquisition (i.e., acquiring skills that were not specifically targeted for teaching) and challenging behavior reduction and may lead to overall improvements in the learner's life (Koegel et al., 1999; Koegel & Koegel, 2006). Researchers have demonstrated that PRT can be effective in reducing challenging behaviors, improving socialization, and establishing the learner as a valued member of a peer group with social activities (Koegel & Koegel, 2006).

Koegel et al. (1987) conducted a multiple baseline study with two children diagnosed with ASD to assess the ability of the PRT motivation strategies (e.g., child selection of intervention materials, bids to attract the child's attention, interspersing of mastered and novel tasks, logically related and natural reinforcers, and immediate reinforcement for any appropriate response) to increase language development. Within the PRT teaching procedure, a preferred stimulus (e.g., a toy) was presented to the participants and the participant was prompted to make a verbal request. The stimulus was provided, contingent upon the verbal response. Results demonstrated improvement in language development for both participants (Koegel et al.,1987).

Gengoux et al. (2019) conducted a randomized controlled study which compared a 24-week PRT package (PRT-P) group with a delayed treatment group (DTG). Forty-eight children that were diagnosed with ASD and significant language delays and their parents were randomly assigned to the PRT-P group or the DTG group. The PRT-P included a 12-week intensive phase which was followed by a 12-week maintenance phase. The intensive phase occurred from week 1 to week 12 and provided the parents with weekly 60-minute parent training sessions on how to conduct PRT. Also, during the intensive phase, the children received 10 hours per week of treatment in the clinic setting. Treatment targeted the development of the child's communication skills. Weeks 12–24 consisted of a maintenance phase wherein parent training sessions were reduced to once per month and the treatment provided to the children was reduced to five hours per week and was conducted in the home. While the PRT-P group received the PRT-P intervention, the DTG group received stable community-based interventions. Following 24 weeks, analysis revealed that the number of utterances increased for the PRT-P group as compared to the DTG. PRT-P improved the child's social communication skills and strengthened parent implementation of PRT procedures.

Parent-Mediated Intervention

Parent-mediated intervention (PMI) is the specific involvement of parents in the delivery of treatment for their child (Casagrande & Ingersoll, 2017). As described by Bearss et al. (2015), PMI involves the systematic training of parents to implement treatment strategies to be utilized with their child. PMI is used to help parents manage their child's behavior and develop specific skill areas (Casagrande & Ingersoll, 2017). As described by Casagrande and Ingersoll (2017), PMI is often utilized in a treatment package in conjunction with other treatment procedures. PMI can increase the intensity of the child's intervention (Casagrande & Ingersoll, 2017), reduce the amount of treatment resources needed (Chasson et al., 2007), and improve the parent–child relationship and overall family functioning (Casagrande & Ingersoll, 2017; Karst & Van Hecke, 2012; Strauss et al., 2012). The evidence for PMI for mitigating an LD is somewhat limited, with recent studies reporting null findings (Carter et al., 2011; Rogers et al., 2012; Turner-Brown et al., 2019) and reviews discovering methodological flaws in the literature on PMI for treatment of an LD (Beaudoin et al., 2014; Oono et al., 2013). However, some studies successfully demonstrated the use of PMI to increase social communication skills (Ingersoll et al., 2016; Kaiser et al., 2007; Turner-Brown et al., 2019; Wetherby & Woods, 2006).

Ingersoll et al. (2016) implemented a randomized controlled trial (RCT) pilot study. A PMI treatment was designed to increase social engagement, language skills, and other skills outside the domain of social communication (e.g., play). Parents were divided into a self-directed (i.e., the parent independently engaging with the interactive program) or a therapist-assisted program (i.e., the parent was provided with assistance from a professional therapist). Twenty-four individual or group parent–child sessions were provided biweekly for one hour each session. The children within both groups demonstrated increased learning skills, with slightly larger gains in the therapist-assisted group. Treatment resulted in increased fidelity of parental use of treatment, decreased parental stress, and more positive child perceptions. Greater fidelity and more positive child perceptions were reported in the therapist-assisted group. Therefore, PMI is a potentially effective treatment for improving an LD (Ingersoll et al., 2016; Wetherby & Woods, 2006). Casagrande and Ingersoll (2017) suggested that careful consideration of several factors could increase the effectiveness of PMI for developing social communication skills. Prior to employing PMI, practitioners should consider the interventions used (e.g., DTT), the social communication skills selected, the format of parent training (i.e., group vs. individual), the dosage of parent training, and specific parent variables (e.g., stress) (Casagrande & Ingersoll, 2017).

Augmentative and Alternative Communication

Augmentative and Alternative Communication has been considered both an intervention and a behavior that is taught (ASHA, n.d.-c). For example, the Picture Exchange Communication System (PECS) would be considered an intervention (AAC Institute, 2021); however, when a learner responds using a Proloquo (Van der Meer et al., 2013) to communicate, that would be considered a behavior. AAC is utilized for the supplementation or replacement of natural speech and/or writing and is an integrated group of components used to enhance communication (AAC Institute, 2021). Aided AAC refers to systems that are additional to the person communicating, some form of external tool such as pictures, drawings, speech-generating devices, or objects (AAC Institute, 2021); unaided AAC refers to communication systems that do not require additional equipment or items and would include manual sign, gestures, or finger spelling (AAC Institute, 2021). AAC is augmentative when used to supplement existing speech, is alternative when replacing speech that is absent or dysfunctional, and is temporary when used postoperatively in intensive care cases (Elsahar et al., 2019).

PECS has been shown to increase spoken communication (Yoder & Stone, 2006). A randomized group experiment was conducted by Yoder & Stone (2006) which compared the effect of Responsive Education and Prelinguistic Milieu Teaching (RPMT) and PECS on the use of nonimitative spoken communication acts and nonimitative words. Both treatments were provided for a total of 24 hours and broken into three 20-minutes sessions weekly over 6 months. The RPMT sessions occurred on the floor 1:1 and taught gestures, gaze, vocalizations, and words using mands and explicit imitation prompts to evoke spoken communication. The PECS sessions were conducted in a chair with 2:1 for phases I, II, III, and IV of PECS (per the PECS manual) and 1:1 for the remainder of phases. The growth rate of nonimitative words was faster with the PECS group (for children who began the treatment with relatively high object exploration behavior). However, for participants who began with relatively low object exploration, the RPMT group was more successful.

AAC models are another type of AAC intervention (Binger & Light, 2007). Binger et al. (2007) examined the use of an AAC model for language intervention (i.e., increasing the use of multisymbol messages) for five preschool children between the ages of three and five years. Two children used a voice output (speech-generating device) and two children used a communication board (pictures on a board). The participants were taught to use their AAC device to directly select a picture by touching it with an index finger. The AAC model was delivered through the use of natural speech while pointing to and labeling a graphic symbol on an AAC device. Four of the five participants demonstrated an increase in use of multisymbol messages suggesting that AAC modeling had a positive effect on increased sentence length (Binger & Light, 2007).

Conclusion

In order to appropriately address skill acquisition, set meaningful goals, and help learners progress in any of the broad areas encompassed under the area of language, a clinician should have a basic knowledge and understanding of developmental milestones and benchmarks. Understanding how typical language development looks is important for knowing when a learner is delayed or missing core language skills. Knowledge of the developmental process allows the clinician the ability to understand when to refer to the appropriate professionals and who that professional may be. Language impacts many skills and when there are difficulties in this area, there may be a negative impact across multiple other developmental areas. A language disorder may negatively impact the basic ability to communicate with others to meet one's needs or wants as well as affecting the establishment and growth of relationships.

Hallmarks of a language disorder include impaired comprehension and/or expression of spoken, written, or other symbol systems as well as social interactions. When identifying a language disorder, professionals must consider the extent to which the language difficulties (a) impact adversely on social, psychological, and educational functions, (b) represent a difference rather than a disorder, and (c) are significant enough to be labeled a disorder (Turnbull & Justice, 2017). Considerations must also be given to cultural dimensions that may influence both verbal and nonverbal behaviors. Distinguishing between a communication difference and a communication disorder is a skill required for clinical competence. The importance of understanding, diagnosing, and treating an LD cannot be overemphasized. LD can have many negative consequences which include but are not limited to lower academic achievement (e.g., decreased reading ability, lower level of education), social anxiety that results in difficulty establishing relationships, increased risk of bullying and victimization and decreased self-esteem, and a risk for sexual assault in adulthood (Rice, 2018). It is imperative that the professionals who work with individuals with LD (and/or who are on teams that address the needs for individuals with LD) have a concrete understanding and working knowledge of the many facets of language. A foundational understanding of language skills, language development, language components, and the distinction between a disorder and a cultural difference is critical for accurate diagnosis and treatment; this working knowledge leads the professional to select appropriate intervention, in order to avoid the aforementioned risks and progress barriers. By collaborating through use of evidence-based practices, professionals (i.e., SLPs, behavior analysts, psychologists, educators) and family members can offer meaningful support toward optimized clinical outcomes and improved quality of life.

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Functional Communication Training

44

Reem Muharib and Emily Gregori

Typically developing children as well as children with developmental disabilities may engage in challenging behaviors. Challenging behaviors range from noncompliance to more severe forms such as aggression (e.g., hitting, kicking, biting others), self-injury (e.g., self-biting, hair pulling, head banging), and property destruction (e.g., breaking furniture). Challenging behavior may interfere with the child's learning, impede the child's ability to develop healthy friendships with peers, and in severe cases, also cause harm to the child and others (Powell et al., 2007). Because of the negative effects of challenging behaviors, practitioners must be able to use evidence-based practices to reduce these behaviors and teach appropriate prosocial skills. One of these evidence-based practices is Functional Communication Training (FCT; Carr & Durand, 1985). FCT has accumulated sufficient research support to be deemed an evidence-based practice for children including children with autism, intellectual disability, other health impairments, behavior disorders, and multiple disabilities (Gerow et al., 2018; Muharib & Wood, 2018).

FCT involves three steps. The first step is to identify the function of the challenging behavior. In other words, a practitioner attempts to find out why the child is engaging in challenging behavior; what the child is getting or getting out of by engaging in challenging behavior. The second step is to select a new replacement behavior (i.e., an appropriate way to ask for the reinforcer). The third step is to teach the child a replacement behavior that will result in accessing the same reinforcer as the challenging behavior. For example, if the child engages in hitting to gain access to a toy (the function), then the practitioner may teach the child to say "*can I have my toy, please?*" and then provide the child with the requested toy.

Functional Behavior Assessments

Conducting functional behavior assessments is the first step in FCT. The process of functional behavior assessments typically involves several components: (a) indirect assessments, (b) direct assessments, and (c) formulating a hypothesis regarding the function (purpose) of challenging behavior.

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When conducting functional behavior assessments, a practitioner gathers information about the child's challenging behavior and related contextual variables. For example, a practitioner may gather information about what happens right before and right after the challenging behavior occurs. A practitioner may find out that every time mealtime begins, the child starts throwing a tantrum, and then the parent removes the child from the dining area. In this example, the practitioner learns that this challenging behavior is maintained by avoiding mealtime. In other words, the child engages in tantrums because she has learned that every time she throws a tantrum, her parent removes her from the dining area (i.e., an activity the child dislikes). The practitioner, in this example, also learns about the time (mealtime) and place (dining room) where the challenging behavior is likely to occur. By collecting such information (data), a practitioner can develop an FCT program where the child is taught an appropriate replacement behavior (e.g., saying "*break*, *please*") and implement the program during the time and place where the challenging behavior is likely to occur.

Indirect Assessments

Information regarding the function of challenging behavior and relevant contextual variables may be obtained using indirect and direct assessments. Indirect assessments involve interviewing people that are familiar with the child such as parents, teachers, and paraprofessionals. The purpose of these interviews is to gather information about (a) when and where challenging behaviors occur and do not occur, (b) when and where appropriate behaviors occur and not occur, and (c) what happens before and after challenging behaviors occur. This method is considered indirect because the practitioner assessing the behavior is not directly observing the child. Instead, the practitioner is asking others who interact with the child and have observed the child engage in these behaviors.

Rating Scales Rating scales are surveys designed to obtain information on a specific challenging behavior, or group of challenging behaviors. The purpose of a rating is to obtain information regarding the settings and contexts in which the challenging behavior is likely to occur and variables that may trigger and reinforce the behavior. Typically, rating scales list scenarios (e.g., "Does the behavior occur when you walk away from the child") and ask the respondent to rate the extent to which that statement is accurate using a numerical scale (e.g., "1 = always true, 2 = true, 3 = sometimes true, etc."). Sections with the highest ratings may indicate the function of the individual's behavior. Common rating scales used during the functional behavior assessment process include the *Motivation Assessment Scale* (Durand & Crimmins, 1992) and the *Questions About Behavioral Function* (Paclawskyj et al., 2000). Rating scales are useful when you want to glean initial information regarding a challenging behavior. Typically, rating scales can be implemented quickly (10–20 min) and require minimal training to administer, which make them feasible to use in classroom, home, and community-based settings. Rating scales, however, only provide the practitioner with an overview of the behavior, and more detailed information is often overlooked when using these tools.

Interviews Interviews are structured conversations between the practitioner and individuals who know the target child (e.g., parents, teachers, related service providers). Behavioral interviews typically consist of questions designed to elicit information about the behavior of concern, and variables that influence the occurrence of the behavior. For example, interview questions may include "In what situations is the target behavior most likely to occur?" "What typically happens right before the behavior occurs?" or "Have there been any recent changes to the child's regular routine?" There are many published interview tools available to behavior analysts and educational practitioners. The

Functional Assessment Interview (FAI; O'Neill et al., 1997) is a comprehensive interview tool that is commonly used during the functional behavior assessment process. The FAI gleans information related to the target challenging behavior, history of treatments for the target behavior, communicative abilities, environmental factors that may influence the target behavior, and variables that may reinforce the target behavior. Like other interview tools, the FAI is more time intensive than rating scales, but gives the practitioner deep and rich information concerning the child and the target challenging behavior.

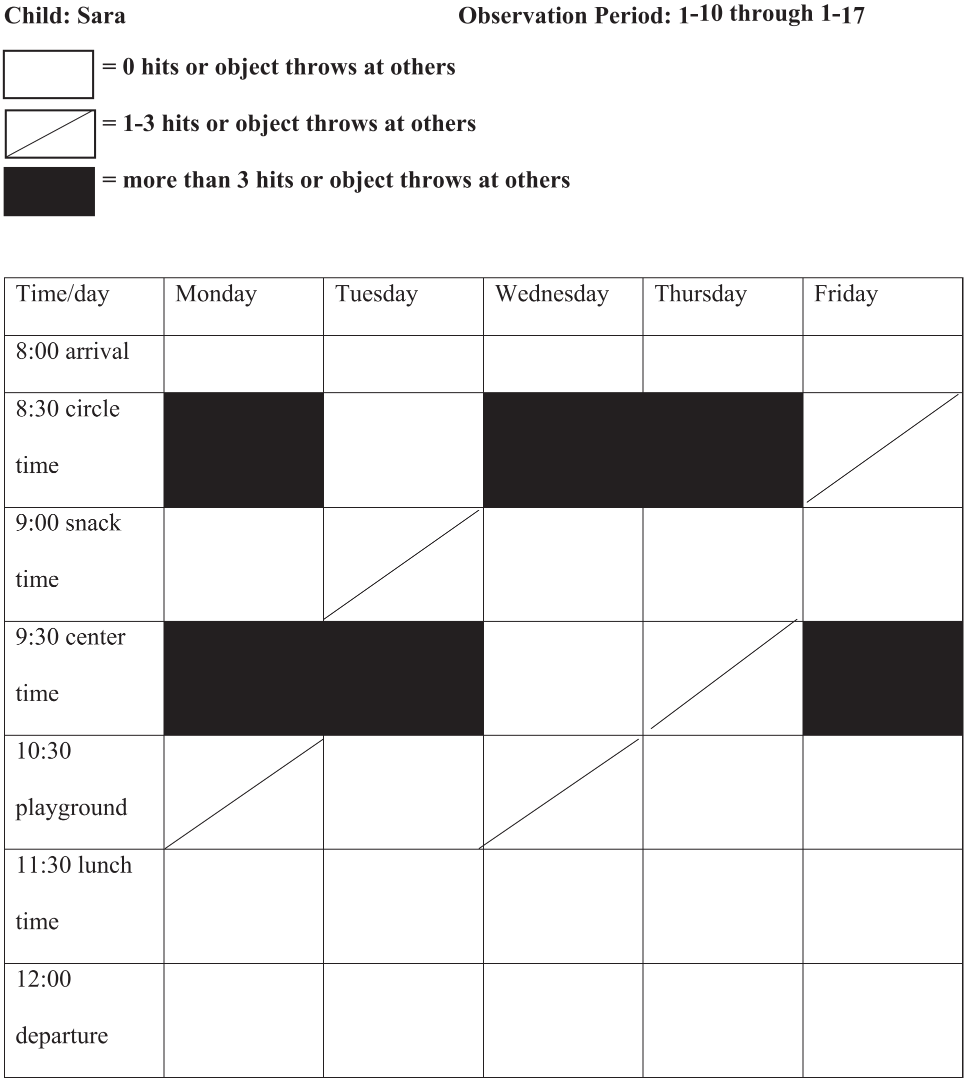
The process of conducting indirect assessments begins by identifying the key individuals who you will administer the assessments to. When conducting indirect assessments, it is important to obtain information from individuals who know the child well, spend consistent time with the child, and interact with the child in settings where the challenging behavior occurs. For example, if a practitioner is conducting a functional behavior assessment for a fourth-grade student in special education, he or she may consider implementing indirect assessments with the child's parents, special education teacher, paraprofessional, and related service providers (e.g., speech therapist, occupational therapist). The practitioner should conduct the interviews or administer the rating scales at times that are feasible and convenient for the respondent. For example, if the practitioner plans to interview a parent, they should schedule the interview in a way that reduces logistical barriers (e.g., in the evening, conducting the interview over distance technology). The practitioner should also ensure that the respondent is comfortable with and informed regarding the assessment procedures. Before beginning the assessment, the practitioner should explain the purpose of the assessment and ask the respondent if they have any questions.

After the practitioner has administered the assessments, the practitioner will analyze the results. The practitioner should summarize the results of the assessments and use the results to identify the settings in which they will conduct the direct observations. The practitioner may also use the information obtained during the indirect assessments to refine the definition of the target challenging behavior. Although the result of the indirect assessments may indicate potential functions of challenging behavior, they are often less reliable that direct assessment procedures, and therefore, should only be one of many tools used during the functional behavior assessment process.

Direct Assessments

Often times, indirect assessments are not sufficient to determine the function of challenging behaviors and the relevant contextual variables that influence the behavior. While indirect assessments are an important first step in identifying the function of challenging behavior, other methods, such as direct assessment, can provide more accurate and reliable information regarding the behavior of concern. Direct assessments provide a practitioner with opportunities to observe the child during natural routines without disturbing the flow of events (e.g., classroom routines). Unlike indirect assessments wherein a practitioner relies on reports from others, a practitioner can observe and record challenging behaviors as they occur to determine the environmental variables that trigger and maintain the challenging behaviors. Direct assessments involve the practitioner directly observing the child using (1) a scatterplot to determine the settings and times of day the challenging behavior is most likely to occur and (2) antecedent-behavior-consequence (A-B-C) recording method to identify environmental variables associated with the challenging behavior to determine the function of challenging behaviors.

Scatterplots A scatterplot is a matrix relating challenging behavior to the time of day and is used to gather information about when challenging behaviors occur. Scatterplots are used to record the extent



Child: Sara **Observation Period: 1-10 through 1-17**

☐ **= 0 hits or object throws at others**

⧄ **= 1-3 hits or object throws at others**

■ **= more than 3 hits or object throws at others**

Time/day	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 arrival	☐	☐	☐	☐	☐
8:30 circle time	■	☐	■	■	⧄
9:00 snack time	☐	⧄	☐	☐	☐
9:30 center time	■	■	☐	⧄	■
10:30 playground	⧄	☐	⧄	☐	☐
11:30 lunch time	☐	☐	☐	☐	☐
12:00 departure	☐	☐	☐	☐	☐

Fig. 44.1 A Scatterplot durning a 5-Day Observation

to which the challenging behavior occurs more often at certain times of the day or certain contexts than others. To use a scatterplot, a practitioner creates a matrix and divides the day into several blocks of time (see Fig. 44.1). After a practitioner collects data for several days using scatterplots, a practitioner can analyze the data to detect any patterns. A practitioner may find out that a challenging behavior occurs more often during a certain time of the day such as a certain time of the day wherein the child is expected to complete a set of non-preferred tasks. It is important to note that a practitioner should collect data using this method over several days to be able to see a pattern of the challenging behavior.

As an example of a scatterplot (Fig. 44.1), a practitioner observed Sara in her preschool from arrival time at 8:00 until departure time at 12:00 Monday through Friday. Using a scatterplot, we can see that Sara hits and throws objects at others during circle time and center time more often than any other time of the school day. Finding this information about when Sara is more likely to engage in challenging behavior will help the practitioner choose the time of the day in which these behaviors occur to conduct A-B-C recording. In this next step, a practitioner uses A-B-C recording to gather information about the function of challenging behavior.

A-B-C Recording After identifying the times and locations that the challenging behaviors occur most frequently using a scatterplot, a practitioner will observe the child during those times using antecedent-behavior-consequence (A-B-C) recording method. The purpose of the A-B-C recording is to identify the relationship between environmental variables and the target challenging behavior. Ultimately, the results of the A-B-C observations will be used to determine the function of the challenging behavior (i.e., what does the child get or get away from by engaging in challenging behavior?). A-B-C recording has several advantages: (a) like scatterplots, a practitioner can observe the challenging behaviors as they occur without disturbing the child's natural routine, and (b) a practitioner can gain a better understanding of the environmental variables that trigger and reinforce the challenging behavior. Before conducting an A-B-C recording, a practitioner must be familiar with the three-term contingency (A-B-C) that governs behavior. Challenging behavior (or any other behavior) does not occur in isolation. Before a behavior occurs, an antecedent (something in the environment) triggers the challenging behavior. Examples of antecedents include placing a non-preferred worksheet in front of the child, a peer taking a toy from your target child, or a peer telling your child "you can't play with us." When the antecedent takes place, a behavior occurs. What occurs immediately after the behavior is called a consequence. A consequence in the form of reinforcement (i.e., giving the child what she wants or removing what the child does not want) increases the chances that the child will keep engaging in challenging behavior in the future. Examples of reinforcement include removing a non-preferred worksheet after the child hits the teacher or giving the child a toy after the child yells at her peer. Figure 44.2 illustrates the three-term contingency involving a child who hits and spits at her teacher.

A-B-C recording involves directly observing the child in settings where the challenging behavior is most likely to occur. As seen in Table 44.1, the practitioner will record every challenging behavior

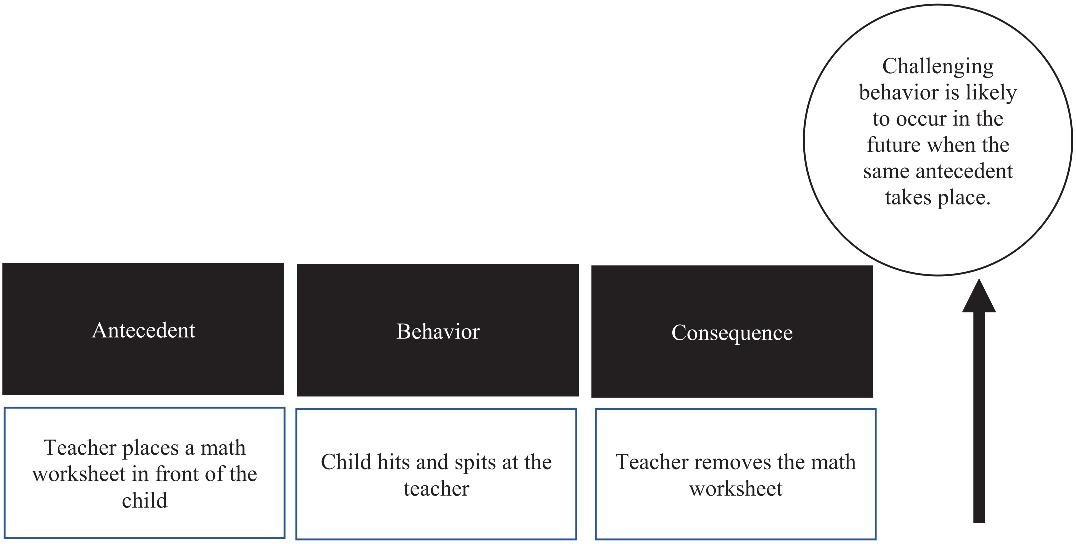


Fig. 44.2 The three-term contingency

Table 44.1 A-B-C recording

Time	Antecedent	Behavior	Consequence
9 am (center time)	Peer playing with a tea pot	Sara hits the peer	Peer cries and gives Sara the tea pot
9:02 (center time)	Peer approaches Sara and says "my turn"	Sara pushes peer with one hand	Sara keeps the tea pot
9:05 (center time)	Peer playing with a potato head	Sara grabs the potato head from the peer	Peer walks away and Sara keeps playing with the potato head
9:08 (center time)	Peer tries to grab a toy from Sara	Sara slaps the peer on the face	Sara keeps playing with the toy
10 am (snack time)	Peer shows others a toy he brought from home	Sara grabs the toy from peer	Peer cries and teacher takes the toy from both of them
10:01 (snack time)	Teacher takes the toy	Sara cries and throws her snack on the floor	Teacher throws the snack in the trash

occurrence (e.g., hitting), what happens right before the behavior (antecedent; e.g., a peer is in a possession of a toy in the housekeeping center), and what happens right after the behavior (consequence; e.g., the peer cries and gives Sara the toy). By gathering such information, a practitioner can see a pattern of behavior and what occurs before and after the behavior. Consequently, a practitioner can formulate a hypothesis about why the child is engaging in challenging behavior. Based on the information gathered in the A-B-C report, we can see and hypothesize that Sara engages in challenging behaviors to obtain toys from her peers.

Selecting a Replacement Behavior

After a practitioner has formulated a hypothesis regarding the function of the challenging behavior, the practitioner, along with people that often interact with the child (e.g., parents, teachers), select a new replacement behavior to teach the child that will replace the challenging behavior. Specifically, this new replacement behavior is taught to the child as an alternative way to ask for the functional reinforcer (e.g., toy, attention, break) instead of engaging in challenging behavior. For example, if a child engages in hitting when they are thirsty, a practitioner could teach the child to say, "*Drink, please*" instead of hitting. Selecting a new replacement behavior should be done as part of a collaborative team that includes individuals who interact with the child such as caregivers, the classroom teacher, and a speech and language pathologist. There are a few considerations to keep in mind before selecting a new replacement behavior: (a) it must be easy to learn, (b) easily recognizable by others, and (c) must result in getting access to reinforcement consistently and immediately (Dunlap & Duda, 2004).

Easy to Learn The first rule to increase the effectiveness of FCT is that the child should have the skills to emit the replacement behavior or the ability to learn the replacement behavior with their existing skills. For example, if a child has complex communication needs and is unable to communicate vocally (a skill they do not have), a practitioner should not select a vocal response. Instead, the practitioner may teach the child to exchange a card that includes a picture of the preferred item or activity. However, if a child is able to form simple sentences (a skill they do have), the practitioner may choose to teach the child to make a simple vocal request such as "toy." Regardless of the level of support the child requires to learn a new skill, the practitioner should select a skill that is most appropriate for the child's needs and preferences.

The second consideration a practitioner needs to make is to ensure that the replacement behavior requires less effort to emit than the challenging behavior; in other words, the practitioner should select a replacement behavior that is easy for the child to emit. For example, a child engages in head banging to get away from one-on-one work and has no appropriate replacement behaviors in her repertoire. A practitioner may teach a child to point to a "break" picture. The practitioner, for example, does not teach the child to pick up the "break" picture and hand it to him/her because this may require more effort from the child than simply banging her head. If a practitioner selects a new replacement behavior that requires more effort than engaging in challenging behavior, then the child is more likely to engage in the challenging behavior than the new replacement communicative behavior.

For children who do not produce vocal speech or only produce unintelligible speech, a practitioner may opt to teach the replacement behavior using Augmentative and Alternative Communication (AAC) systems. AAC systems are used to supplement or replace vocal speech and are commonly used for children with developmental disabilities. AAC systems include aided system where an external tool is used such as pictures, speech-generating devices (e.g., microswitches), or tablets loaded with communication applications (apps), as well as unaided systems wherein no external tool is required and this includes the use of manual signs.

It is important for a practitioner to consult with parents, as well as other people who frequently interact with the child (e.g., teachers, paraprofessionals), regarding what AAC system to select for the child. It is also key to assess the child's ability to use an AAC system before selecting one. Specifically, the team should assess the child's vision and hearing abilities and fine motor skills (Alzrayer & Banda, 2017). For example, for a speech-generating device or tablet to be selected, the child must have the ability to see the icons, hear the speech output that the device produces, and have the motor strength to tap an icon. Some modifications can be made when using such devices. For example, if the child has low hearing ability, then a practitioner may place the tablet in a case with a sound amplifier feature. If the child has low vision abilities, then a practitioner may enlarge the icons on the tablet screen, and if the child has hand tremors, a practitioner may decrease the screen sensitivity (e.g., two taps required to operate an icon instead of one tap). If the child does not have the minimum abilities to use such devices (e.g., blind), then a practitioner will rule out this option. Similar considerations also apply to selecting printed pictures as an AAC system. For pictures to be selected, a child must be able to see the pictures and touch them (or hand them to the other person). On the other hand, if a practitioner and other stakeholders (e.g., parents) consider manual sign to teach the child (e.g., "break"), then the child must have the necessary fine motor skills to manually do the sign.

After assessing the child's necessary skills, an AAC system is selected. Regardless of which AAC system is selected for the child, it is important to teach the child one response only to increase the effectiveness of FCT. For example, Johnny is a nonvocal child with autism. His challenging behavior is maintained by access to attention from adults. After assessing his abilities, a tablet that is loaded with a communication app is selected as an AAC system. A practitioner programs the app and allows only one icon "*play please*" on the screen. By allowing only one icon on the screen, the child does not need to learn to discriminate between multiple icons, thus, decreasing his response effort in engaging in the new appropriate replacement behavior. In other words, if Johnny had to select the correct icon out of multiple icons to request attention, it might be just easier for him to simply engage in challenging behavior. The same consideration must be kept in mind when selecting a communicative response in the form of a manual sign, picture, or even a vocal response. For example, a practitioner wants to teach Peter to vocally request a break from work instead of engaging in challenging behavior. The practitioner teaches Peter to say "*break*" instead of "*may I have a break, please?*" Although saying "*may I have a break, please?*" may be more socially appropriate than just saying "*break*," teaching Peter to only say "break" may increase the likelihood that he will use this vocal response to ask for a break because it does not require a lot of effort compared to "*may I have a break, please?*"

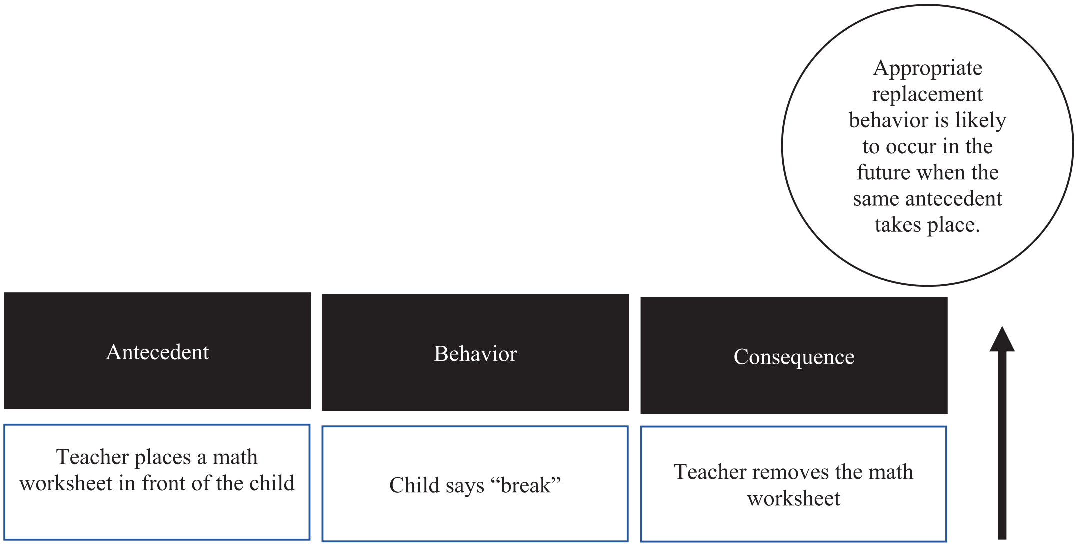


Fig. 44.3 The three-term contingency in reinforcing appropriate replacement behavior

Easily Recognized by Others The second consideration for selecting a new replacement behavior for the child is that it must be easily recognized by others such as parents, siblings, peers, and other individuals who interact with the child. If the child uses a new replacement behavior correctly but others are not able to recognize it, then the child is likely to return to engage in challenging behavior. For example, Alex is a child with Down syndrome who is now able to sign "play" to request attention from his teacher in the classroom. Alex goes home and signs "play" to request attention from his sibling but his sibling does not recognize the sign. Because Alex does not get attention from his sibling when he signs "play," Alex screams and his sibling immediately turns his attention to Alex. In this scenario, even though Alex was able to sign correctly, the sign was not recognizable by others who interact with him. For this reason, it is important to select a communicative behavior that can be easily recognized by others so that they respond to the child's appropriate communication, which consequently decreases the child's likelihood of returning to challenging behavior. This may require training people who interact with the child to recognize the new replacement behavior. For example, a teacher may explain to other children in the classroom what the "play" sign means and how they should respond when Alex uses this sign. A teacher may also model or verbally prompt other children when Alex signs "play" to get their attention.

Consistently and Immediately Reinforced The last consideration for selecting a new replacement behavior is that it must be reinforced consistently and immediately. For FCT to be effective, the new replacement behavior (e.g., saying "*break please*") must immediately and consistently produce reinforcement. For example, every time a child uses the new replacement behavior to ask for a break from a demand, the teacher should immediately provide the child with a break. The reason behind the need for reinforcing each appropriate replacement response immediately is to teach the child the contingency between asking appropriately and getting access to the requested reinforcer, and also to weaken the contingency between the challenging behavior and the reinforcer. In other words, when a practitioner provides the reinforcer every time the child asks for it appropriately, then the child is likely to use this appropriate replacement response more often and refrain from engaging in challenging behavior. See Fig. 44.3 for an example.

Teaching the New Replacement Behavior

After selecting the new replacement behavior, a practitioner begins teaching the child the new replacement behavior. A practitioner may teach the new replacement behavior (a) in a one-on-one format or (b) during natural teaching opportunities. Teaching in a one-on-one setting involves repeatedly presenting antecedents that evoke challenging behavior, teaching the replacement behavior, and reinforcing the replacement behavior during a predetermined instructional session. For example, a practitioner selects a demand that has a history of provoking the challenging behavior of Alex whose challenging behavior is maintained by escape (getting away) from demands. The practitioner places the demand in front of Alex and immediately prompts Alex to engage in the new replacement behavior to ask for a break. The practitioner immediately provides Alex for a break whether he requests a break appropriately with or without a prompt. The practitioner may give Alex a 30- or 60-s long break and then present the demand again and repeat the steps. The practitioner would repeat this process until the instructional session has ended. The purpose of providing the child multiple consecutive opportunities to engage in the new replacement behavior is to build the contingency between the new replacement behavior and accessing the requested reinforcer. That is, the child learns that every time she uses her replacement behavior, she immediately gets what she asks for (e.g., a break). One main advantage of teaching a new replacement behavior in a one-on-one format is that the practitioner does not need to wait for a natural teaching opportunity to present itself. Instead, a practitioner can direct when the teaching occurs and how many teaching opportunities to present to the child. Another advantage to this teaching format is that the child can have multiple opportunities to engage in the new replacement behavior in one teaching session; thus, learning the new replacement behavior may occur more rapidly. However, this approach may not facilitate generalization. For example, a child who learns to ask for a break during the one-on-one teaching session may not be able to ask for a break during small group instruction. This may happen because the child was only presented with opportunities to engage in the new replacement behavior in one setting/situation, so the child may associate the new replacement behavior with that one setting/situation only.

A practitioner may also take advantage of natural opportunities to encourage the child to use the new replacement behavior. For example, Sara whose challenging behavior is maintained by access to toy was approaching her peers in the housekeeping center. Before Sara engages in challenging behaviors (e.g., hitting peers to get toys), the practitioner immediately prompts Sara to say "*toy*, *please*." Once Sara uses this new replacement behavior, the practitioner prompts the peer to give Sara the toy. As another example of looking for natural opportunities to teach the new replacement behavior, Alex is having trouble opening a box of blocks. A practitioner sees this as an opportunity to prompt Alex to ask for "*help*." The practitioner prompts Alex to ask for "*help*" when the challenging behavior is triggered (having difficulty opening the box) rather than waiting until Alex engages in challenging behavior. Once Alex uses the new replacement behavior, the practitioner opens the box. Using natural opportunities to teach the new replacement behavior has several advantages. First, the child's natural routine is not disturbed. A practitioner only waits for a natural teaching moment to teach the child the new replacement behavior. Second, this teaching method may facilitate generalization. Because teaching happens during natural routines, a child may learn to generalize the new replacement behavior across different people or settings more easily compared to the one-on-one format. For example, Alex who had trouble opening a box of blocks now has trouble opening his lunchbox. The practitioner prompts Alex immediately to ask for "*help*" and opens the lunchbox for him once he says "*help*." Now that Alex has had multiple situations where he was taught to say "*help*," he is more likely to be able to say "*help*" in similar situations. For example, Alex had a hard time opening his milk box. Without teaching, Alex asked his teacher for "*help*." This happened because Alex was exposed to multiple natural opportunities that represented a range of similar situations (i.e., box of blocks and lunchbox). A disadvantage of this approach, however, is that learning the new replacement behavior may take longer as the practitioner must wait for natural teaching opportunities.

Table 44.2 System of prompts

	Prompt type	Definition	Prompt type	Definition
Most supportive	Full verbal	Practitioner models full word (e.g., “Milk”)	Full physical	Hand-over-hand assistance
↓	Partial verbal	Practitioner models partial word (e.g., “Mil”)	Partial physical	Hand-on-elbow assistance
	Initial phoneme	Practitioner models initial phoneme of the target word “M”	Partial physical	Hand-on-shoulder assistance
	Model	Practitioner demonstrates desired response		
Least supportive	Gesture	Action that indicates what the learner should do (e.g., pointing, nodding)		

Systems of Prompts

The efficacy of FCT relies, in part, on the child learning to emit the replacement communication response. As mentioned earlier, not all children have an appropriate communicative response in their repertoire. In these cases, the practitioner must teach the child the response. Prompting is a procedure that involves a practitioner using various levels of verbal and physical support to evoke a specific response. Prompts range from less supportive to most supportive (see Table 44.2). The level of prompt support provided to a child should be selected based on the child’s needs and preferences, and the mode of the communicative response (i.e., vocal, gesture, picture exchange). Various prompting methods exist for teaching communicative responses including least-to-most prompting, most-to-least prompting, graduated guidance, and time delay (Collins et al., 2018).

Least-to-Most Prompts Least-to-most (LTM) prompting is a prompt hierarchy that involves providing increasing levels of physical or verbal support until the child is able to engage in the target behavior. To begin LTM prompting, the practitioner should select three prompts and order them from least to most supportive (e.g., initial phoneme, partial verbal, full verbal). To implement LTM prompting, the practitioner should first provide the antecedent and provide the predetermined wait time (e.g., 5 s). If the child does not respond to the antecedent, the practitioner should provide the first, least supportive, prompt. If the child responds correctly, the practitioner should provide praise and reinforcement (e.g., “*Nice job saying*, ‘*Cookie please*.’ *Here is your cookie*”). If the child does not respond, the practitioner will provide the second, next supportive prompt. If the child responds correctly, the practitioner should provide praise and reinforcement. If the child does not respond, the practitioner should provide the third and most intrusive prompt. After the child responds to the most supportive prompt, the practitioner should provide praise and reinforcement. If at any point the child makes an error or does not respond, the practitioner should provide the next most supportive prompt.

To illustrate how LTM works, read the case scenario of Marcus and his social worker, Mrs Lu. Mrs Lu is using FCT to teach Marcus to request juice without engaging in challenging behavior. Marcus has complex communication needs and uses a picture exchange system to communicate. Mrs Lu conducts

FCT sessions right before snack time, when she knows Marcus will be thirsty for his juice. To begin the session, Mrs Lu asks Marcus to sit across from her at the snack table and places Marcus' juice cup in sight but out of reach. Mrs Lu then waits 5 s for Marcus to touch the picture of the juice on his communication book. When Marcus does not respond within 5 s, Mrs Lu points to the picture of the juice (i.e., model prompt) and gives Marcus another 5 s to respond. When Marcus does not point to the picture of the juice, Mrs Lu places her hand on Marcus' elbow (i.e., partial physical prompt). After 5 s elapses and Marcus still does not respond, Mrs Lu places her hand on top of Marcus' and guides him to point to the picture of juice (i.e., full physical prompt). When Marcus points to the picture of juice, Mrs Lu says, "*Great job pointing to juice*" and hands Marcus the juice cup.

Most-to-Least Prompts Most-to-least (MTL) prompting is a prompt hierarchy that involves providing the most supportive prompt first and decreasing the supportiveness of the prompt based on child responding. To implement MTL prompting, the practitioner should select three prompts and order them from most supportive to least supportive. MTL prompting begins with the practitioner providing the antecedent and immediately providing the most supportive prompt. When the child responds correctly, the practitioner will provide praise and the reinforcer. On the next opportunity, the practitioner will provide the antecedent and simultaneously provide the second most supportive prompt. If the child responds correctly, the practitioner will provide praise and access to the reinforcer. On the next opportunity, the practitioner will present the antecedent and the third most supportive prompt. If the child responds correctly, the practitioner will provide praise and access to the reinforcer. If at any point the child makes an error or does not respond, the practitioner should provide the next most supportive prompt.

Read the example of how Mr Johnson used MTL prompting during FCT to teach Hakeem to request crackers during lunch time. During lunch, Mr Johnson sat across the table from Hakeem and placed a cracker on his plate. After Hakeem consumed the cracker, Mr Johnson looked at him and said, "*Cracker*." Hakeem then immediately said, "*Cracker*." In response, Mr Johnson said, "*Great job asking*" and gave Hakeem another cracker. After Hakeem finishes his cracker, Mr Johnson says, "*Cr*," and waited for Hakeem to respond. When Hakeem said, "*Cracker*," Mr Johnson replied, "*Excellent job asking for more*," and gave him another cracker. Once Hakeem finishes his second cracker, Mr Johnson looks at him and says, "*C*." Once Hakeem says, "*Cracker*" Mr Johnson offers praise and another cracker.

Graduated Guidance Graduated guidance is a procedure used to prompt communication that requires a motor response (e.g., sign language, picture exchange). Graduated guidance involves the practitioner providing the most supportive prompt to evoke correct responding (e.g., full physical prompt) and gradually fading amount of support based on the child's responding. For example, a practitioner can use graduated guidance to teach a child with complex communication needs to press an icon on her speech-generating device. First, the practitioner would use hand-over-hand prompting by placing their hand over the child's and gently guiding them to press the correct icon. Once the child starts responding with the most supportive prompt, the practitioner would fade the support. For example, the practitioner could place their hand on the child's elbow and guide them to the correct icon. After the child starts responding, the practitioner would once again fade the supportiveness of the prompt. For example, the practitioner could place their hand on the child's shoulder to facilitate pressing the correct icon. Eventually, the practitioner should lessen the prompts until they are no longer providing physical support. Like other prompt hierarchies, if at any point the child makes an error, or does not respond, the practitioner should increase the supportiveness of the prompt.

Time Delay Time delay is a procedure used to increase the amount of time in between an antecedent and the delivery of a prompt. To begin, the practitioner should select the *controlling prompt*. The controlling prompt is the prompt that the practitioner expects the student to respond to (e.g., full verbal prompt). To start a time delay session, the practitioner should provide the antecedent and immediately provide the controlling prompt. The immediate delivery of the controlling prompt is known as a 0 s delay. Once the child reliably responds with a 0 s delay, the practitioner will insert the time delay. There are two methods for implementing time delay: *constant* and *progressive*. Constant time delay involves keeping the delay consistent across teaching trials (e.g., 5 s). Progressive time delay involves gradually increasing the duration of the delay across teaching trials. It is important that the delay increase gradually, in small increments (e.g., 2 s, 4 s, 8 s, 16 s) until the final time delay is reached. Both constant and progressive time delay have been shown to be effective (Duker et al., 2004), so practitioners should select the method they feel is most appropriate.

To illustrate, let's read about how Mrs Jeffries used time delay to teach her student Chan Woo to request his toy car during shared play. To start, Mrs Jeffries says, "*My turn*," takes the car and immediately says, "*Car*." When Chan Woo says, "*Car*," she gives him the car and says, "*I liked the way you asked for car.*" After Chan Woo reliably says, "*Car*" with a 0 s delay, Mrs Jeffries increases the time delay. After saying, "*My turn,*" and removing the car, she waits 2 s before providing the full verbal prompt (i.e., "*Car*"). Mrs Jeffries continues this process until Chan Woo begins requesting the car before the controlling prompt.

Additional Considerations to FCT

In addition to prompting the appropriate replacement behavior, it is also important to acknowledge and reinforce replacement behavior every time the child uses it. For FCT to be effective, the new replacement behavior should work more efficiently for the child than challenging behavior. This means that the child gets what she asks for when she uses the replacement behavior rather than exhibiting challenging behavior. If the challenging behavior works more efficiently for the child (e.g., Alex spits on a worksheet, the teacher lets him leave the work area), then the child is likely to continue to use challenging behavior and less likely to use the new replacement behavior. On the other hand, if the replacement behavior works better for the child (e.g., the teacher lets Alex leave the work area every time Alex says "*break please*"), then the child is more likely to use the replacement behavior and less likely to engage in challenging behavior.

Equally important, for FCT to be effective a practitioner places the challenging behavior on extinction (Hagopian et al., 2011). In other words, a practitioner does not provide a reinforcer when the child engages in challenging behavior. For example, Mikey's challenging behavior is maintained by access to toys. A practitioner removes a toy from Mikey to provide him with an opportunity to engage in the new replacement behavior. The practitioner verbally prompts Mikey (e.g., saying "*touch the picture*") to engage in the replacement behavior in the form of touching a picture depicting (*toy please*). Instead of touching the picture, Mikey screams and pulls the practitioner's hair. The practitioner does not provide the toy to Mikey, but instead, the practitioner moves up in the prompt hierarchy (e.g., physical prompt) to help Mikey engage in the appropriate replacement behavior without exhibiting challenging behavior.

For many children with disabilities, challenging behavior is their only form of communication. This means, that over the course of their life, the challenging behaviors have been reinforced numerous times and may be resistant to change. In other words, the child may engage in challenging behavior more often because the child is used to getting what she wants (or getting out of what she does not want) by exhibiting challenging behavior. By being consistent in ignoring challenging behavior and only reinforcing the replacement behavior, the child learns that the new replacement behavior is more useful than challenging behavior to get what she wants.

In practical settings, such as in the classroom, it may not be possible to place challenging behavior entirely on extinction. For example, it is likely impossible, and always unsafe, for a teacher to ignore a child that is hitting his peers. In this situation, a practitioner may remove the child away from others to keep the child and others safe even though responding to the child's behavior that way may provide the child some attention (i.e., the reinforcer).

It is important to note that while extinction can be effective in reducing challenging behavior, it may lead to a temporary increase in the challenging behavior. This temporary increase in behavior is known as an *extinction burst.* Although the increase in challenging behavior is not expected to last, it is important that the practitioner and team develop a safety plan. The safety plan should include procedures for blocking challenging behavior and other relevant safety measures (e.g., protective equipment). It is also important that the safety plan align with the guidelines for crisis intervention in place at the school or other organization where FCT is being implemented. For example, if the school's crisis plan indicates that the school counselor should be called if dangerous challenging behavior (e.g., aggression, self-injury) occurs, then the child's safety plan should include those procedures as well.

While FCT is effective in reducing challenging behavior and increasing appropriate communication, it is important the children learn to use the appropriate communicative response in all contexts where challenging behavior may occur. Learning to use communicative skills in other settings or contexts beyond the initial teaching setting is known as *generalization*. Planning and teaching for generalization is critical because we want to ensure that children are able to use important skills like communication in the contexts that are important in their life. For example, we want children to be able to request bathroom at home, at school, and in the community.

Generalization Across Individuals It is important that the child learn to use the communicative response with individuals who they interact with in their daily life including teachers, parents, peers, and other relevant educators and related service providers. The practitioner should train all relevant individuals in the FCT procedures and create opportunities for the child to use the communicative response with them. For example, if Lucy is learning to say, "My turn," after a toy is taken away, the practitioner should teach the child to use this response during free play with peers. First, the practitioner should teach Lucy's peers that if she says, "My turn," that they should give her a turn with the toy. The practitioner should also closely observe during free play and provide any necessary support the peers need (e.g., prompts, reminders, reinforcement).

Generalization Across Settings It is also important the child learn to use the communicative response in all of the settings where the challenging behavior is likely to occur. Using FCT across settings will increase the likelihood that the child uses the communicative response any time they need it. For example, if a child screams anytime they want water, it would be important to teach the child to ask for water at home, at school, on the playground, and when the child is at a friend's house.

Reinforcement Schedule Thinning

In applied settings such as the classroom, home, or community settings (e.g., grocery store, library, park), it may not be possible to provide the child with the requested reinforcer every time the child asks for it appropriately. Excessive requesting for a break or a toy, for example, may impede the child's learning and prevent engagement in other prosocial behaviors or activities (e.g., school work; Muharib et al., 2022). On the other hand, not providing the child with the reinforcer when the child asks for it appropriately may teach the child to revert back to engaging in challenging behavior (Hagopian et al., 2011; Muharib & Pennington, 2019). For example, Tony has learned to ask for his favorite toy by touching an icon on his speech-generating device. Every time he touches the icon to ask for the toy, his mother gives him the toy. One day while the mother was on the phone, Tony asks for the toy using his device but mother was too busy on the phone to respond to his appropriate request. Tony, then, screams and bangs his head against the wall. The mother hangs up immediately and gives Tony the toy.

Unfortunately, variations of this scenario are not uncommon in applied settings. Fortunately, research has identified effective methods to prevent challenging behavior from recurring while simultaneously teaching the child to wait for access to reinforcement. These methods are referred to as *reinforcement schedule thinning*. Reinforcement schedule thinning involves teaching the child to tolerate delays to reinforcement by gradually increasing the number of tasks required to complete before accessing a break (*Chained Schedules of Reinforcement*) or gradually increasing the time of no access to attention or tangible items (*Multiple Schedules of Reinforcement*).

Chained Schedules of Reinforcement In applied settings, it may be problematic and impractical to provide the child with a break every time the child asks for it appropriately. This may lead to frequent interruptions of educational routines and may also impede the child from receiving academic instruction. Chained schedules of reinforcement (also known as demand fading) addresses this issue by allowing a practitioner to program for one task or a series of tasks to be completed before allowing the child to receive a break (Hagopian et al., 2011). Chained schedules of reinforcement are most suitable for children who engage in challenging behavior maintained by escape from non-preferred tasks (e.g., instructional demands). In this procedure, a practitioner gradually increases the number (or difficulty) of tasks the child must complete before reinforcement (i.e., a break) is provided. This procedure increases the child's tolerance for non-preferred tasks and also to delayed reinforcement.

Steps to Implement Chained Schedules of Reinforcement Following successful implementation of FCT (e.g., low rates of challenging behavior, consistent use of the replacement behavior), a practitioner implements a chained schedule of reinforcement by requiring the child to complete one small task or one step of a long task. If the child asks for a break appropriately before completing the task, the practitioner delivers a wait signal (e.g., "*good job asking nicely, but first finish your work*") and does not attend to nondangerous challenging behavior. Once the child completes the task, the practitioner allows the child to take a break. Gradually, the practitioner increases the number of tasks or time required to be engaged in a task before giving the child access to a break.

Multiple Schedules of Reinforcement In applied settings, children need to learn when it is appropriate to ask for reinforcers (e.g., a toy) and when it is not appropriate to ask for reinforcers. For example, it may be appropriate to ask for a tablet to play video games during break periods in the classroom, but it may not be appropriate to ask for it during instructional periods. Similarly, it may be appropriate for a child to ask her mother to play with her when the mother is reading a newspaper, but it may not be appropriate to ask her mother to play with her when the mother is talking on the phone. When a child asks for a reinforcer (e.g., a toy, attention) during an inappropriate time, it is likely that child will not get access to the reinforcer which may lead to engagement in challenging behavior. For example, if a child asks her mother to play with her while the mother is busy talking on the phone, it is unlikely that the mother will be able to respond to the child's request for attention. In this case, the child may revert to challenging behavior. Multiple schedules of reinforcement address this issue. Using this procedure, a practitioner teaches the child to differentiate between periods/situations when reinforcers are accessible and periods/situations where reinforcers are not accessible (Muharib & Pennington, 2019; Saini et al., 2016). This procedure is most appropriate for children whose challenging behavior is maintained by attention (e.g., from peers, teachers, parents) or tangible items (e.g., toy, tablet). By teaching the child to differentiate between appropriate and inappropriate periods/situations, a practitioner does two things: (a) increases the child's tolerance for not receiving a reinforcer during inappropriate periods, and (b) decreases the likelihood that the child returns to using challenging behavior to get her wants or needs met.

Steps to Implement Multiple Schedules of Reinforcement Following a successful implementation of FCT (e.g., low rates of challenging behavior, consistent use of the replacement behavior), a practitioner selects two distinct visual cues (e.g., two colored cards). These cues will be used to signal that reinforcement is or is not available. When the visual cue for reinforcement is in place (the appropriate periods/reinforcement periods), every time the child asks for a reinforcer, the child is immediately given the reinforcer. When the visual cue signaling that no reinforcement is in place (the inappropriate periods/no-reinforcement periods), the reinforcer is not given to the child even if the child asks for it appropriately.

For example, a practitioner selects a red card to use during the no-reinforcement period and a green card to use during the reinforcement period to help Johnny differentiate between when it is appropriate to ask for a tablet (his reinforcer) and when it is not. After selecting the visual cues, the practitioner should explain how the system works and use a rule to help Johnny understand the new procedure ("*when the green card is out, you can ask for your tablet and I will give it to you, when the red card is out, no tablet*"). After presenting the rule, the practitioner models the expected behavior and then provides Johnny with opportunities to engage in the appropriate replacement behavior during the reinforcement period. For example, the practitioner might say, "Johnny now that the green card is out, you can ask for tablet. Let me show you how you can ask. Now you try." The practitioner should also be prepared to provide error correction if the child uses the replacement behavior during no-reinforcement times. For example, if Johnny does engage in the replacement behavior during the no-reinforcement period, the practitioner should acknowledge ("*good job asking nicely, but you need to wait for the green card*") and then redirect the child to other appropriate activities or tasks.

Using this procedure, it is critically important to keep three rules in mind: (a) select visual cues that the child is familiar with and is able to differentiate between, (b) reinforce the replacement behavior only during the reinforcement period, and (c) keep the no-reinforcement period short in the beginning of using this procedure. To address the first rule, a practitioner pre-tests the child's ability to differentiate between the visual cues before using them. For example, a practitioner presents the red card in the presence of other colored cards and asks the child to select the red card. A practitioner also presents the red card and asks the child ("*what color is this?*"). If the child is able to answer correctly, then the practitioner can select this visual cue to use in the multiple schedule procedure.

To address the second rule, a practitioner should only give the child the requested reinforcer when the child engages in the replacement behavior during the reinforcement period and never give the child the requested reinforcer when the child engages in the replacement behavior during the no-reinforcement period. A practitioner should also refrain from giving the child the reinforcer when the child engages in challenging behavior during either period. Finally, to address the third rule, a practitioner should keep the no-reinforcement period short initially. For example, a practitioner may start with only 1 min in which the target reinforcer is not accessible. Gradually, the practitioner can increase the duration in which the reinforcer is not accessible (e.g., 2 min, 3 min). Keeping the period short initially may help the child build tolerance for not receiving the reinforcer and it may also help prevent the child from returning to challenging behaviors.

To make multiple schedules of reinforcement more practical, a practitioner may pair visual cues with specific activities and then fade out the visual cues. For example, a practitioner may present a green card during break time to signal the availability of the reinforcer and present a red card during one-on-one time to signal that reinforcement is not available. For example, a mother may present a green card while she is reading a newspaper to signal the availability of the reinforcer and present a red card while she is one the phone to signal the unavailability of the reinforcer. Once the child consistently differentiates between the two conditions (i.e., requesting a reinforcer appropriately during the reinforcement period, and not requesting a reinforcer nor engaging in challenging behavior during the no-reinforcement period), then the colored cards may be removed.

For some children who have strong language receptive repertoire, visual cues may not be needed. Instead, a practitioner presents the child with at least two different scenarios wherein one represents the reinforcement period and the other represents the no-reinforcement period (Kuhn et al., 2010). For example, a practitioner may begin by stating a rule (e.g., "*when I'm not talking to someone, you can talk to me, when I'm talking to one of your friends, I can't talk to you, you need to wait*"). Then, the practitioner may prompt the child to talk when the practitioner is not talking to others (e.g., "*OK, Johnny, I'm not talking to anyone, you can talk with me if you want to*"). The practitioner gives Johnny attention by talking and listening to him as he is talking. Then, as the second situation, the practitioner talks to another child in the classroom for a brief period (e.g., 20 s). If Johnny tries to ask for the practitioner's attention, the practitioner acknowledges his replacement behavior only once (e.g., "*good job asking, but I'm talking to your friend, you need to wait*") and then ignores any other occurrences of the replacement behavior during the waiting period to teach Johnny that he needs to wait while she is talking to others.

For some children whose challenging behavior may persist in the no-reinforcement periods, a practitioner can give the child an alternative reinforcer when the targeted reinforcer is not available (Fuhrman et al., 2018). For instance, when a child's reinforcer is her teacher's attention, and the teacher cannot attend to the child, the teacher may give the child an alternative activity to engage in while waiting. The alternative activity must be (a) preferred by the child and (b) given before the child starts engaging in challenging behavior.

To identify the child's preferred activities, a practitioner can conduct one or more preference assessments which may involve (a) asking the child's parents, teachers, and others who frequently interact with the child about the toys/activities the child likes to do during free time, (b) observing the child during free play and noting the toys/activities the child engages with, or (c) giving the child a few choices and asking the child to select one (Cannella-Malone et al., 2013). For instance, using the information gathered from an observation, the teacher presents the child a few options (e.g., toy car, squishy ball, coloring book) and asks the child to choose one at the beginning of an instructional period. The first selection (e.g., squishy ball) is likely to be the most highly preferred activity for the child. Then, once a waiting period (i.e., no-reinforcement period) starts, the teacher immediately gives the child this selected alternative activity while waiting to get the teacher's attention (e.g., "*OK, you can play with the squishy ball while I help your friends, I will right back*").

Recommendations for Successful Implementation of Reinforcement Thinning Procedures

As previously stated, to make FCT feasible and practical in applied settings such as home and school, it is important to use a reinforcement thinning procedure following a successful implementation of FCT. There are a few recommendations to consider to enhance the effectiveness of reinforcement thinning procedures. First, it is important for all stakeholders (herein referred to as the team) to be on the same page. This can include parents, teachers, paraprofessionals, and any other individuals who interact with the child on a regular basis. Before implementing an intervention, a practitioner meets with the team, describes the intervention and the rationale behind using the intervention with the child, and provides a step-by-step description in jargon-free language about how to implement the intervention with the child. It is important to make the team feel their input being valued and to answer their questions clearly. This may increase the team's buy-in. Without their buy-in, the team is less likely to implement the intervention with fidelity. After a clear description of the intervention and answering the team's questions, a practitioner models to the team how to implement the intervention with the child and provides different scenarios of how to react to a child's replacement behavior or challenging behavior when they occur. Then, the practitioner provides multiple opportunities for the team to practice the intervention in a role-play format wherein the practitioner plays the child's role until each member of the team can implement the intervention with 100% accuracy. This is especially important because lack of consistent accurate implementation of the intervention across all the team members may lead the child to revert to challenging behavior. For example, a teacher has been implementing a chained schedule of reinforcement with Johnny where Johnny is required to complete one academic task before he can take a break. When Johnny engages in challenging behavior, the teacher ignores it and prompts Johnny to complete the task. However, when a paraprofessional implements the intervention with Johnny and Johnny engages in challenging behavior, the paraprofessional lets Johnny take a break. This inconsistent implementation teaches Johnny to engage in challenging behavior with certain people or in certain contexts (Muharib & Pennington, 2019). Therefore, it is critical to make sure every member of the team follows the intervention steps accurately. In Johnny's scenario, the teacher may provide positive and corrective feedback to the paraprofessional. When providing feedback to any team member, it is important to provide it in a positive calm tone and start off highlighting the steps the team member implemented correctly. Then, a practitioner provides the corrective feedback (e.g., "I liked the way you presented the task to Johnny. Next time Johnny spits on the worksheet, let's ignore it and prompt Johnny to complete the task"). It is also important to provide the feedback immediately and privately. A practitioner provides immediate feedback so that the team member remembers what they exactly did during the implementation. A practitioner refrains from providing feedback in front of other people because doing so may make the team member feel uncomfortable which consequently may build a wall between the team member receiving the feedback and the practitioner giving the feedback (Reid & Parsons, 2018).

Second, before implementing any of the reinforcement thinning procedures, it is important to determine how long you expect the child to tolerate periods of no reinforcement (i.e., terminal goal). This goal should resemble what is acceptable in the setting and should be age appropriate. This decision should be made as a team. In other words, a practitioner consults with other team members such as teachers and parents and asks them what would be acceptable in the classroom or home. For example, a teacher may say that other children in the classroom are allowed to take a break for 5 min every 30 min. Another example, a mother may say that she wishes her child would only play video games on the tablet during a certain time of the day (e.g., before dinner). Based on the information gathered from the team members, the ultimate goal can be selected. So, for Johnny, for example, his ultimate goal would be receiving a 5-min break after engaging in activities (e.g., circle time, center time, one-on-one time) for 30 min.

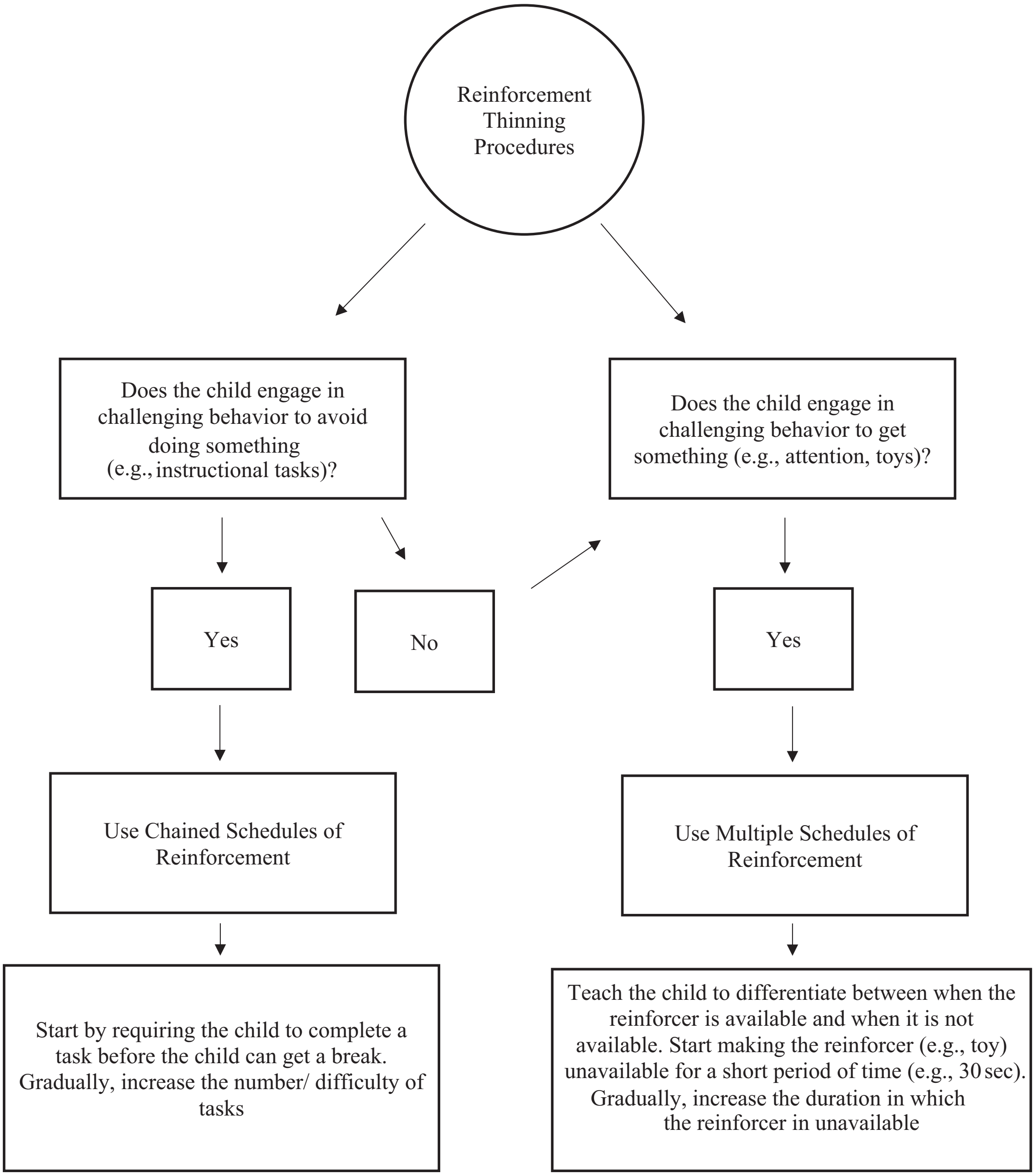


Fig. 44.4 Reinforcement thinning procedures

Third, as with any intervention, it is important to collect data to assess the effectiveness of FCT and reinforcement thinning procedures. Data collection serves as a guide tool. For instance, a data pattern that shows a lack of progress may suggest a need to revisit and modify the procedure. A data pattern that shows a lack of progress may also suggest that team members may not have been implementing the procedures accurately which may explain the lack of child's progress. In this case, a practitioner does not modify the procedure. Instead, a practitioner re-trains the team members using modeling, role-play, and feedback.

Finally, a practitioner must gradually thin the schedule of reinforcement and base any changes in the criteria (e.g., changing from requiring the child to complete one task to requiring the child to complete two tasks) on data indicating the child's success on the current criteria. Changing criteria rapidly or arbitrarily (e.g., increasing the 1 min to10 min of no reinforcement in a multiple schedules of reinforcement) may lead the child to return to engage in challenging behavior. Thus, criteria changes must be gradual and not easily detectable by the child (e.g., going from 1 to 1.5 min). If a practitioner makes a criterion change and the data pattern indicates a high level of challenging behavior, a practitioner can adjust the criteria or go back to the previous criteria. For example, a practitioner implementing a multiple schedule of reinforcement changes the waiting period (no-reinforcement period) from 1 to 3 min. The practitioner sees a data pattern that indicates an increased level of challenging behavior of Alex and, therefore, adjusts the waiting period from 3 to 2 min. After adjusting the criteria, Alex's challenging behavior decreases. The practitioner continues to have Alex wait for 2 min for a few more days to ensure the decreased level of challenging behavior continues, and then increases the waiting period for Alex from 2 to 3 min (Fig. 44.4).

Summary

- Functional communication training is an evidence-based practice that involves teaching a child an appropriate replacement behavior that matches the function of challenging behavior.
- To identify the function of challenging behavior, a practitioner conducts indirect and direct functional behavior assessments and then formulates a hypothesis about why the challenging behavior occurs.
- A practitioner uses a team approach to select a new replacement behavior for the child that is easy for the child to learn and use, and can be easily recognized by others in the child's environment.
- A practitioner teaches the child the new replacement behavior using a prompt procedure (e.g., least to most, most to least) and ensures teaching takes place in different contexts and across different individuals to ensure that the child is able to generalize the new replacement behavior across settings and individuals.
- A practitioner gradually thins the schedule of reinforcement using either a multiple schedule of reinforcement (for challenging behavior maintained by attention or tangible items) or a chained schedule of reinforcement (for challenging behavior maintained by escape from non-preferred activities).

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Internet Gaming Disorder

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Internet Gaming Disorder

Playing video games ("gaming") is an extremely popular pastime in the United States and internationally and has grown in popularity over the last few decades. For example, in a national sample of American teenagers aged 13–17 conducted in 2018, 84% of girls and 97% of boys reported playing video games of any kind (Pew Research Center, 2018). Unlike the early years of gaming when video games were primarily played on designated consoles or desktop computers, gaming now occurs on multiple platforms, including traditional console-based games (e.g., Xbox, Wii, PlayStation), handheld games (e.g., Nintendo DS, PlayStation Portable), computers, tablets, and mobile phones, making them nearly ubiquitous in the lives of both children and adults in the United States. Further, with the introduction of online gaming, video games can be used to socialize and connect with friends on online platforms, transforming gaming from a primarily solitary endeavor to what is often a social interaction.

The large majority of youth who play video games do not experience significant negative consequences (e.g., Przybylski et al., 2017; Wittek et al., 2016) and, in most cases, gaming can be viewed as a fairly harmless hobby. Some studies suggest that low levels of gaming may even be associated with *better* adjustment among children (see Granic et al., 2014, for an overview). For example, one study found that children (aged 10–15) who engaged in low levels (<1 h/day) of gaming were involved with more prosocial behaviors and had fewer behavioral or psychological problems than children who never played video games (Przybylski & Mishkin, 2016); children playing more than 3 h/day exhibited more problems than children not gaming at all or playing at low levels. These results do not necessarily suggest that children should be encouraged to play video games; instead, they fit with the larger literature suggesting that low levels of gaming are likely harmless. However, a minority of

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youth engage in *excessive* gaming, and this may interfere with key activities important to this developmental period, including academics, other nongaming extracurricular activities and hobbies, and unstructured socialization with peers (Allahverdipour et al., 2010; van Rooij et al., 2014; Weis & Cerankosky, 2010). An even smaller proportion of gamers develop symptoms consistent with a mental disorder, often presenting with similar symptoms as individuals with addictions to substances or gambling.

Research on problematic gaming is in its infancy, and formal diagnostic criteria related to gaming are new in the last decade. In 2013, the American Psychiatric Association (APA) included Internet gaming disorder (IGD) as a *potential* mental disorder in the research appendix of the *Diagnostic and Statistical Manual of Mental Disorders* – 5th edition (*DSM-5*; APA, 2013). The decision to include this new potential diagnosis was recommended by a Substance Use Disorder Workgroup designated by the APA to review the evidence for a range of non-substance-addictive behaviors (Petry et al., 2014). This workgroup found enough evidence for the severity of the consequences of IGD to warrant inclusion, and they also outlined nine diagnostic criteria to guide future research on IGD. These symptoms largely parallel substance use disorder and gambling disorder symptoms, and the preliminary diagnostic cutoff set for IGD involves meeting five of the following nine criteria: preoccupation, withdrawal, tolerance, unsuccessful attempts to stop or reduce gaming, loss of interest in other hobbies or activities, excessive gaming despite experiencing problems related to gaming, deception/lying about the extent of gaming behaviors, using gaming as an escape or relief from negative moods, and jeopardizing or losing a relationship, job, or educational/career opportunity due to gaming. Despite the nomenclature of "Internet" gaming disorder, the *DSM-5* definition of IGD explicitly includes gaming both online and offline. Of note, no other behavioral addictions were added to *the DSM-5* based on the research of this workgroup, and gambling disorder remains the only behavioral addiction in the *DSM-5*. More recently, the World Health Organization (WHO) added "gaming disorder" as a diagnosable mental disorder in the 11th revision of the International Classification of Diseases (ICD-11; WHO, 2018). Unlike the APA's experimental designation, the WHO member states voted to recognize gaming disorder as a mental disorder. Criteria for the ICD-11 gaming disorder diagnosis are different from APA's IGD and require the following three symptoms: impaired control over gaming, increased priority given to gaming, and continuation or escalation of gaming despite negative consequences. Both the ICD-11 and the *DSM-5* require that symptoms result in significant impairment and are evident for at least 12 months. However, the biobehavioral symptoms (i.e., tolerance and withdrawal) included in the *DSM-5* definition are notably absent from the ICD-11 classification.

There is substantial controversy over the validity of the gaming disorder and IGD diagnoses, with some scholars concerned that these diagnoses overpathologize a normal recreational activity (Ferguson & Colwell, 2020), while others suggest that IGD symptoms may be better explained by other underlying mental disorders (e.g., Bean et al., 2017). Even among scholars who agree that problems related to excessive gaming behavior should be considered a diagnosable mental disorder, there is an ongoing debate over the exact definition of the disorder, including which symptoms are representative of the diagnosis (Király et al., 2015). Despite such uncertainties, the APA and WHO guidance provides as close to a consensus in the field as possible given the existing research base and, importantly, has provided common sets of symptoms and language that can be used to further investigate gaming disorder, particularly the manifestation of its symptoms, short- and long-term outcomes and trajectories, and potential treatments. This common language has allowed research to move forward in a more organized fashion, which has the potential to help uncover and disseminate effective treatment approaches more rapidly.

Of note, "addictions" to other types of Internet activities (e.g., use of social media, "surfing" the web, and cell phone usage more generally) have not been formally recognized as mental disorders. Online gambling can lead to potential addiction but is subsumed under the broader category of gambling disorder. Nevertheless, much research has been published on Internet addiction, smartphone addiction, and online shopping addiction, among other purported behavioral addictions tied to Internet use. For the purposes of this chapter, we will solely focus on gaming disorder/IGD. Further, for the remainder of the chapter, we will use the term “Internet gaming disorder” (IGD) to refer to either the ICD-10 defined gaming disorder or the *DSM-5* defined Internet gaming disorder. In addition, this chapter will focus on children, adolescents, and, where relevant, emerging adults, as these are the age groups identified as most impacted by excessive gaming, and many emerging adults who develop problems with gaming start this behavior during childhood or adolescence.

This chapter provides an overarching understanding of the state of the field of IGD research, focusing on aspects of the research most likely to be relevant to clinical practice. Ongoing controversies about the diagnosis will be discussed, including recent developments that support (or detract from) the case for the IGD diagnosis. Prevalence rates, risk factors, and common comorbidities of gaming disorder will be reviewed. Finally, we will describe current best practices for assessing and treating IGD and briefly discuss emerging research on the impact of the COVID-19 pandemic on gaming behaviors.

Ongoing Controversies About the IGD Diagnosis

Gaming as an Addictive Behavior From its outset, IGD was included in the *DSM-5* only as a “Condition for Further Study” (APA, 2013). In a review of over 250 publications on IGD-related topics at the time, the *DSM-5* Substance Use Disorder Workgroup found evidence that excessive video game play could result in clinically significant distress and/or impairment and that it would be useful to have an established standard for IGD diagnosis to increase standardization across future research efforts (Petry et al., 2014). Identified harm includes significant health consequences, such as sleep deprivation, dehydration and malnutrition, sedentary behaviors, pressure sores, obesity, seizures (Achab et al., 2011; Chuang, 2006; Kohorst et al., 2018; Peracchia & Curcio, 2018), and even death from gaming instead of eating and sleeping (BBC News, 2005). However, health consequences alone do not mean a behavior is addictive. Numerous models of addiction exist, with most including an emphasis on symptoms of tolerance and withdrawal in addition to harm.

Petry et al. (2014) sought to establish an international consensus on IGD symptoms with the most research support, largely basing their work on conclusions by the *DSM-5* Substance Use Disorder Workgroup and the empirical work of Tao et al. (2010) to iteratively identify diagnostic criteria for general Internet addiction. *DSM-5* IGD criteria were intentionally written to mirror substance use and gambling disorder criteria while taking into account specific nuances of gaming. For example, when referring to drug addiction, the symptom of withdrawal is a pathophysiological response due to interactions of the drug and neurotransmitters that can result in a range of physical symptoms, including severe outcomes such as seizures and death. For IGD, withdrawal is conceptualized as feelings of sadness, anxiety, or restlessness when the individual either is unable to game at their typical levels or attempts to cut down on gaming (Petry et al., 2014). A similar adjustment was made to the tolerance criteria to better capture what happens with gamers. As related to drug use, tolerance develops on the molecular and cellular level where repeated exposure to a drug causes physiological mechanisms in the brain and body to become more adept at processing that drug, in turn requiring more and more drug to get prior effects. Tolerance in gaming is not proposed to target the same physiological mechanisms. Instead, it is related to behavior, such as needing to play for longer and longer to get excitement from playing and needing more exciting games or more powerful gaming equipment to find gaming as engaging as one once did (Petry et al., 2014). Much of the evidence for gaming as an addictive behavior relates to possible symptoms of harm from excessive play, including loss of relationships, failing school, continuing to game despite problems (e.g., financial, work, and relationship), being so distracted and preoccupied with game play that one cannot focus on anything else important, and turning to gaming to escape negative moods. Evidence supports that a small subset of gamers experience this cluster of symptoms to a level that causes functional and psychological impairment (Chappell et al., 2006; Griffiths et al., 2015; Király et al., 2014, 2017a, b; Ko et al., 2014). This harm, in addition to evidence of withdrawal and tolerance criteria as modified to capture gaming-specific mechanisms, points to the need for efficacious treatment options to reduce further harm to individuals. A specific mental health diagnosis aids access to treatment.

Concerns About the Diagnosis Criticism of the classification of IGD as a mental disorder ranges from concerns about moral panic around new technology, the potential adverse impact on the multibillion-dollar video game industry if the harms of play are highlighted, the devaluing of the word addiction such that anything can be labeled an addiction (e.g., designer shoe addiction and carrot cake addiction), as well as specific critiques of certain diagnostic criteria, such as tolerance or withdrawal given no substance is consumed to alter bodily states. In an open debate paper, Aarseth and an international group of IGD researchers (2017) summarized scoping concerns about the inclusion of gaming disorder in the ICD-11. Authors expressed concerns with the quality of the research base, noting lack of international consensus on diagnostic criteria (Griffiths et al., 2016), the wide range of prevalence estimates, and lack of clinical studies with sufficiently large sample sizes (van Rooij et al., 2017). Authors also disliked the reliance of the conceptualization of IGD on substance use and gambling criteria (Aarseth et al., 2017). They suggested it is particularly problematic to use withdrawal and tolerance criteria that may be physiologically different with a behavioral addiction compared to withdrawal from or tolerance to a psychoactive drug. Further, they express concerns about pathologizing thinking about games a lot, using them to improve mood, and lying to parents about time spent playing, suggesting these may be normal behaviors for people who play video games and often do not rise to the level of clinical concern. Finally, Aarseth et al. (2017) point out that the lack of clear diagnostic criteria has led to a proliferation of assessments that misclassify patients. Further, they suggest problematic gaming could merely be a symptom of coping with a mental health condition other than IGD (for further commentary on this argument, see Kardefelt-Winther, 2014).

In addition to specific concerns about the accuracy of symptoms and lack of rigorous research on IGD, Aarseth et al. (2017) express general concerns about making problematic video game play a formal disorder at all. They point to concerns about moral panic about game play that leads to pathologizing of normative behavior, citing very high rates of nonproblematic play and lack of significant differences between gaming and other types of entertainment. Such stigmatization of nonproblematic video game players may lead to parents unnecessarily feeling pressure to limit play, increased family conflict, and unnecessary treatment for children. Further, the authors are concerned that researchers will use the inclusion of a formal diagnosis to conduct confirmatory research instead of engaging in exploratory research to determine "a proper theoretical foundation" for IGD and other behavioral addictions (Aarseth et al., 2017).

Although some researchers continue to debate about IGD, the WHO has proceeded with the inclusion of gaming disorder in ICD-11, as available evidence seems to suggest that gaming problems can, in fact, rise to levels of impairment observed in other mental disorders. Of note, concerns raised by scholars likely substantially influenced the diagnostic criteria, particularly the exclusion of withdrawal and tolerance symptoms from the ICD-11 gaming disorder criteria. The decision to include the diagnosis was made in light of the considerable evidence that excessive video game play can cause clinically significant impairment, including significant health consequences and even death. Further, considerations of the importance of ensuring access to quality care and a uniform set of diagnostic criteria to inform research and clinical practice are paramount. If research continues to provide evidence that gaming is an addictive behavior, concerns that have arisen from these early debates provide a helpful reminder of the continued need to explore a theoretical basis for gaming-related problems, to not pathologize normative play, to improve assessment and ensure only symptoms that cause clinically significant impairment are used for diagnosis, and to work to reduce stigma for IGD as well as all mental health diagnoses.

Prevalence of IGD

Estimates of IGD prevalence vary widely and depend on the setting, measure, age group, and country. A review of 16 studies from 15 countries found rates of IGD among adolescents aged 10–19 to be 4.6% on average with a range of 0.6%–19.9% (Fam, 2018). A recent and larger review that looked at both youth and adult populations found prevalence estimates ranging from 0.6% to 14.7% among 53 studies from 17 countries (Stevens et al., 2020). This same review found that the overall prevalence rate of IGD across studies was 3.05%; however, when only studies with rigorous sampling methods were included, the prevalence rate was much lower (1.96%). Clinical populations, specifically youth receiving specific treatment for IGD (68.6%–79.3%), naturally have higher prevalence rates of IGD than the general population (Darvesh et al., 2020), though few prevalence studies have been conducted in clinical populations. Table 45.1 provides overall rates of IGD in the general population (inclusive of gamers and nongamers), while Table 45.2 shows rates of IGD among more specific samples of youth who reported playing video games.

Estimates likely vary widely because of differences in research methodology (e.g., anonymous surveys vs in-person interviews; and recruiting convenience samples vs randomly selected samples) and who is rating the youth's symptoms (e.g., questionnaires completed by youth themselves vs parents/caregivers vs clinician ratings). The setting (e.g., community vs clinical vs online studies promoted in online gaming forums) and characteristics of the samples (e.g., age or grade sampled) also likely contribute to these differences. In addition, historically, there has been very little consistency in measures or even definitions of IGD across studies. In fact, Stevens et al. (2020) found that the type of IGD assessment accounted for most of the variability in prevalence estimates in their review. Multiple self-report measures of IGD have been developed that vary in wording, number of items, and clinical cutoffs; only a few have been widely adopted. As seen in Table 45.1, there is substantial variability in the self-report and interview measures used in studies of IGD prevalence, which likely at least partially explains the variability in the prevalence estimates themselves. As the field has developed more consistent definitions through the *DSM-5* and ICD-11 classifications, newer and future studies may provide more reliable estimates of prevalence, and more can be learned about whether there are true differences across countries and demographic groups.

Risk Factors for IGD

Sex Differences Despite challenges related to consensus on symptoms and measurement, certain patterns have emerged regarding demographic and other risk factors for IGD. For example, there are clear gender differences in both video game play and IGD diagnoses. Almost all (97%) boys of age 12–17 report playing video games, while the majority, but far fewer girls (83%) report gaming (Pew Research Center, 2018). Boys are also more likely to have a gaming console at home (92%) than girls (75%; Pew Research Center, 2018) and are more likely to play daily and play longer each day than girls. In a representative US sample (ages 8–18), 41% of boys played video games daily compared to 9% of girls and, on average, boys spent 78 min per day gaming, compared to just 14 mins a day among girls (Rideout & Robb, 2019). Differences in gaming behaviors *may* explain the large gender differences in IGD prevalence rates, though other sex-related differences may also play a role. Across 16

Table 45.1 Prevalence of IGD in general population studies

Country	Number of people	Ages	Author(s) name, year	Measure of IGD	Rate of IGD
Germany	580	14–18	Festl et al. (2013)	Gaming Addiction Short Scale	0.2%
Germany	11,003	13–18	Rehbein et al. (2015)	Video Game Dependency Scale	1.16%
Netherlands	903	14–81	Haagsma et al. (2012)	Gaming Addiction Scale	1.3% in adolescents and 3.3% in young adults
Sweden	1736	15, 17	Vadlin et al. (2015)	Gaming Addiction Identification Test	1.3% self-report 2.4% parent report
Netherlands	3048	13–16	van Rooij et al. (2011)	Compulsive Internet Use Scale + frequency of online gaming	1.5%
Germany, Greece, Iceland, Netherlands, Poland, Romania, and Spain	12,938	14–17	Müller et al. (2015)	Assessment of Internet and Computer Game Addiction	1.6%
Germany	15,168	Average = 15.3	Rehbein et al. (2010)	Video Game Dependency Scale	1.7%
South Australia	1287	12–18	King et al. (2013)	Pathological Technology Use Checklist	1.8%
Norway	3237	12–18	Johannson & Götestam (2004)	Diagnostic Questionnaire for Internet Addiction – adapted for gaming	2.0%
Australia	824	Average = 14.1	King and Delfabbro (2016)	Internet Gaming Disorder Checklist	3.1%
Germany	1866	19–39	Festl et al. (2013)	Gaming Addiction Short Scale	3.3%
Hungary	5045	Average = 16.4	Pápay et al. (2013)	Problematic Online Gaming Questionnaire-Short Form	4.6%
Iran	1020	12–18	Ahmadi et al. (2014)	DSM-IV criteria for addiction adapted for computer games	5.3%
Netherlands	2444	13–40	Lemmens et al. (2015)	Internet Gaming Disorder Scale	5.4%
England	467	11–16	Fisher (1994)	DSM-IV criteria for addiction adapted for video games	6%
New Zealand	1945	14 and older	Porter et al. (2010)	Problem Video Game Use Questionnaire	8.0%
Singapore	2998	8–15	Choo et al. (2010)	Pathological Video Game Use Questionnaire	8.7%
Canada	2832	12–19	Turner et al. (2012)	Problem Video Game Playing Scale modified	9.4%
China, Singapore, USA	3267	Average = 21	Tang et al. (2017)	Problematic Online Gaming Questionnaire – Short Form	20.9%

Table 45.2 Prevalence of IGD among gamers

Country	Number of people	Age range	Author name year	Video game use measure	Rate of IGD
Norway	816	16–40	Mentzoni et al. (2011)	Gaming Addiction Short Scale	0.6%
Norway	3389	16–74	Wittek et al. (2016)	Gaming Addiction Short Scale	1.4%
United States, United Kingdom, Canada, Germany,	18,932	18+	Przbylski et al. (2017)	DSM-5 proposed criteria for IGD checklist	2.4%
USA	4028	14–18	Desai et al. (2010)	Minnesota Impulse Control inventory – revised for gaming	3.0% girls, 5.9% boys
Taiwan	8110	10–18	Chiu et al. (2018)	Internet Gaming Disorder Test – 10	3.1%
Hungary	3415	Average = 21	Demetrovics et al. (2012)	Problematic Online Gaming Questionnaire	3.4%
USA + 12 other countries	1420	12–62	Hussain et al. (2012)	Gaming Addiction Scale	3.6%
Australia	2031	Mainly 12–24	Thomas and Martin (2010)	Young's Diagnostic Questionnaire for Internet addiction – adapted for computer gaming	5%
57 countries	1003	Average = 26	Pontes et al. (2014)	IGD-20 Test	5.3%
Spain and UK	2356	11–18	Lopez-Fernandez et al. (2014)	Problematic Videogame Playing Scale	7.7% in Spain, 14.6% in UK
Hungary	5045	Average = 16.4	Pápay et al. (2013)	Problematic Online Gaming Questionnaire-Short Form	8.2%
USA	1178	8–18	Gentile (2009)	Pathological Video Game Use Questionnaire	8.5%
Hungary	40,875	Average = 16.4	Király et al. (2014)	Problematic Online Gaming Questionnaire-Short Form	11%
Europe	696	13–54	Dauriat et al. (2011)	MMORPG Addiction Scale, adapted from the Young Internet Addiction Scale	11.2%
Korea	236	Average = 13.7	Koo et al. (2017)	Structured Clinical Interview for IGD	11.4%
Germany	7069	Average = 21	Grüsser et al. (2007)	World Health Organization criteria for addiction – modified for gaming	11.9%
England	387	12–16	Griffiths and Hunt (1998)	DSM-III criteria for addiction adapted for computer games	19.9%

studies, IGD prevalence was roughly four times as high in male (7.1%) versus female adolescents (1.7%) (Fam, 2018). Another review of 15 studies of both youth and adults found prevalence rates ranging from 2.0% to 22.7% for males and 0% to 14.9% for females (Mihara & Higuchi, 2017), and all but one study found higher rates among males than females. A third review found a ratio of males with IGD to females of 2.5:1 across 53 international studies (Stevens et al., 2020).

Age Rates of gaming and IGD prevalence are higher among adolescents and young adults compared to older adults. Similar to substance use, the prevalence of IGD over the lifespan is likely inversely "U" shaped – meaning rates of IGD increase from early childhood and peak in adolescence to young adulthood, followed by decreases throughout later adulthood (Paulus et al., 2018a, b). In a meta-analysis of IGD prevalence studies, higher prevalence rates of IGD were found in samples with younger mean ages (Stevens et al., 2020). Similarly, in some studies of adults, the prevalence of IGD decreases with age (Mihara et al., 2017). In a study of 1401 South Korean adults, almost 70% of those who met criteria for IGD were between ages 18 and 29, and less than 10% were over 40 (Kim et al., 2017).

Age differences in IGD prevalence are likely at least partially explained by higher rates of actual gaming behaviors in young people; 60% of young adults aged 18–29 play video games, compared with 53%, 31%, and 24% of individuals in the 30–49, 50–64, and 65+ age ranges, respectively (Pew Research Center, 2017). In addition, earlier age of gaming initiation appears to predict later IGD, similar to findings related to early initiation of drugs and alcohol and risk for later substance use disorders (Hingson et al., 2006; King et al., 2007; Lopez-Quintero et al., 2011). Among 1044 adults who reported playing massive multiplayer online role-playing games (MMORPGs), early age of gaming initiation was a significant predictor of IGD symptom severity (Beard et al., 2017). Among Japanese children, starting to play video games regularly before age 5 was related to development of IGD, relative to onset of regular gaming after age 10 (Nakayama et al., 2020).

Regional Differences Several reviews have identified regional differences in IGD prevalence; specifically, prevalence rates appear to be higher in Asian countries compared to other regions (Fam et al., 2018; Long et al., 2018; Stevens et al., 2020). However, studies have not directly investigated if higher rates of IGD in Asian countries are related to high levels of Internet and smartphone availability and use (Király et al., 2018). Generally, reasons for cross-cultural differences are not yet clear, but gaming is a popular pastime in East Asian countries, as evidenced by the popularity of gaming cafes and heavy usage of mobile games on smartphone platforms (Jin et al., 2015). In addition, research is needed to determine whether such differences are truly cultural or can be better explained by systematic differences in how IGD has been studied across countries.

Gaming Characteristics In addition to individual characteristics that appear to be risk factors for IGD, certain aspects of the games or gaming behavior themselves may also increase risk. Although playing games often or for long periods does not necessarily equate to an IGD diagnosis, such behaviors are associated with higher risk for developing IGD. For example, one study found that, compared to children without gaming problems, children defined as "pathological gamers" had played video games for more years, played more frequently and for more hours per day, were more familiar with video game rating symbols, and were more likely to have friends with potentially problematic gaming (Gentile, 2009). A review of 37 studies also found that time spent playing, with more hours per day or week spent playing games, higher frequency (e.g., more days per week on average), and more years playing games, was associated with IGD (Mihara et al., 2017).

Types of games played also appear to make a difference in terms of development of IGD. Generally, online games are much more strongly linked to IGD than offline games (Lemmens & Hendriks, 2016). Among online games, massive multiplayer online role-playing games (MMORPGS) have been singled out as particularly problematic when it comes to excessive gaming. MMORPGs are more likely to lead to IGD than offline, single-player games (Rehbein et al., 2010), and gamers with IGD are more likely to play MMORPGs than gamers without IGD (Porter et al., 2010). A study across seven European countries found that MMORPGs and first-person shooter games showed the strongest relations with the development of IGD (Müller et al., 2015). In another systematic review, MMORPGs showed stronger relations with IGD symptoms and the development of IGD when compared to other types of games (e.g., real-time strategy, sports games, and arcade games; King et al., 2019). Among people who play MMORPGs, those with greater impulsivity and higher motivations to game in order to escape and to earn achievements have been found to be at greater risk for IGD (Billieux et al., 2015). Related to types of games, one study found that adolescents who played games from a larger number of different genres were more likely to display IGD symptoms (Donati et al., 2015). Thus, there is clearly a relation between types of games played and likelihood of development of IGD; however, it is less clear whether this relation is causal or even direct. One possibility is that this relation is better explained by the longer playing times associated with certain genres, such as MMORPGs, as these games often involve time-consuming and elaborate tasks as well as pressure from peers or opponents to continue playing. Another possibility is that characteristics of gamers that draw them to a specific genre of games also put them at risk for developing IGD.

Consequences and Correlates of IGD

As described earlier, the decision to include IGD in the *DSM-5* and ICD-11 was partially due to the links between IGD and significant negative outcomes, ranging from interference with school or work responsibilities to social problems, physical health problems, and development of other mental health problems. However, it should be noted that, as with many other aspects of the IGD scientific literature, findings have been inconsistent across studies, and this may, again, stem from challenges related to inconsistent definitions of IGD as well as methodological flaws.

Academics and Prosocial Activities A major concern related to IGD for youth is the potential for interference with academics and normative prosocial behaviors. For example, playing video games more than intended is certainly an aspect of IGD that may dominate time that would otherwise be spent on academics and extracurricular activities. In a representative sample of close to 13,000 European adolescents, an IGD diagnosis was associated with poorer self-reported academic achievement and lower participation in sports and other prosocial activities (Müller et al., 2015). A study of Lebanese adolescents found that IGD was associated with significantly lower academic achievement and that youth with IGD (compared to youth with IGD risk or casual gamers) had the lowest academic achievement and were, on average, failing classes (Hawi et al., 2018). Although the link between low academic achievement and IGD is fairly consistent in the literature, the direction of this relation between IGD and academics is not clear. One possibility is that the excessive gaming often associated with IGD takes up so much of the youth's time, crowding out time spent on academics and other activities. However, these studies have not ruled out another potential explanation; that is, youth who struggle with academic and extracurricular pursuits may be more likely to engage in gaming behaviors, perhaps because gaming can provide a sense of mastery and achievement for youth who have not experienced success in other endeavors. Importantly, these findings appear to be confined to youth who develop IGD symptoms (not just those youth who game a lot), as the amount of time spent gaming has not been consistently linked to academic performance (Drummond & Sauer, 2014). More research is needed in this area, as establishing the direction and mechanism of such effects will have important clinical implications.

Social Development Another major concern is that IGD and excessive gaming may interfere with social development. For many young people, video games serve as a way to connect with peers, engage in cooperative play, and develop social skills, albeit not the face-to-face social skills typically cultivated during this developmental period. However, deficits in social development have been observed among youth who develop problems related to gaming. For example, IGD symptoms have been linked with loneliness, low social competence, and low self-esteem (King et al., 2013a, b; van den Eijnden et al., 2018). A study examining the direction of effects between IGD and social factors found that low social competence and self-esteem as well as loneliness preceded the development of IGD, though increasing levels of loneliness were also found to be a consequence of problem gaming (Lemmens et al., 2011). Other studies found that deficits in social and emotion regulation skills at age 8 predict IGD symptoms at age 10 (Wichstrøm et al., 2019) and that social vulnerability (defined as difficulty establishing and retaining close friends) during adolescence predict increased IGD symptoms 1 year later (Peeters et al., 2018). Research in this area is underdeveloped and inconsistent in its findings, possibly because problems with social development are likely to both precede and be worsened by IGD symptoms. Further, there may, in fact, be positive impacts of gaming more generally on social development, and it can be challenging to disentangle the impact of IGD symptoms from gaming behaviors.

Family Conflict Related to social development, problems related to gaming may negatively impact parent–child relationships, potentially through the conflict that arises from the gaming behavior itself (e.g., tension over limits to game play and rule breaking related to gaming) and IGD symptoms themselves (e.g., deception and playing despite consequences caused by gaming). It is potentially even more likely that problems within the family and certain parenting approaches predate and may increase youth's risk of developing excessive gaming and IGD. Quite a few studies have found a link between poor family functioning and either IGD or "problematic gaming behaviors" (Rikkers et al., 2016; Zhu et al., 2015). Among 434 adolescents in France, those with IGD reported higher levels of family conflict, poorer family relationship quality, and poorer family cohesion than adolescent gamers without IGD (Bonnaire & Phan, 2017). Further, clear rules about gaming and consequences for breaking gaming rules were associated with lower rates of IGD. Kim and Kim (2015) found a link between IGD and both Korean adolescents' ratings of their attachment to their parents and their perceptions of the parenting they receive. The pattern of findings across studies suggests that family dynamics, particularly related to parenting, play a role in IGD. This finding is not surprising, as parenting factors, particularly monitoring and rule setting, are strong predictors of other similar problems in this age group, including substance use and delinquent behaviors (e.g., Hoeve et al., 2009). More research is needed to understand the full range of family and parental factors that might contribute to IGD specifically as well as the direction of effects, as IGD symptoms can certainly put a significant strain on parent–child relationships.

Physical Health Problems Chronically high levels of video game play have the potential to lead to physical health problems, including musculoskeletal problems related to overuse and sedentary behaviors, eye strain, and obesity. These problems are more common in adult gamers, as many (e.g., carpal tunnel syndrome, problems with eye sight) are linked to chronic use over many years. However, childhood obesity has been studied as a potentially problematic outcome of excessive media use among youth; although research is somewhat limited, IGD symptoms do not appear to present a specific risk for obesity (Desai et al., 2010; Männikkö et al., 2015); rather excessive gaming or other sedentary behaviors (e.g., cell phone use and TV) are associated with obesity, even in the absence of

IGD. The association between these sedentary behaviors and obesity is suspected to be due to not only low rates of physical activity, but also higher junk food intake during sedentary activities (Chaput et al., 2011).

A growing literature supports the link between IGD and another major health concern for youth: sleep. Across studies, IGD has been associated with significant impairments in sleep, including fatigue and sleep problems among adolescents (Männikkö et al., 2015), shorter sleep duration by roughly 2 h per night among adolescents (Hawi et al., 2018), and poor sleep quality and shorter duration of sleep across ages, particularly among those who play MMORPGs (Lam, 2014). Further, poor sleep quality also partially explained the relation between IGD symptoms and psychological distress in university students (Wang et al., 2021). Sleep disruptions are likely to be linked to excessive gaming and timing of gameplay, in addition to IGD symptoms themselves. In an experimental study, playing video games for 2.5 h before typical bedtime (compared to 50 min) contributed to worse sleep quality, sleep efficiency, time spent sleeping, and less rapid-eye-movement sleep in a sample of adolescent boys (King et al., 2013a, b). Thus, the impact of gaming on sleep is likely due to a combination of factors, including gaming replacing time spent sleeping and engaging in screen time before bedtime.

Media reports have highlighted some cases of more severe consequences of excessive video game play, including seizures and even death. The deaths reported have typically been linked to playing "marathon" gaming sessions lasting 24 h or more with few breaks (e.g., Miller, 2019). Deep vein thrombosis (i.e., blood clots) that can lead to death has also been reported in heavy gamers. Out of 15 published case reports of deep vein thrombosis related to sedentary behaviors associated with extended video game play, 8 cases were among youth under 18, and one of the 2 deaths reported was a youth under 18 (Rambaran & Alzghari, 2020). Deaths and severe injuries are very rare but highlight potentially severe outcomes related to gaming.

Natural Course of IGD

One of the most important and perhaps least understood aspects of IGD is its natural course (e.g., how likely are people to simply "grow out" of IGD or spontaneously remit). One idea is that IGD may follow a similar developmental course as substance use disorders, with diagnoses peaking during emerging adulthood and then declining as youth transition into older adulthood. There is some support for this hypothesis, but such trajectories of IGD have not been studied nearly on the same scale as the epidemiology of substance use disorders. Longitudinal studies of IGD are still limited, with very few following participants for more than 2 years; just a few studies have followed people for 5 years. One found that problematic gaming behavior was highly stable among German students from fourth grade to ninth grade (Rehbein & Baier, 2013), suggesting that IGD is unlikely to be transient in nature, at least between childhood and adolescence. A second found that only roughly 22% of young adults who met IGD criteria at age 20 still had IGD at age 25 (Marmet et al., 2018). A third surveyed a sample of adults (mean age of 46 at initial assessment) annually for 5 years; a subsample reported gambling (but not necessarily gaming) problems (Konkolÿ Thege et al., 2015). The majority of participants who reported excessive gaming only did so at a single time point, suggesting that gaming behavior is relatively unstable over time among adults; further, IGD symptom severity significantly decreased over time. A recent review found that, generally, IGD appeared to be more stable over time in adolescent samples than adult samples (Richard et al., 2020); however, even some studies of adolescents report 1-year stability rates of less than 30% (Peeters et al., 2018; Rothmund et al., 2018). More research is needed on the course of untreated IGD as this will be an important consideration for prevention and treatment efforts.

Common Comorbidities

The controversy about whether IGD symptoms may be better explained by comorbid mental or behavioral health conditions is driven, in part, by high rates of comorbidity observed in persons with IGD. So far, little is known about the reason for these high comorbidity rates. A recent study using a Norwegian community sample used a novel approach to disentangle whether IGD and its comorbidities were causal in their relationship (i.e., one leading to another) or simply that common underlying factors predispose individuals to both IGD and other mental health problems (Hygen et al., 2020). They found very little evidence for prospective relationships between disorders. The findings suggest that comorbidities are most likely explained by risk factors common to both IGD and other disorders. These findings are intriguing and more research is needed to determine whether these same findings can be replicated in clinical samples and to identify the specific common risk factors at play. In the proceeding section, we summarize some commonly observed co-occurring mental health problems among youth with IGD.

Attention Deficit Hyperactivity Disorder (ADHD) ADHD is one of the most commonly reported comorbidities with IGD, with associations observed in both general population and clinical studies (see Dullur et al., 2020, for a review). Specifically, children, adolescents, and adults with ADHD tend to be at higher risk for developing IGD (Ferguson et al., 2011; Mathews et al., 2019; Stavropoulos et al., 2019). In a rare study of gaming problems in very young children (mean age of 5.8 years), parent-rated ADHD symptoms were associated with frequency of game playing and IGD symptoms (Paulus et al., 2018a, b); of note, this was a fairly large sample of 1271 German children, and about half of the children played video games at least occasionally, even at this young age. In addition, comorbid ADHD may make IGD more difficult to treat. In a longitudinal study of Korean children and adults who received an 8-week treatment for IGD, 93% of individuals with IGD without psychiatric comorbidity no longer had IGD 3 years later, but only 60% of individuals with IGD and comorbid ADHD no longer had IGD (Lee et al., 2021).

Autism Spectrum Disorders (ASDs) Persons with ASDs appear to be at higher risk for developing IGD (see Craig et al., 2021; Murray et al., 2021, for reviews). Children with ASD report more symptoms of IGD than neurotypical siblings (Mazurek & Wenstrup, 2013). Similarly, adults with ASDs have higher rates of IGD than adults without ASD, even after accounting for higher levels of game play (Engelhardt et al., 2017). Some scholars suggest that the development of gaming problems may be related to the core features of ASD, such as engagement in restrictive and repetitive interests (Mazurek et al., 2013), or the fact that engaging socially with others through gaming may be easier for some people with ASD than in-person activities. Studies of ASD and IGD have generally been limited by their failure to use established clinical cutoff points for IGD, making it impossible to conclude definitively that people with ASD are at risk for IGD and not just high levels of gaming (Craig et al., 2021).

Depression and Anxiety Some studies suggest that youth with IGD have elevated rates of anxiety and depression (Desai et al., 2010; Gentile et al., 2011; Vadlin et al., 2016; van Rooij et al., 2014), though other studies have failed to find this relation (King et al., 2013a, b). In a meta-analysis of 92 studies from 25 countries, the prevalence of depression among persons with IGD was highly inconsistent across studies, likely due to variability in design and measurement of IGD (Ostinelli et al., 2021). The overall prevalence of depression among persons with IGD across studies was 32%. One large-scale study of US adolescents using the Youth Risk Behavior Survey data found that playing more than 5 h of video games per day is a risk factor for suicidal ideation and planning, though this study did not assess IGD symptoms specifically (Messias et al., 2011). Generalized anxiety disorder and social anxiety disorder have both been linked to IGD. In one sample, young adults with IGD were more likely to have generalized anxiety disorder than those with IGD (Wang et al., 2017). Among gamers, social anxiety disorder symptoms were correlated with more severe symptoms of IGD (Sioni et al., 2017). However, as noted with other comorbidities, there is limited research on the reasons for the links between anxiety, depression, and IGD symptoms.

Substance Use Disorders Given similarities in the types of symptoms for substance use disorders and IGD as well as the substantial overlap between substance use disorders and gambling disorder, the link between IGD and substance use, as well as substance use disorders, among youth is a topic of interest for many scholars. However, youth often engage in gaming while in their parents' homes and in the absence of other peers, which likely decreases access to substances, and time spent gaming may compete with seeking out and engaging in substance use. Some studies have, in fact, found links between IGD and substance use in youth. For example, US high school students with gaming problems had higher rates of smoking and some forms of illicit drug use than those without problem gaming (Desai et al., 2010). In the Netherlands, students' excessive online gaming was associated with smoking cigarettes, drinking, and cannabis use (van Rooij et al., 2014), and IGD was linked to cannabis use among German youth (Walther et al., 2012). Walther et al. (2012) also found that substance use, gambling, and gaming had the personality feature of impulsivity in common. Impulsivity is a core aspect of substance use disorders and may play a role in the development or maintenance of other addictions as well. However, some studies have failed to find a link between substance use and gaming (e.g., Brunborg et al., 2014; Porter et al., 2010). A recent cross-national study found negative associations between problem gaming and substance use among youth from higher income countries and positive associations in lower income countries, suggesting intriguing differences likely related to the cultural context of gaming behaviors (Strizek et al., 2020).

Gambling Disorder There are many seeming commonalities between video games and gambling machines. The games structurally look similar in that players interact directly with technology that has lights and sounds. Similarities in the play itself include the variable ratio reinforcement to play, ability to accumulate credit of some form (e.g., for gambling, money is usually accumulated, whereas in gaming, credit often comes with moving up to the next level or increasing one's status in the game), and activities that generate motivation to keep on playing, or at least to not lose. Further, some video games include loot boxes (e.g., a sealed or locked mystery box, sometimes modeled after a roulette wheel) that are gambling-like experiences within the game where players spend actual money for a random chance to get a virtual prize with some value within the game, such as a weapon.

Some studies find that video game players are more likely to gamble than nongamers, and gamblers are more likely to play video games than nongamblers (Chui et al., 2012; Gupta & Derevensky, 1996; Karlsson et al., 2019; Rémond & Romo, 2018; Wood et al., 2004). However, the literature on whether video game play corresponds with or predicts gambling behavior is far from conclusive, with some studies finding no relation between the behaviors (Delfabbro et al., 2009; Forrest et al., 2016; King et al., 2012; Jimenez-Murcia et al., 2014; Walther et al., 2012). Studies that directly examine gambling on or within video games find those who bet on video games or engage in betting behavior within the game (e.g., purchase loot boxes) are of higher risk for gambling problems (Brooks & Clark,

Table 45.3 A Selection of IGD measures with empirical support

Author(s)	Assessment	Number of items	Reliability (Cronbach’s α)
Király et al. (2017)	Internet Gaming Disorder Test (IGDT-10)	10	0.62–0.87
Lemmens et al. (2009)	Game Addiction Scale (GAS-7)	7	0.66–0.94
Lemmens et al. (2015)	Internet Gaming Disorder Scale (Lemmens IGD-9)	9	0.67–0.95
Pontes & Griffiths et al. (2015)	Internet Gaming Disorder-Scale Short Form (IGD-9SF)	9	0.81–0.96
Pontes et al. (2014)	Internet Gaming Disorder-20 Test (IGD-20)	20	0.85–0.92
Pontes et al. (2019)	Gaming Disorder Test (GDT)	4	0.84
Rehbein et al. (2015)	Video Game Dependency Scale (VGDS)	16	0.93
Wölfling et al. (2012)	Assessment of Internet and Computer Addiction Scale-Gaming (AICA-S)	15	0.70–0.92
Young (1998)	Young Internet Addiction Test (YIAT)	20	0.86–0.97

2019; Drummond et al., 2019; Macey & Hamari, 2018, 2019; Wardle, 2019; Zendle & Cairns, 2018, 2019). A path analysis by Li et al. (2019) illuminated the directionality between video gaming and gambling, suggesting that increased gambling in the context of video games (e.g., buying loot boxes within the video game) leads to increased time spent playing video games and gambling, which in turn leads to increased gaming- and gambling-related problems. They also found that just the act of gambling within a video game is associated with increased problems from video games (e.g., more time spent playing, more sessions of play, more general psychological distress) and problem gambling severity. Thus, although not conclusive, there is some concern that aspects of gaming that are similar to gambling behaviors may put youth at risk for later gambling problems.

Assessment of IGD

Validated Assessments for IGD Validated assessments of IGD are available, but standardized recommendations for measurement selection are not. Measures of IGD have largely been developed by modifying previously validated measures for other behavioral addictions such as gambling disorder. Unfortunately, many published measures are not based on either *DSM-5* or ICD-11 diagnostic criteria because they were developed prior to the release of these criteria. Validated clinical assessments of IGD are limited, but numerous self-report screening measures have been developed (see King et al., 2020, for a comprehensive review). Screening measures vary significantly in length, item complexity, and empirical support for psychometric properties, but have generally been found to be reliable (see Table 45.3 for a selection of widely used measures). Measures continue to be developed, tested, and modified in response to findings in the literature and, most recently, in response to ICD-11 (Pontes et al., 2019).

Ko et al. (2014) developed a clinical interview based on *DSM-5* criteria to compare individuals with current gaming-related symptoms, past but not current symptoms, and controls. This interview is able to identify those with normal game play behavior from individuals who were symptomatic in a sample of young adults. Koo et al. (2017) developed a similar structured assessment that corresponds closely with clinical judgment of gaming-related concerns and that has good test–retest reliability in an adolescent sample.

Screening measures for IGD are more common, with a recent systematic review identifying 32 different measures used across 320 studies of IGD (King et al., 2020). One of the most widely used screening measures is the Young Internet Addiction Test (YIAT; Young, 1998). The YIAT was originally developed to assess general Internet addiction but has been modified specifically for IGD and has been used widely in both adolescent (Johansson & Götestam, 2004; Kim et al., 2012) and young adult populations (Nam et al., 2017; Park et al., 2016). The YIAT has preliminary construct validity (Keser et al., 2013); however, there is only partial overlap between YIAT items and *DSM-5* and ICD-11 symptomology (King et al., 2020), which makes it less than ideal for use in research studies and clinical applications moving forward. The Internet Gaming Disorder-20 Test (IGD-20; Pontes et al., 2014) closely corresponds to *DSM-5* criteria and has been validated with young adults (Pontes et al., 2014) and utilized in clinical studies with adolescents (e.g., Torres-Rodríguez, 2018). The short form of this measure, the Internet Gaming Disorder-Scale Short Form (IGD-9SF, Pontes & Griffiths, 2015), retains adequate validity, is correlated with weekly game play and the full-length version of the IGD-20, and has been validated in a sample of young adults (Pontes & Griffiths, 2015). The IGD-9SF appears particularly promising given its combination of brevity and alignment with diagnostic criteria; in addition, it was selected by King et al. (2020) as one of several psychometrically supported screening measures. The Video Game Dependency Scale (VGDS; Rehbein et al., 2015) has high reliability, predictive validity for IGD diagnosis, and high correspondence with *DSM-5* criteria and has been validated for use with adolescents (Rehbein et al., 2010, 2015). The Gaming Disorders Test (GDT; Pontes et al., 2019) also warrants consideration, as it is the first directly tied to ICD-11 criteria, strongly correlates with the well-performing IIGD-9SF, and has been validated with young adults (Pontes et al., 2019). Additional measures with strong psychometric support are the Assessment of Internet and Computer Addiction Scale – Gaming (Wölfling et al., 2012), the Game Addiction Scale – 7 items (Lemmens et al., 2009), the Internet Gaming Disorder Test – 10 Items (Király et al., 2017a, b), and the Internet Gaming Disorder-Scale – 9 items (Lemmens et al., 2015).

Limitations of Measurement and Diagnostics The ability to systematically judge the quality of clinical interview assessments or screening assessments for IGD remains limited by the lack of a "gold standard" assessment measure with which to compare sensitivity and specificity of scores. Additional studies that explore diagnostic interviews for IGD criteria performed by clinicians knowledgeable in diagnosis and IGD-related harm are needed. Validation of these interviews and movement toward a "gold standard" will allow for increased confidence around the validity, sensitivity, and specificity of already developed assessments and screeners.

The majority of available assessments are measures previously validated to capture other mental health disorders, such as gambling disorder or internet addiction. They do not universally utilize *DSM-5* IGD or ICD-11 gaming disorder criteria as their basis. Such measures include inaccurate wording or symptom emphasis that does not align with *DSM-5* or ICD-11 diagnosis (e.g., emphasizing frequency of play). Although the *DSM-5* and ICD-11 defined sets of diagnostic criteria, the criteria and diagnostic cut-point warrant further research attention to ensure appropriate sensitivity and specificity. With a still experimental and sometimes controversial set of criteria as the most standardized basis for measurement development, precise measurement of IGD remains aspirational.

Measures that include time spent gaming as a criterion or other characteristics of play but do not emphasize harm may lead to pathologizing behavior that does not represent clinically significant symptomology (Petry et al., 2018). Further, not all IGD assessments have been validated across the lifespan, with some primarily used in adolescent populations and some in young adult samples. Determination of cross-cultural measurement invariance (i.e., if IGD assessment tools work similarly well across cultural groups) is also needed as game play, and the manifestation of gaming-related problems, could vary by culture. To best aid capture disorder prevalence and aid in clinical decision making, researchers and clinicians should select assessments that use *DSM-5* or ICD-11 symptoms, only code symptoms as present if they lead to clinically significant impairment, and are validated for the target population.

Impact of the COVID-19 Pandemic on IGD

Many experts are concerned about the potential impact of the COVID-19 pandemic on rates of gaming and IGD. Specifically, stay at home orders and social distancing measures throughout the world have disrupted normal daily routines; for many youth, this has meant a much larger amount of time spent home and unsupervised by parents and, thus, the potential for greater engagement with digital technologies. Fears about upticks in gaming specifically have been supported by data from the gaming industry showing substantial increases in traffic, active users, and gaming activity across various platforms (e.g., Perez, 2020). Of note, increases in gaming behavior do not necessarily lead to increases in rates of IGD; under the current global conditions, increases in gaming behaviors that are used to fill time and connect with same-age peers may be healthy and adaptive for many youth. However, for youth who struggle with IGD, pandemic-related stressors and social isolation may exacerbate symptoms and make engaging in nongaming prosocial behaviors much more challenging. Studies of the impact of the pandemic on rates of IGD are just beginning to emerge. One study assessed a large sample of 1221 German youth (aged 10–17) in 2019 prior to the pandemic and again in April 2020 during a national lockdown (Paschke et al., 2021). Time spent gaming increased significantly between the two time points. Interestingly, at the first time point, time spent gaming was strongly predictive of IGD symptoms but was much less predictive of IGD during the lockdown period. This finding suggests that increases in gaming were normative and may not actually lead to higher rates of IGD, though research with longer follow-up periods is needed to confirm this. Another longitudinal study of Chinese children and adolescents during a similar time period found significant increases in not only gaming behavior but also IGD diagnoses and that children who had anxiety and depression prior to the pandemic were at greater risk for IGD (Teng et al., 2021).

Other emerging research has examined risk factors for problematic gaming during the pandemic, finding similar risk factors as in prepandemic studies, including low parental support and supervision, poor mental health, and loneliness (Zhu et al., 2021). A study of Indian college students found an increase in gaming behaviors among roughly half of the sample during a lockdown and that increased gaming was related to stress about college exams as well as the belief that gaming is an effective coping strategy for stress (Balhara et al., 2020).

Overall, there is some evidence that the COVID-19 pandemic has at least temporarily increased rates of gaming and IGD among youth. Longer-term studies are needed to determine whether there will be lasting impacts on global prevalence rates. Such concerns are in line with overarching concerns about the global impact of this public health emergency on mental health more broadly (Pfefferbaum & North, 2020).

Effective Treatments for IGD

Availability of treatment for IGD in the United States is virtually nonexistent, with only a handful of residential treatment facilities specializing in this problem. Further, most insurance plans do not cover treatment for IGD at least partially because it has not been recognized in the *DSM* as a mental disorder. In turn, very few clinicians have expertise in treating IGD, and few training programs prepare their clinicians to assess and treat IGD. This access contrasts with other countries, particularly in some Asian and European countries, where government-run counseling centers, hospitals, and treatment centers offer IGD treatment (e.g., King et al., 2018; Koo et al., 2011).

In addition to a lack of access to treatment, there are currently no interventions for IGD that meet the criteria for an evidence-based treatment (Zajac et al., 2017). Multiple recent reviews have pointed out the methodological limitations of studies of IGD treatments, including small sample sizes, lack of control groups in many studies, variability in definitions and assessment of IGD across trials, and too few trials on any particular treatment (King et al., 2014; Stevens et al., 2019; Zajac et al., 2020). More research is clearly needed in this area but here we will review interventions with the most research support so far. Many such interventions are modeled after evidence-based interventions for other addictive behaviors as well as other common behavioral problems prevalent among youth (e.g., delinquent behaviors). Of note, there are very limited data on medication treatments for IGD (see Zajac et al., 2020, for a review).

Cognitive behavioral therapy has been the most widely studied approach for IGD. Such approaches are premised on the idea that maladaptive cognitions about gaming lead to and maintain symptoms of IGD. Further, CBT is widely used and shown to be effective in treating substances use disorders (Magill & Ray, 2009) and gambling disorder (Ribeiro et al., 2021). A 2018 review (Stevens et al., 2019) identified 12 studies of CBT for IGD, 6 of which were specifically tested with adolescent samples. Few studies used rigorous methods, including a randomized design or comparison group (either controls or intervention). Overall, CBT showed promise as an effective treatment but appeared to be more effective for adults than adolescents.

Family-based approaches to treatment of IGD among youth have received even less attention, which is surprising given that interventions with family components are the most effective at treating adolescent substance use disorders (Tanner-Smith et al., 2013) and disruptive behaviors (McCart & Sheidow, 2016). In a 2020 review of treatment studies for IGD (Zajac et al., 2020), only three studies evaluated treatments with family components and none of them used a randomized design or compared the intervention to a control group. Still, there is a clear rationale for a family-based approach to treating IGD, especially among children and adolescents. First, motivation for changing gaming behavior and insights into harms related to IGD tend to be low among youth. Thus, individual approaches, such as CBT, are likely to be less effective. Second, family factors, particularly parenting approaches like monitoring of gaming behaviors and rule setting, are likely to contribute to gaming behaviors and are modifiable targets for intervening on youth gaming behaviors. Finally, as noted earlier, treatments that include a family or parenting component are the most effective at treating other similar problems among youth.

A few evaluations of family-based interventions for IGD have recently been published or are currently underway. Nielson et al. (2021) evaluated Multidimensional Family Therapy (MDFT), an intensive multisystemic family approach that has been shown to be effective for treating adolescent substance use and delinquency (Liddle, 2016). In this clinical trial, 12 adolescents (aged 12–19) diagnosed with IGD were randomly assigned to receive MDFT and 30 were randomly assigned to receive family therapy as usual. Adolescents in the MDFT group showed greater reductions in IGD symptoms than did those in treatment as usual. However, they also completed more sessions (26 total sessions on average in the MDFT group compared to 17 on average in the treatment as usual group), meaning the dose of treatment, rather than the treatment itself could have contributed to improvements in IGD symptoms.

Data from our group's own recently completed pilot randomized controlled trial suggest initial efficacy of a brief six-session family-based intervention for IGD (Zajac et al., 2021). Youth aged 10–19 who met the diagnostic criteria for IGD by parent report were either randomized to the experimental family treatment (n = 32) or referred to outside services for related problems (n = 28). The family treatment consisted of six weekly sessions focused on three overarching principles from Petry (2019): *record* (i.e., monitoring by both the parent and youth of the youth's gaming behavior); *replace* (i.e., working collaboratively to help the youth identify and engage in nongaming-related interests and behaviors that would compete with time spent gaming); and *reward* (i.e., identifying and implementing sustainable rewards provided to the youth for nongaming behaviors). Sessions also focused on strengthening communication skills, setting clear goals around an appropriate number of gaming hours per week, and taking practical steps to reduce opportunities for gaming (e.g., moving gaming systems and other electronic devices from the youth's bedroom to open areas in the home). Youth randomized to the family-based treatment showed greater reductions in child- and parent-reported hours and days of video game playing and self-reported (but not parent-reported) IGD symptoms immediately posttreatment, compared to the control group. Effects on parent-reported hours of gaming and on child-reported days of gaming and IGD symptoms were still significant 4 months after treatment ended. Although both this brief family-based treatment and the more intensive MDFT approach show promise in treating IGD in youth, larger trials are needed to confirm these results and to understand how such treatments can best be implemented in the community.

Practical Suggestions for Treatment Providers

Research on treatment approaches for IGD is rapidly expanding but we still have a substantial amount of work to do in order to establish evidence-based treatments for this problem. However, treatment providers are being approached by concerned parents and youth who are seeking effective treatments for problems related to gaming. Thus, providers need practical suggestions for how to best treat such patients, in the absence of established treatment protocols. Luckily, there is some initial evidence to suggest that interventions shown to be effective for other similar problems among youth, including substance use problems and other behavioral issues (e.g., oppositional behavior and delinquency), may also work for IGD.

Our own work, as well as emerging research from other groups, suggests that including parents in treatments for youth struggling with IGD is likely to be effective (see also Bonnaire et al., 2019). Interventions that promote increased parental monitoring, rule setting, and rewards for nongaming behaviors are likely to be effective in decreasing opportunities for gaming and development of alternate interests and hobbies. Many different family therapy approaches target such parenting behaviors; empowering parents and helping them to develop these parenting behaviors are likely to be familiar techniques to many treatment providers who work with youth and their families and can easily be modified to address gaming specifically. Thus far, the large majority of IGD treatments tested scientifically have taken a harm reduction approach, meaning that the goal is to reduce the amount of gaming rather than to achieve complete abstinence from gaming. This approach is likely more palatable to both youth and parents, respects adolescents' need for autonomy, and acknowledges potential positive social experiences related to gaming in moderation.

Incorporation of CBT principles in treating IGD is also a reasonable approach given the initial promising studies. CBT for other problems has been widely disseminated, making its principles familiar and accessible to many treatment providers. Further, CBT may be particularly helpful for older youth struggling with IGD who may have barriers to parent involvement in treatment. Given IGD's high comorbidity with other mental disorders, CBT can also be a good choice, as it has been shown to be effective in addressing depression, anxiety, and substance use disorders. Further, CBT can certainly be incorporated into a family-based approach for IGD.

Finally, treatment providers should carefully assess for comorbid conditions among youth presenting with IGD symptoms. Although the research in this area is mixed, it is possible that addressing other mental disorders, including ADHD, depression, and anxiety, might, in turn, reduce gaming and IGD symptoms. Providers can consider taking a dual approach to targeting both the IGD symptoms and the comorbid condition simultaneously, as it is possible that such co-occurring conditions are "maintaining" each other over time (e.g., a youth is gaming more often to manage symptoms of depression, but excessive gaming is also maintaining depressive symptoms). Thus, careful assessment and case conceptualization are particularly important for the treatment of IGD.

Conclusions

Although research on symptoms, risk factors, assessment, and treatment of IGD is very much still in its infancy, youth (and their parents) are experiencing problems related to gaming and are seeking help from mental health professionals. Our field has a lot to learn about prevention and treatment of IGD, though CBT and family-based approaches show the most initial promise in reducing gaming and IGD symptoms. Further refinement of current IGD assessments is essential for the development of a gold standard diagnostic measure that is psychometrically sound and meaningfully captures symptoms tied to clinically significant impairment. Adding IGD as a diagnosis to the next *DSM* may lead to increased training of mental health practitioners in IGD and treatments, lead to increased accessibility of treatment, and eventually improve understanding of how best to implement IGD treatment in real-world practices. Until that time, practical steps can be taken to help parents and youth cut back on gaming and reduce distress and symptoms related to IGD.

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COVID-19 and Children's Mental Health

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Since early 2020, the world has been devastatingly impacted by the Coronavirus Disease (COVID-19). According to the World Health Organization (WHO, 2020), the virus spread across various countries within 2–3 months, being declared a global pandemic by March 2020. The number of deaths throughout our society has been staggering. The Centers for Disease Control and Prevention (CDC, n.d.) reported over 30 million cases of the virus with 550,000 deaths by April 2021. During the period between March 1 and September 19, 2020, there were approximately 277,285 laboratory-confirmed cases in school-aged children in the United States (Leeb et al., 2020). Countries across the globe were completely shut down and had imposed mandatory lockdowns. As a result, businesses and recreational facilities were closed, leading to a revenue loss of 396 billion US dollars (Szmigiera, 2022). In addition to businesses temporarily or permanently closing, many school systems had to transition quickly to some form of distance instruction for students, which led to altered access to educational services and a disruption in interpersonal relationships with peers (Henderson et al., 2020). This chapter will explore how the pandemic caused massive economic dislocation, negatively influenced family health and financial stressors, and impacted the physical and mental health of children and adolescents.

Massive Economic Dislocation and Financial Stressors

As mentioned earlier, the pandemic disrupted employment and financial resources for many across world economies, thus potentially creating stressors for children and their families (Sama et al., 2021). The COVID-19 pandemic also gave rise to increases in rates of unemployment and poverty. Pandemic-related job loss and the resulting economic hardship brought about global displacement, family separations, and large-scale migration (Yoshikawa et al., 2020). The World Health Organization (WHO, 2020) reported that economic and social disruption caused by the pandemic placed millions of families at risk of falling into extreme poverty. The organization also indicated the number of undernourished

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individuals would increase by up to 132 million by the end of 2020. Many families struggled to meet some of the basic needs of their children. By March 21, 2020, 2.9 million Americans had applied for unemployment benefits constituting a 1000-fold increase (Lee, 2020). In some instances, secondary students of economically disadvantaged families had to drop out of school and help provide for their families (Lucas, 2020; Smith, 2021). Because of the substantial economic instability, an additional 42–66 million children are estimated to live in extreme poverty due to the pandemic (Yoshikawa et al., 2020). Economic impacts of the pandemic are correlated with children's reported socioemotional problems (McKune et al., 2021). Several studies have found that poverty early in life puts an individual at risk for potential negative effects later in life with more severe effects prevalent in those with longer exposure to poverty (Brooks-Gunn & Duncan, 1997; Yoshikawa et al., 2020).

In an economic depression like that caused by the COVID-19 pandemic, factors such as infection or absence of child care could mean the loss of hourly wages or job termination. Pandemic-related loss of income was cited as a point of stress for parents of school-aged children (McKune et al., 2021). Parents who are essential employees are more likely to miss work in the absence of appropriate child care to take care of their children which could lead to wage loss (Lucas, 2020). Underemployment, wage loss, and increased healthcare costs have inflated rates of housing and food insecurity (Smith, 2021). Further, the extended periods of quarantine imposed by several federal mandates likely exacerbated economic stress on households (McKune et al., 2021). United Nations Children Education Fund (UNICEF, 2021) referred to children and adolescents as a lost generation due to how the pandemic will have long-lasting implications on their educational and economic outcomes even into adulthood. These changes were unsettling for many children and adolescents in our society. Many of them had loved ones who were gravely ill or died as a result of COVID-19. Further, youth across the country were faced with limited contact with their friends, a loss of vital extracurricular and structured activities, and quick transitions to distance learning in schools by and large not accustomed or familiar with the techniques of distance education.

School Closures and Distance Education

In addition to economic hardships, many students and their families had to adjust to school closures across the country. During Spring 2020, many school systems struggled to transition to remote learning (Sullivan et al., 2021). Children are in a critical period for physical, cognitive, and socioemotional development. Students navigated a novel educational experience without peer interaction or academic supports equivalent to those they benefited from prior to the COVID-19 pandemic (Yildirim, 2021). Distance education posed several challenges to school-aged children navigating the new "classroom" environment.

By April 17, 2020, there were nation-wide school closures in 191 countries, which disrupted the traditional learning environment of over 1.7 billion students (Lucas, 2020; Smith, 2021; Yildiz et al., 2021). Some education systems closed and required students to repeat a year of academic work upon safe resumption of classes (Smith, 2021). It is reported that about 463 million children worldwide were unable to receive education altogether (Lee, 2020). Although comprehensive infectious disease plans are required by American school districts in the case of an outbreak, many were unprepared for the rapid rise of COVID-19 cases and subsequent school closures (Uscher-Pines et al., 2018). Educational institutions provide a variety of services for their students. For families from low-income backgrounds that may rely on schools to help meet some basic needs such as meals and other food assistance programs, poor nutrition was another very real outcome of the COVID-19 pandemic (Limbers, 2021; Lucas, 2020; Yoshikawa et al., 2020).

Worldwide, most schools made the transition to some form of distance education. Yildiz et al. (2021) defined distance education as "a teaching method that operates based on the active use of information technologies in order to teach lessons and to facilitate learning as instructors and students are located in different times and places" (p. 248). Distance learning took several forms such as television broadcasts, live or recorded instruction, software-based homework submission, phone and video calls, group communication applications, and even social media integration (Munastiwi, 2020; Yildirim, 2021; Zhao et al., 2020). Most approaches to distance learning utilized both synchronous and asynchronous instruction to accommodate the individual needs of students (Yildiz et al., 2021).

The integration of technology in the school setting could mean a more accessible education for some students, but it also comes with consequences. The inaccessibility of adequate technological resources in some parts of the world meant remote education was not feasible (Magomedov et al., 2020). For several reasons, some students lacked access to technology and other class materials necessary for distance education curricula (Magomedov et al., 2020; Munastiwi, 2020; Scarpellini et al., 2021). Teachers also reported Internet connectivity issues and device malfunctions to be among the many challenges associated with distance learning (Garbe et al., 2020; Magomedov et al., 2020; Yildirim, 2021). These students faced a unique barrier to distance education. Economically disadvantaged students were disproportionately affected by this barrier. It is predicted that the learning gap between students of high and low socioeconomic statuses widened due to discrepancies in distance learning practices (Smith, 2021; Scarpellini et al., 2021).

The transition to distance education was difficult for all stakeholders in education. Teachers of pandemic classrooms were faced with the challenge of transitioning to distance learning and managing virtual classrooms with very little notice and, in some cases, little training or preparation. Teachers were faced with using new platforms to disseminate learning materials and a lack of guidance on how to conduct online classrooms (Munatiwi, 2020; Yildirim, 2021).

They expressed several concerns about distance learning and the implementation of remote curriculum (Yildirim, 2021). There were very few resources on how to construct online educational programming for younger students in particular. There were some teachers who found the online format to be a barrier to effective education due to lack of expertise using required platforms (Munastiwi, 2020) as well as the big difference in the intrusion of family issues into school concerns (Kolodziej et al., 2021).

In addition to having to create engaging and effective online lessons for hard-to-teach skills, teachers of young students were teaching to students who are noisy and inaccessible with short attention spans (Yildirim, 2021). Preschool and primary school teachers were not the only educators facing the issue of fleeting or nonexistent engagement. Both teachers and parents of higher grade students reported increased distractibility and the increased need for monitoring in home–school and online classrooms (Scarpellini et al., 2021; Zhao et al., 2020).

Even with the transition to an online format for educational programming, classroom management was an issue for teachers. Only 8.6% of surveyed teachers reported they could effectively monitor their online classrooms (Zhao et al., 2020). That percentage fell to 0% in regard to managing higher grade students. A survey of parents of school children in India found that students were often distracted by Internet surfing and online competitions (Grover et al., 2021).

As mentioned earlier, the COVID-19 pandemic led to many tough restrictions and social distancing policies, which caused mental and physical reverberations for many children (Iqbal & Tayyab, 2021). Approximately 200 nations imposed nation-wide school closures affecting more than 1.6 billion children and youth (UNICEF, 2020). Many schools in the United States switched to some form of online teaching. Spending long hours online completing classes on the computer without sufficient in-person support from peers and teachers was overwhelming for many children (CDC, 2020). These changes were more difficult for students whose schools were unprepared to provide adequate equipment and technological support (Reza, 2020). Such challenges caused many students to be fearful of failing their academic subjects (de Figueiredo et al., 2021). Grover et al. (2021) surveyed 289 guardians in the United States, and three-fourth of the guardians reported that online classes for their children were less comfortable, and 80% of them indicated their children experienced poor attention and concentration. Parents in Turkey revealed there were technical problems in supporting their children's online education, but assistance was provided when problems occurred (Demir & Demir, 2021). However, findings from another study suggested that parents in Turkey were concerned with the number of screen hours their children endured after their distance education classes (Eyimaya & Irmak, 2021). Further, Cardenas et al. (2020) suggested that students across the country have experienced a "parallel pandemic" because of temporary school shutdowns that occurred. These school closures led to home confinements that were emotionally distressing for children and adolescents (Hamoda et al., 2021). Youth were faced with limited contact with their friends, a loss of regular extracurricular and structured activities, and a rapid learning curve to adjust to distance learning.

Childhood Trauma

As a result of the stressors caused by the pandemic, there have been concerns these COVID-19 experiences have been traumatizing, especially for vulnerable populations such as children and adolescents. COVID-19-related stressors such as prolonged duration, fears of infection, inadequate information, and loss of natural support systems can have long-lasting effects on children and adolescents (Guido et al., 2020). Childhood trauma has been defined as the emotional, psychological, and physiological residue left over from heightened stress that accompanies experience of threat, violence, and life-changing events (Crouch et al., 2019). These traumatic events can overwhelm a child's ability to adapt to life and can lead to strong negative emotions due to a degree of experienced or witnessed threat to self (McLaughlin et al., 2010). Common symptoms for children and adolescents who might be experiencing traumatic stress include aggressive behavior, physical symptoms, constricted play, agitation, social withdrawal, and loss of interest in what was once pleasurable (Guido et al., 2020).

While there is limited research on how the pandemic has been traumatizing for youth, research on natural disasters provides some insight into how traumatic stress symptoms, such as symptoms of acute stress disorder (ASD) and posttraumatic stress disorder (PTSD), are likely to increase due to the COVID-19 pandemic (Gruber et al., 2021). Children who are impacted by natural disasters such as hurricanes and earthquakes display multiple symptoms of depression and posttraumatic stress even when controlling for cultural differences (Navarro et al., 2016; Langley et al., 2013). Youth affected by Hurricane Katrina reported feelings of anger, depression, loss, instability, a sense of danger, and boredom (Roberts et al., 2010; Langley et al., 2013). Even after 12–18 months after Hurricane Katrina, there was a high prevalence of serious emotional disturbance (McLaughlin et al., 2010). Further, researchers indicated that postdisaster distress that children experienced due to the Chilean earthquake had the tendency of creating a negative family environment (Garfin et al., 2014). The effects of the 2011 Great Japan Earthquake caused elementary and middle school children to be vulnerable to the onset of pediatric mental disturbances (Leiber, 2017). Thus, we can assume that the COVID-19 pandemic caused significant mental health, socioemotional, and academic concerns for youth across various communities.

Mental Health

While there is limited research on how the pandemic has been traumatizing for youth, Phelps and Sperry (2020) highlighted that the pandemic could contribute to an increase of mood and anxiety disorders. Researchers have indicated that postdisaster distress that children experienced due to the Chilean earthquake had the tendency of creating a negative family environment (Garfin et al., 2014). The effects of the 2011 Great Japan Earthquake caused elementary and middle school children vulnerable to the onset of pediatric mental disturbances (Leiber, 2017). Similarly, Kandemir et al. (2018) found the prevalence of war-related adverse events, depression, and anxiety symptoms among Syrian refugee children living outside of camps in Sanhurfa in Turkey to be extremely high with toxic levels of stress due to the war and displacement-related adversities in addition to the witness of torture, injuries, and deaths of friends, siblings, and parents. Even research on the global HIV epidemic has demonstrated how disasters can negatively impact children. For instance, acquired immunodeficiency syndrome (AIDS)-orphaned children and children whose parents have been found to be HIV positive were found to be experiencing severe mental health problems; specifically, AIDS-orphaned children and child victims showed higher depression, anxiety, and PTSD than their peers (Boyes & Cluver, 2015).

Hamoda et al. (2021) postulated that children are likely to struggle with mental health issues due to home confinement and school closures. The direct and indirect effects of COVID-19 have been traumatic for a number of children and adolescents, with long-term consequences across their lifespan. Henderson et al. (2020) reported that before the pandemic, 3.2% of children and adolescents were diagnosed with depression, 7.1% with anxiety, and 7.4% with behavioral problems. During the first 24 weeks following the COVID-19 pandemic, the number of acute encounters in US children's hospitals declined significantly for children dealing with depression, suicidal ideation, and anxiety disorders (Zima & Bussing, 2021). Thus, the effects of COVID-19 are likely exacerbating preexisting issues for youth and may constitute adverse childhood experiences (ACEs) and dangerous predicaments such as child sex work and trafficking. Also, the tensions experienced among family members living in the same household could have led to children facing increased risk of domestic violence and abuse (Shen, 2020).

Hamoda et al. (2021) suggested that children were more likely than adults to struggle with mental health consequences related to emotional distress, home confinement, and school closures due to the COVID-19 pandemic. Jiao et al. (2020) found the rates of fear, anxiety, and other emotions were higher among children residing in highly epidemic areas. Jiao et al. (2020), after examining the behavioral and emotional disorders in children during the COVID-19 epidemic, discovered that even though children seemed to have been less vulnerable than adults to COVID-19, they suffered from various emotional and behavioral disorders such as clinginess, irritability, and fear in younger age group (3–6 years) while children aged 6–18 years showed the likeliness of showing inattention and persistent inquiry. Similarly, Nearchou et al. (2020) indicated that there was a strong association between COVID-19 and high rates of depression, anxiety, and psychological distress among children. However, even children who were residing in areas with lower infection rates were experiencing psychological issues such as anxiety (Kumar et al., 2020). Specifically, there was an increase in separation anxiety, fear of physical injury, social phobia, panic disorder, and generalized anxiety (Duan et al., 2020). Sama et al. (2021) indicated children from India displayed more irritation and anger as a result of the nation-wide lockdown. Youth in Ireland reported feelings of social isolation and increases in maladaptive behavior (Sullivan et al., 2021). Some children and adolescents might have displayed difficulties concentrating on tasks (McKegney, 2021). The physical health of children is linked to their overall academic and socioemotional functioning. Due to school closures and state and local restrictions, many children were unable to engage in physical activity such as playing sports with peers or exercising. Dunton et al. (2020) reported increased screen time due to school rather than for recreational or educational purposes could have resulted in sleep disruptions or disturbances.

Academic Functioning

Classroom-based schooling often gives students better access to active interaction with teachers and a focused environment for working and learning (Munastiwi, 2020; Scarpellini et al., 2021). Some students expressed a concern that distance learning did not align with their personal learning style (Garbe et al., 2020). This could give insight into why parents, teachers, and students prefer classroom-based schooling to homeschooling or other schooling styles (Limbers, 2021; Zhao et al., 2020). High school students reported lowest satisfaction with online learning, highlighting heavy workloads, poor self-management, and learner satisfaction (Garbe et al., 2020).

Due to a lack of parental material mastery and insufficient teacher interaction, some students had to teach themselves with home–school materials using various online resources (Munastiwi, 2020). The COVID-19 pandemic also saw an increase in student dropout rates with a disproportionate number of dropouts accounted for by students identified as coming from low socioeconomic status families (Lucas, 2020; Smith, 2021). With no choice but to utilize distance learning methodology due to the coronavirus pandemic, some students experienced long-term learning deficits. The academic challenges of distance learning have cost some students promotion to the next educational level (Magomedov et al., 2020).

Young Children Younger students pose a unique concern in regard to distance learning. As early childhood education is in part focused on skills like collaborative play, socialization, and prosocial behaviors, distance learning makes it more difficult to teach these early skills (Munastiwi, 2020). With play being such a vital part of the early education of children, isolation due to the closing of social institutions means short-changing not yet well-developed process skills, such as negotiation and finding common ground, during the years when children naturally learn these skills (de Avila et al., 2020). Young children who are still developing language and vocabulary skills are also at risk for deficits due to a lack of peer socialization and masks which can obscure social cues (Charney et al., 2021). Preschool teachers stated that distance learning negatively impacted the education of their students as preschoolers are often taught prosocial behaviors, collaboration, communication, critical thinking, and other imperative skills for young learners that are not easily taught online (Yildirim, 2021).

Students with Disabilities Difficulty meeting learning disability-related needs of students was a consideration sometimes overlooked by teachers and parents in distance education practices (Garbe et al., 2020). Italian students with diverse developmental and physical needs reported reduced time with support teachers and less support than everyone (student, parent, teacher, administrator) perceived to be necessary for success (Scarpellini et al., 2021). Further, students who may have needed academic or behavioral interventions could have missed identification by teachers or administrators due to the online education format (Magomedov et al., 2020). With all school activity deferred to an online format, students who had been identified as needing possible intervention for academic success encountered the barrier of ethical assessment practices (Lucas, 2020). Students with behavioral issues were reported to experience significant increases in symptoms during the pandemic (Goldberg et al., 2021).

Socioemotional Functioning

Experiencing psychosocial challenges following disasters is a common outcome for children (McKune et al., 2021). During the quarantine lockdown period, an Italian survey reported mothers' documentation of behavioral changes in their school-aged children such as restlessness, attention deficits, aggressiveness, sadness, and regressive behaviors in response to peer isolation and lack of structure in home–school environments (Scarpellini et al., 2021). For adolescents, separation from their peers could have caused significant emotional, moral, and behavioral development disruptions (Gruber et al., 2021). Additionally, some children witnessed significant instances of illness, hospitalization, separation, and even loss of caregivers or other associates during the COVID-19 pandemic. The potential distress associated with these experiences could lead to negative effects on health and well-being such as symptoms of anxiety, depression, and obsessive-compulsive disorder (McKune et al., 2021; Yoshikawa et al., 2020). Further, the implications of the pandemic are correlated with higher levels of overall stress for school-aged children (Feinberg et al., 2022).

COVID-19 and Disparities

The worst impact of disasters is felt by children from low-income backgrounds and ethnic minority status who may already be facing disparities in healthcare and education accessibility coupled by inadequate housing, limited accommodation or assistance, and access to quality nutrition (Zemrani et al., 2021). The economic health of many families of color was disproportionately impacted by the pandemic (Fortuna et al., 2020). Of the 58% of school-aged children who were diagnosed with COVID-19 between March 1 and September 19, 2020, 42% were Hispanic/Latino and 17% were non-Hispanic Black (Leeb et al., 2020). Black, Hispanic/Latino, and Native American children have experienced disproportionate COVID-19-related hospitalizations and death rates (Czeisler et al., 2021; Shen, 2020). The COVID-19 health disparities experienced in the United States occurred as a result of social distancing, testing access, healthcare quality which were worsened by racism and classism (Sullivan et al., 2021). Further, Black and Hispanic/Latino people were more likely to have preexisting conditions that increased risk for serious COVID-19 illness and mortality (Gruber et al., 2021). Many American families of color had to make difficult decisions regarding following health recommendations and risk their livelihoods or continue working as essential laborers at the expense of their physical well-being (Sullivan et al., 2021). Researchers reported that in June 2020 serious suicidal ideation was reported by 18.6% of Hispanic individuals, 15.1% of those who identify as Black compared to 7.9% of White individuals surveyed in the United States (Czeisler et al., 2021). When many schools across our society transitioned to remote learning, health disparities were worsened among children of color (Reza, 2020). Many Black and Hispanic children from low-income backgrounds experienced home technology barriers which prevented their full participation in their education (Sullivan et al., 2021). These technology barriers created or worsened academic deficits for many of these children, which was more than likely stressful for children and their parents. Also, the financial insecurities experienced by families living in poverty likely resulted in poor parent mental health, which can be a secondary stressor for children and adolescents; these conditions can leave them at risk for child maltreatment (Shen, 2020). Ramaswamy and Seshadri (2020) determined there was a link between the lockdown and an increase in child labor, child sex work and trafficking, and sexual abuse. Due to school closures, the ability of school personnel to report suspected incidences was inhibited.

Mental Health Supports

In order to mitigate the trauma of the COVID-19 pandemic, mental health clinicians must be willing to not only make evidence-based mental health care accessible for youth, but also help youth and their families build supportive environments and give caregivers the resources to talk to children about

COVID-19 (Shen, 2020). Further, a social justice–ecological framework should be utilized to address the lack of resources, quality care, and mental health professionals that have been deepened by COVID-19 for communities of color (Ormiston et al., 2021).

For instance, we have to address that for many countries, less than 2% of countries' health budgets are dedicated to mental health treatments (Jalalizadeh, 2021). Also, such a disaster requires that mental health clinicians adopt a trauma-informed public health lens for system, group, and individual levels to foster supportive and healing environments (Sullivan et al., 2021). The social justice–ecological framework and lens would also allow for focus on a comprehensive system of care, which in many districts may require building a system beyond what exists (Schor, 2021). Schor (2021) has proposed the following domains of a mental health system for children and adolescents: (1) eligibility; (2) accessibility; (3) standardized screening and assessment; (4) continuum of care services, settings, and providers; (5) system integration; (6) comprehensive financing and funding; (7) public awareness and advocacy; (8) family engagement and support; (9) quality assurance; and (10) technology.

Jalalizadeh (2021) stressed that mental health professionals must advocate for governments to assess efficacy of current funding to determine how mental health needs of those impacted by the pandemic are not adequately addressed. Advocacy is needed for a continuum of school and community services within a public health model, which could be provided by mental health clinicians with strategies and practices to improve or prevent significant psychological and emotional distress (Rozek et al., 2021). In order to help youth deal with the impact of COVID-19, connected systems of care across schools, public, health, health care, social services, behavioral health, and other systems are needed, because silo supports are inefficient and can reinforce disparities (Sullivan et al., 2021).

Health Promotion

The pandemic can cause an epidemic of childhood trauma, which will make it hard to identify all youth negatively impacted by this disaster. Therefore, mental health clinicians should first focus on health promotion, where the goals are to foster self-determination, self-efficacy, and hope (Hess et al., 2012). Kumar and Preetha (2012) summarized the following foci for health promotion: (a) for healthy individuals, clinicians would promote healthy lifestyles and prevention of risk factors and health problems; (b) for individuals with risk factors, the focus would be on health promotion and screening, action on risk factors, building resilience, and maintaining healthy lifestyles; (c) for individuals with symptoms, early detection, treatment and care, and maintaining healthy lifestyles would be key areas; (d) and for individuals with known disorders, clinicians should focus on treatment and care and maintaining healthy lifestyles. Strategies to achieve the above-mentioned foci include advocating for health-enhancing public policy, creating supportive environments, and strengthening community action such as media campaigns (Kobau et al., 2011).

Ultimately, the activities and programs that foster positive mental health and resilience and help prevent mental illness are key for health promotion. The authors of the chapter believe mental health clinicians must emphasize activities and programs that promote resilience, which can help youth go from surviving to thriving by providing opportunities to learn self-awareness and self-management (Hertal & Johnson, 2020). This could mean providing youth with the opportunities to express their emotions regarding the pandemic and creating time for youth, especially young children, to interact with peers as a way to foster a sense of safety and security (Shen, 2020). Also, mental health clinicians must bolster resilience of not only youth but also families, communities, institutions, and systems (Sullivan et al., 2021). For instance, there has been a shift to telehealth, which we believe will become a permanent mode through which to provide therapy. However, we must remember some communities might not have the technological resources (Henderson et al., 2020). Lastly, a part of this health promotion is to ensure communities have access to mental health services regardless of racial, ethnic, or geographic differences in populations (Schor, 2021). Also, mental health clinicians must advocate for policies and laws that can benefit youth's recovery from the pandemic. For instance, to help with the recovery, the federal government advocated funds to enhance school systems' ability to support youth's academic, behavior, and socioemotional well-being.

Prevention

Universal Prevention Another area on the continuum of services is prevention, which takes a tiered approach—universal, selective, and indicated. The purpose of prevention is to understand the pathway from risk factor to outcome, and the promotion of evidence-based interventions and services. Researchers have argued that the first step to determine the type of tiered approach needed for youth is to conduct a population-based assessment, where the needs, strengths, risks, and socioemotional competencies of youth can be evaluated (Baker, 2008). Such an assessment approach is invaluable because it allows mental health clinicians to take an ecological approach to understand the youth, the contexts they are in, and the youth-within-contexts interactions (Baker, 2008). Once a needs analysis is conducted through a population-based assessment, clinicians must determine the level of prevention indicated. For universal prevention, all youth will receive the same supports or programming (Hess et al., 2012). The purpose of universal prevention is to increase social, emotional, and academic competence and to decrease behavior deficits (Macklem, 2011). At this level, parents, teachers, and other stakeholders are educated on the signs and symptoms of stress caused by the pandemic so that youth are identified as quickly as possible for additional supports (McKegney, 2021).

Selective Prevention There will be youth who will need greater levels of mental health to address internal and external factors that place them at a greater risk for negative outcomes; therefore, selective prevention will be vital (Hess et al., 2012). Youth might need support to examine pandemic-related trauma by being taught to deal appropriately with strong emotions or parents might need support with parenting skills (Hess et al., 2012; Simon et al., 2020). Further, caregivers might need the resources and training to talk with youth about COVID-19 and to care for themselves (Shen, 2020).

Indicated Prevention The third type of prevention is indicated where there is a focus on individual youth who are displaying challenging behaviors, problems managing their emotion, and social isolation (Hess et al., 2012). The goal is to reduce rates of depression, anxiety, PTSD, eating disorders, obsessive-compulsive disorder (OCD), and panic disorders (Shen, 2020). At this level, partnerships with community-based and trauma-informed mental health providers will be key (Simon et al., 2020). For instance, Ervin (n.d.) highlighted the importance of having over 23 outside agencies to support school-based mental health initiatives for over 85 Boston public schools. The author believed the Collaborative for Academic, Social, and Emotional Learning (CASEL, n.d.) can serve as a guide to advance equity across the various tiers of prevention through authentic school–family–community partnerships. The domains of this framework include self-awareness, self-management, social awareness, responsible decision-making, and relationship skills.

Treatment

In an average of 2000 adolescents, we can expect that 340 of these adolescents would exhibit a severe mental health problem (Hess et al., 2012). PracticeWise (2022) indicated that cognitive-behavior therapy has the best support to treat youth dealing with traumatic stress, anxiety, depression, or disruptive disorders. For instance, trauma-focused cognitive behavioral therapy (TF-CBT) and prolonged exposure therapy have significant evidence for people facing traumatic stress (Damiano et al., 2021). There are ten components of TF-CBT, which are (a) psychoeducation—provide information about typical response to traumatic events, (b) parenting skills—learn effective praise, selective attention, time-out, and contingency reinforcement program strategies, (c) relaxation—learn techniques to reduce physiological responses to stress through breathing strategies, mindfulness, and meditation (d) affective expression and modulation—learn how to identify and mange feelings and learn effective problem-solving skills, (e) cognitive coping and processing I—learn to utilize cognitive coping skills needed to recognize and share internal dialogues, (f) trauma narrative—the goal is to unpair thoughts, reminders, or discussions of the traumatic event from overwhelming negative emotions; (g) cognitive coping and processing II—creates an opportunity for the therapist to identify and challenge trauma-related negative thinking, (h) in vivo mastery—clinician helps youth become desensitize from innocuous cues of the trauma-related event, (i) conjoint child–parents sessions—clinician meets with the youth and family to review educational information and teach how to engage in more open communication, and (j) enhancing future safety and development–youth learn personal safety tips (Cohen et al., 2006). Other therapeutic programs include cognitive behavioral interventions for trauma in schools (CBITS), dialectical behavior therapy (DBT), eye movement desensitization and reprocessing (EMDR), and parent–child interaction therapy (PCIT; Effective HealthCare Program, 2021). Lastly, some youth will need psychopharmacological interventions in addition to psychotherapy. Some possible class of medications are antidepressants, stimulants, and antipsychotics (Effective HealthCare Program, 2021). Researchers have suggested that youth should not be prescribed benzodiazepines because they can increase PTSD symptoms (Damiano et al., 2021).

Conclusion

Undoubtedly, the impact of the COVID-19 pandemic and associated restrictive measures have proven tremendously devastating to humanity across all ages. From infections, isolations, intensive care units, to deaths; from masking, social distancing, to lockdowns, all humanity has been affected. The danger is the impact it has on the future of our children, adolescents, and young adults. The chapter explored the various areas of impact on children from the COVID-19 pandemic and its associated control and restrictive measures. Strategies and interventions for clinicians and stakeholders were highlighted even as we continue to support the overall well-being of youth. In the aftermath of the crisis, health, education, and family support services should take on board the lessons learned on how to develop resilient and crisis-proof child policies, data, and service infrastructures to support families and children.

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Part X

Assessment of Psychopathology in Children

Assessment of Anxiety Disorders in Children and Adolescents

47

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Introduction

Anxiety is a normal human emotion that can be both adaptive and protective (Nebel-Schwalm & Davis, 2013). Anxiety is what drives a person to exercise caution in dangerous situations (e.g., stopping to check for oncoming traffic when changing lanes or stepping away from a steep cliff). While fear and anxiety can be normal, and even necessary, these emotions can also become maladaptive and impairing if left unchecked (e.g., becoming so frightened to the point of avoiding driving or refusing to climb a ladder to change a lightbulb). When assessing for anxiety disorders, it is pertinent to consider developmental appropriateness, frequency and severity of symptoms, and impairment in functioning. Anxiety disorders differ from the normative emotion of anxiety by being excessive, persisting beyond developmentally appropriate periods, persisting for extensive durations, and causing significant impairment (American Psychiatric Association, 2013).

Occurrence and Sociodemographic Variables

The prevalence of anxiety disorders in children and adolescents varies among the specific disorders; however, generally about 6.5% of children meet criteria for at least one anxiety disorder by the age of 18 (Polanczyk et al., 2015; Spence et al., 2017). The most prevalent anxiety disorders in adolescents are specific phobia (20%) and social anxiety disorder (8.6%; Kessler et al., 2012). Recent research that included a younger age range (4–7-year-olds) by Spence et al. (2017) found that separation anxiety was the most prevalent (4.3%), followed by social anxiety (2.3%) and generalized anxiety (2.2%). The least common by far is selective mutism, with rates of 0.03–0.2% (Higa-McMillan et al., 2014). In general, anxiety disorder rates are higher in girls than in boys (McLaughlin & King, 2015). Kessler et al. (2012) found that this difference was more evident based on the anxiety disorder. For instance, in separation anxiety disorder, social anxiety disorder, agoraphobia, and generalized anxiety disorder, adolescent females were almost twice as likely to be diagnosed; however, in specific phobias and panic disorder, rates were about equal (Kessler et al., 2012). This difference failed to exist when stud-

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ies looked at parent reports as opposed to child reports of anxious symptomology (Wren et al., 2007; Ebesutani et al., 2011). These findings suggest that more research is necessary to understand the gender differences in anxiety disorders and what may be causing these differences. In terms of age, anxiety disorders tend to remain stable but alter in nature over time (Weems & Costa, 2005). Typically, younger children report more specific phobias and fears related to separation, while older children and adolescents endorse more social anxiety and generalized anxiety (Broeren & Muris, 2009; Weems & Costa, 2005). Additionally, research indicates a correlational relationship between anxiety and socioeconomic status (SES). Both lower income and lower status predict increased anxiety (Guerrero et al., 2006; Vine et al., 2012). However, it is proposed that variables related to SES rather than SES itself may be the maintaining factor in this relationship.

Symptom Presentation

It can often be difficult to distinguish between anxiety disorders due to their similar nature in presentation. However, each disorder is marked by certain defining characteristics that allow for distinction. In assessing anxiety disorders in youth, it is critical to determine both the presence (i.e., referring to the severity and impairment criteria) and type (i.e., referring to the defining features) of the anxiety disorder. The *Diagnostic and Statistical Manual of Mental Disorders Fifth Edition* (*DSM-5*) recognizes seven specific anxiety disorders, each with its own key features: separation anxiety disorder, selective mutism, specific phobia, social anxiety disorder, panic disorder, agoraphobia, and generalized anxiety disorder (American Psychiatric Association, 2013).

Separation Anxiety Disorder

Separation anxiety disorder (SAD) is defined by experiencing excessive anxiety and distress related to separation from home or from caregivers. In contrast to most other anxiety disorders, the prevalence of SAD decreases with age (Costello et al., 2003). Due to separation difficulties being developmentally appropriate for young children to experience, SAD should not be diagnosed in children and adolescents below the age of 6 years. Like all anxiety diagnoses, developmental appropriateness should be considered. For example, it may be appropriate for a 7-year-old to fear being left alone. However, a 15-year-old who becomes distressed when his or her parents leave for work and refuses to be left alone is of clinical concern. Youth with SAD often worry about being kidnapped, getting lost, or having something bad happen to their parents or themselves. Additionally, children and adolescents with SAD can often experience school refusal behavior (Higa-McMillan et al., 2014). School refusal can be extremely interfering for the child and the child’s family as it reduces learning opportunities and often results in work absences for family members.

Selective Mutism

Selective mutism (SM) is characterized by a lack of speech in social situations (e.g., school) in children who exhibit no trouble speaking in other settings (e.g., at home with family). Due to its focus on speaking behavior, it is important to note that SM cannot be diagnosed in children who lack knowledge of the primary language and cannot be explained by a communication disorder. Children with SM often experience such severe distress speaking in settings that they may fail to communicate if they are in pain or need to use the restroom. Social anxiety disorder is a common comorbidity in children with SM (estimates of about 65%; Kristensen, 2000); however, it is possible for cases of social anxiety disorder to appear as SM. For example, a child with a speech impediment or an accent may be worried about how he or she will be negatively judged by their peers, thus, avoiding conversations and speaking in front of others in social situations. While the child appears to be mute, the avoidance of speech may be better explained by their fear of embarrassment and negative judgment (i.e., social anxiety disorder).

Specific Phobia

Youth with specific phobias (SP) experience pronounced fear when in the presence of or anticipating certain objects or situations. These fears are disproportionate to the degree of danger they pose. SP falls into five categories (animal, natural environment, blood-injection injury, situational, and other), with the most common in children and adolescents being animal and natural environment (Essau et al., 2000; Last et al., 1992). In addition to the great fear and distress, children and adolescents with SP also limit their developmental experiences by avoiding feared situations and objects (Ollendick et al., 2004). For example, a child who is afraid of insects may avoid playing outside with friends, resulting in them missing out on associated activities and social opportunities. When assessing for specific phobias, it is important to have a developmental perspective. It may be developmentally appropriate for a young child (e.g., 4 or 5 years old) to be afraid of shots; they may even cry or scream when administered. However, a 14-year-old who screams, kicks, and requires restraint when receiving shots is of clinical concern.

Social Anxiety Disorder (Social Phobia)

Social anxiety disorder (SocAD) is characterized by marked and persistent fear in social situations. These social situations can involve being observed by others, social interactions, or performing in front of others. Children and adolescents with SocAD may often be anxious about meeting unfamiliar people, speaking in front of their class, or eating in front of others. They often fear that something they do in a social situation will be negatively evaluated. There have been mixed findings regarding the directionality of SocAD and peer relational problems (Gazelle & Ladd, 2003; Morris, 2004). However, associated characteristics of youth with SocAD are social skill deficits, shyness, and difficulty with peers (Higa-McMillan et al., 2014).

Panic Disorder

Panic disorder (PD) is defined by recurrent and unexpected panic attacks. These panic attacks involve abrupt, intense physical symptoms (e.g., sweating, racing heart, shortness of breath, nausea). Children and adolescents with PD often experience panic attacks that induce intense fear that begins with no warning, typically lasting for 10 to 20 min. In extreme cases, these panic attacks can last up to an hour. Panic attacks are associated with higher levels of suicide ideation and attempts (Goodwin & Roy-Byrne, 2006) as well as respiratory illness (Craske et al., 2001). Prevalence of PD in children and adolescents is still rather rare compared to other anxiety disorders and has been found to be between 0.5% and 5% in community samples and equally prevalent in males and females (Diler, 2003). Even so, PD has one of the highest comorbidity rates of all anxiety disorders, with up to 90% of children who have PD also having another anxiety disorder (e.g., generalized anxiety disorder, SAD) and/or mood disorder (e.g., major depressive disorder, bipolar disorder; Masi et al., 1999).

Agoraphobia

While often accompanying PD, agoraphobia can also be experienced in isolation. Agoraphobia is the fear of being in situations in which escape or receiving help would be difficult if a panic attack ensued. While agoraphobia can be seen in children, onset typically peaks in later adolescence and in early adulthood (American Psychological Association, 2013). In a community sample of adolescents aged 13–17 years, the prevalence of agoraphobia was approximately 1.8% (Kessler et al., 2012). Some of the most avoided environments by children and adolescents with agoraphobia are shopping malls, cafeterias, crowds, elevators, and movie theaters (Kearney et al., 1997). Youth experiencing severe symptoms of agoraphobia may even become afraid to leave their house altogether (American Psychological Association, 2013). This can lead to insufficient learning and social opportunities during critical developmental periods.

Generalized Anxiety Disorder

While most of the aforementioned anxiety disorders focus on anxiety induced by specific situations or are related to certain environments or objects, generalized anxiety disorder (GAD) is associated with excessive and persistent worry about a variety of topics (American Psychological Association, 2013). In youth, these topics often consist of worries related to school, sports performance, peer relations, and worries about the past or future. For instance, a child with GAD may constantly worry about making good grades, being good enough on their sports team or in their band, their social and interpersonal relationships, and the health of their family members. Those with GAD often have the aforementioned worries daily and have trouble controlling their worried thoughts, often interfering with their daily life functioning. Associated characteristics can include feeling a lack of control over their circumstances (Frala et al., 2010) and being unable to recognize low-frequency events (Silverman et al., 1995). Separate studies of youth in America, Australia, and Iran indicate prevalence rates of GAD at 3.0%, 2.3%, and 2.6%, respectively (Burstein et al., 2014; Mohammadi et al., 2020; Spence et al., 2017).

Etiology

Historically, the influence of four major etiological pathways has been explored in child anxiety: classical conditioning, modeling, negative information transfer, and nonassociative accounts (Davis et al., 2017). Other explanations for anxiety development can be found in the areas of genetics (Bartels et al., 2007; Beidel & Turner, 1997), neurobiology (Craske et al., 2009), temperament (Pérez-Edgar & Fox, 2005), and environmental family influences (Bögels & Brechman-Toussaint, 2006). Research has shown that anxiety has a significant genetic component (Bartels et al., 2007; Beidel & Turner, 1997). Genetic contributions have been shown to account for the largest amount of variance when compared to environmental factors (Eley et al., 2003; Hallett et al., 2009). Bolten and colleagues (2006) found that in youth with SocAD and SP, genetics accounted for the largest proportion of variance (73% and 60%, respectively). Other research has supported these claims (Hallett et al., 2009), finding that in young children, social anxiety and fear produced the highest heritability rates. Additionally, the volume, activity, and connectivity of various brain structures (e.g., amygdala, hippocampus, prefrontal cortex, anterior cingulate cortex) have been correlated to anxiety (De Bellis et al., 2000; Etkin et al., 2009, McClure et al., 2007). Various models have been proposed to also explain how youth temperament influences youth anxiety. A common model used to explain this relationship looks at behavioral inhibition (Kagan, 1997). Behaviorally inhibited children, characterized by hypervigilance to their environment (Degnan et al., 2010), are at a higher risk for developing anxiety disorders, specifically SocAD, SAD, and GAD (Hudson & Dodd, 2012). Additional literature also supports etiological models focused on environmental family factors. Those correlated with increased child anxiety include factors such as attachment (Colonessi et al., 2011), parental overcontrol (Drake & Ginsburg, 2012), anxious modeling (Chorpita et al., 1996), and cohesion and conflict (Bögels & Brechman-Toussaint, 2006). While there are many accepted etiological models for youth anxiety, it is commonly accepted that youth anxiety is best understood as some combination of several of these factors, and newer models have expanded even beyond these (see Craske et al., 2014).

Comorbidities

Comorbidities among anxiety disorders are common. Anxiety disorders have high rates of comorbidity within themselves and with major depression and alcohol and drug use. For instance, in a study of children and adolescents with specific phobias, about one-third of the children also met criteria for a depressive disorder (Essau et al., 2000). However, there are higher rates of comorbidity among anxiety disorders. Hammerness et al. (2008) found that 28% of children diagnosed with an anxiety disorder had more than one. Comorbidity among anxiety disorders has been found to occur at an earlier age of onset and to have a more chronic course (Hofmeijer-Sevink et al., 2012). For example, children and adolescents with a specific phobia often have more than one (Ollendick et al., 2009) and also meet criteria for other anxiety disorders (SocAD and SAD; Lewinsohn et al., 1997). In addition, children and adolescents with SM often also meet criteria for SocAD (Palitz et al., 2019). Thus, when evaluating anxiety disorders, it is critical to keep the high comorbidity rates in mind as presenting symptoms might meet criteria for multiple disorders.

Evidence-Based Assessments

Untreated childhood anxiety disorders and fears can lead to life-long problems that cause interference in areas of daily functioning and negatively impact well-being (Kendall et al., 2004). Competent treatment of childhood anxiety and fears is dependent upon a detailed assessment to arrive at the proper diagnosis (Davis, 2009). The use of evidence-based assessment measures increases the accuracy of diagnoses. As such, Silverman and Ollendick (2005) posit that the best approach to assess anxiety and its disorders is the use of a multi-method, multi-informant procedure that allows for comprehensive information gathering. In this way, crucial information regarding emotional functioning and symptom presentation in different physical environments can be fully evaluated (DeLos Reyes, 2011). However, the multi-informant strategy can result in discrepant information regarding the presence and severity of a childhood anxiety disorder based on the information received from children themselves, parents, and teachers (Brown-Jacobsen et al., 2011; DiBartolo & Grills, 2006). Discrepant information should be closely examined by the clinician and given full consideration within the assessment process to increase accuracy and understanding (Davis et al., 2017).

Davis and Ollendick (2005) stress the importance of assessing the three components of anxiety (i.e., cognition, behavior, and physiology) as well as the subjective emotional response which are all needed to arrive at an accurate diagnosis and subsequently create an efficacious treatment plan. Common assessment procedures used for childhood anxiety include unstructured interviews, diagnostic interviews, questionnaires, physiologic measures, and observational methods. Commonly used assessment techniques of each of the aforementioned techniques will be reviewed including information regarding clinical application and psychometric properties.

Unstructured Interviews

The clinical interview is the most common assessment method for any type of psychological condition. Its tripartite goals are to establish rapport, define symptom patterns, and determine an accurate diagnosis (Herbert et al., 2010). The unstructured interview is a free-flowing interview that does not adhere to a standardized format (Jones, 2010). It is advisable to begin the assessment phase with an unstructured interview to establish rapport between the child, family, or caregiver, and the clinician. This informal, less structured time also allows the child to acclimate to the environment. There are several important content domains in which the clinician should gather information during the unstructured interview, including the presenting problem, the reason for seeking treatment, developmental, academic, and social histories, home life/daily routine, family mental and physical health histories (including medications/substances), and any other concerns the family may have. The information gathered is used to help with case conceptualization by incorporating important family contextual information and identifying areas requiring further investigation. Unstructured clinical interviews, though very helpful in rapport building, can be unreliable and prone to clinician bias. Adherence to the multi-method assessment procedure is recommended to increase evidence-based clinical accuracy (Frick et al., 2010).

Diagnostic Interviews

After the unstructured interview is conducted, the clinician should consider administering a semi-structured or structured interview, both of which provide templates to assess information about the symptomatology within diagnostic categories of the *DSM-5* (McTate & Leffler, 2017). Structured interviews require the clinician to use exact wording of the questions and the exact procedure for interpretation, often without the opportunity to ask clarifying questions. An advantage of semi-structured interviews is that the clinician can ask follow-up probes.

The Anxiety Disorders Interview Schedule for DSM-IV Child and Parent Version

The Anxiety Disorders Interview Schedule for DSM-IV Child and Parent Version (ADIS-IV: C/P) is very widely used, semi-structured interview that is designed for use with children 6–18 years old (child version) and with adults and caregivers (adult version; Silverman & Albano, 1996). The ADIS-IV: C/P assesses for a range of internalizing and externalizing disorders. The format includes a module for each disorder (i.e., social phobia, specific phobia, generalized anxiety disorder) and other common disorders and problems in youth (i.e., major depressive disorder, attention deficit hyperactivity disorder, oppositional defiant disorder). Abbreviated screening measures are included to address other problems such as eating disorders, schizophrenia and enuresis. The ADIS-IV: C/P can be administered in part or in whole. Specific modules can be identified for administration to probe for specific disorders or problems. The questions are based on the *Diagnostic Statistical Manual, Fourth Edition* (*DSM-IV*) criteria (Silverman & Albano, 1996).

The ADIS-IV: C/P is administered by asking the respondent (either child or parent/caregiver) to rate the severity of an endorsed symptom on a 9-point scale from 0 (not present) to 8 (very severe/disturbing/impairing). Symptoms of 4 or greater are considered to be indicative of clinical significance likely warranting a diagnosis. A clinical consensus process may be performed where the clinician integrates the information from both the parent/caregiver and child in order to address both concordance and discrepancies in making a final diagnosis (Silverman & Albano, 1996).

The ADIS-IV: C/P has been used more often in research on youth anxiety disorders in comparison to other measures and has the strongest evidence of efficacy (Silverman & Ollendick, 2005). It has been shown to have adequate interrater reliability and test-retest reliability (Grills & Ollendick, 2003; Reuterskoid et al., 2008; Silverman et al., 2001). Concurrent validity and convergent validity of the ADIS-IV: C/P have also been empirically demonstrated (Langer et al., 2010; Wood et al., 2002). Potential disadvantages of the ADIS-IV: C/P are that clinician training is required, and it can take more than 2 hours to administer in its entirety (Evans et al., 2017). There is an updated version of ADIS that uses *DSM-5* criteria, though it is not widely available (Davis et al., 2017). The ADIS-IV has been translated into several languages including French, Portuguese, and Spanish (Grisham et al., 2004). In addition, there is also an autism spectrum disorder addendum (see section on Special Populations in this chapter; Kerns et al., 2017).

Kiddie-Schedule for Affective Disorders and Schizophrenia for School Aged Children-Present and Life Time Version (K-SADS-PL)

The Kiddie-Schedule for Affective Disorders and Schizophrenia for School Aged Children-Present and Life Time Version (K-SADS-PL) is a semi-structured diagnostic interview designed to measure current and past symptoms of a broad range of internalizing and externalizing disorders in children aged 6–18 years old. The primary diagnoses it assesses are anxiety, mood, and psychotic disorders as well as various disruptive behaviors. The K-SADS-PL is administered to both the parent/caregiver and child and includes available ratings from all sources including school sources, if available. If the child is a pre-adolescent, the parent administration should be conducted first. When working with adolescents, the administration should begin with them (Kaufman et al., 1996).

The administration of the K-SADS-PL is a multi-phase process that begins with an unstructured interview. The subsequent phases include a diagnostic screening interview—a gathering of demographic, health, presenting problem and history, school and emotional functioning, etc.; the screen interview—a survey of current and most severe past symptoms of different diagnoses; supplement completion checklist—affective disorders, psychotic disorders, anxiety disorders, behavioral disorders, and substance disorders checklists that are given selectively based on the results of the screening interview; summary lifetime diagnosis checklist—a synthesis of all the information from all sources; children's global assessment scales—a score given to estimate the child's current level of functioning with an additional score given for children who have a past history of psychiatric symptomatology. Probes are included as examples to help elicit more information to score an item and do not have to be used in verbatim. Most of the scoring of the K-SADS-PL is scored on a 4-point scale with 0 = no information is available, 1 = symptom is not present, 2 = subthreshold levels of symptomatology, and 3 = threshold criteria. Other items are rated on a 3-point scale with 0 = no information, 1 = symptom is not present, and 2 = the symptom is present. The clinician must determine a final summary rating for each diagnostic area using the ratings from all sources. If there are discrepant ratings, the clinician must use good clinical judgment in determining summary ratings (Kaufman et al., 1996).

The K-SADS-PL has good psychometric properties. Kaufman et al. (1997) reported good concurrent validity and good to excellent test-retest reliability. Kragh et al. (2019) reported good convergent and divergent validity for anxiety disorders, depressive disorders, oppositional defiant disorder, and attention deficit disorder in children in a sample of Nordic youth. Birmaher et al. (2009) reported good convergent validity, acceptable divergent validity for emotional disorders, and good interrater reliability in a preschool sample of 2–5-year-olds. The K-SADS-PL has been written and translated into 16 languages (Kaufman & Schweder, 2004).

National Institute of Mental Health Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV)

The National Institute of Mental Health Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV) is a highly structured interview that is based on *DSM-IV* criteria to assess more than 30 psychiatric diagnoses including anxiety disorders, mood disorders, schizophrenia, disruptive disorders, substance use disorders, and miscellaneous disorders (i.e., eating disorders, pica). The NIMH DISC-IV has two versions: DISC-Y is designed for youth ages 9–17 and DISC-P is for parents and caregivers of youth ages 6–17. Information from these interviews can be examined separately or combination. These parallel versions are available in paper and computerized format, both of which are interviewer administered. A self-administered audio computerized version is also available (Shaffer et al., 2000).

The questions comprising the DISC-IV are short with most required answers being either "yes" or "no." The clinician must read the questions verbatim. There are just shy of 3000 questions in total examining the presence of a diagnosis within the last 12 months and the last 4 weeks. The components of the DISC-IV include an introductory module which gathers demographic information and provides information to the respondent about the scope and format of the interview; 6 modules to assess anxiety disorders, mood disorders, disruptive behaviors, substance use disorders, schizophrenia, and miscellaneous disorders with additional questions that assess specific domains of impairment; a final optional module called whole life which assesses whether diagnoses present in the last year occurred after age 5 and before the current year. The DISC-IV is typically computer scored as hand scoring can be complex and less accurate. The DISC-IV has been translated into Spanish (Shaffer et al., 2000).

The psychometric properties of the DISC-IV are mixed. The interrater reliability of the DISC-IV ranges from moderate to substantial for anxiety, mood, and externalizing disorders, and has good test-retest reliability (Shaffer et al., 2000). Roberts et al. (2005) reported good interrater reliability between clinical diagnosis and the DISC-IV for adolescent inpatients. However, Lewczyk et al. (2003) reported only fair interrater reliability for all diagnostic categories in a sample of youth where 50% of the sample was comprised of minority participants (Latino, African American, biracial, and Asian American Pacific Islanders). Bravo et al. (2001) found only fair to moderate test-retest reliability for the Spanish version of the DISC-IV. Finally, Sharp et al. (2011) examined the cultural appropriateness of using the DISC-IV in South Africa and determined that a number of adaptations need to be made.

Questionnaires

Questionnaires are another very useful tool in assessing anxiety disorders and making accurate diagnoses. The use of questionnaires typically includes a multi-informant process that allows the clinician to gather information from several sources, such as the youth, parents, and teachers. An advantage of questionnaires in comparison to interviews is that they are less expensive, easy to administer, and provide an opportunity to collect information from several sources (Davis et al., 2017).

The Multidimensional Anxiety Scale for Children, Second Edition (MASC-2)

The Multidimensional Anxiety Scale for Children, Second Edition (MASC-2; March, 2013) was developed to assess a broader range of anxiety while still maintaining adherence to the construct conceptualization of anxiety that was used in the original version of MASC (March, 1997). The MASC-2 is a widely used, 50-item self-report measure that assesses a range of emotional, physical, cognitive, and behavioral symptoms of anxiety for youth aged 8–19 years (March, 2013). There are six scales and four subscales, the latter in parentheses: separation anxiety/phobias, generalized anxiety disorder, social anxiety (humiliation/rejection, performance fears), obsessions and compulsions, physical symptoms (tense/restless, panic), and harm avoidance. A 4-point Likert scale is used to assess symptomatology—0 = never true about me, 1 = rarely true about me, 2 = sometimes true about me, and 3 = often true about me. The MASC-2 also includes an anxiety probability score that estimates whether the youth has one or more anxiety disorders and an inconsistency index that is used to determine response consistency and reliability. The Multidimensional Anxiety Scale for Children, Second Edition Self-Report (MASC-2 SR), completed by youth and the Multidimensional Anxiety Scale for Children Second Edition Parent (MASC-2P), completed by a parent or caregiver, include parallel items that also give a total score, subscale scores, an anxiety probability score, and an inconsistency index. It is recommended that both parents complete the questionnaire. The MASC-2 can be hand scored or computer scored (March, 2013).

Psychometric analyses of the MASC-2 indicated that internal consistency was acceptable, test-retest reliability was strong, and convergent validity was strong (March, 2013). Moderate construct validity was demonstrated for the self-report form but not for the parent form (March, 2013). Generalizability of the use of MASC-2 with other race/ethnic groups was examined. No significant differences between the scores of Caucasian, Hispanic/Latino, and African American groups were found, thus suggesting that the MASC-2 is acceptable for use with those race/ethnic groups (March, 2013).

Revised Children's Manifest Anxiety Scale Version 2 (RCMAS-2)

Another widely used self-report questionnaire that assesses anxiety in children and adolescents is the Revised Children's Manifest Anxiety Scale, Version 2 (RCMAS-2; Reynolds et al., 2012). The RCMAS-2 is a 49-item instrument that uses a yes or no response format. It has three subscales that measure different types of anxiety subsets including physiological anxiety, worry, and social anxiety. Two validity scales, defensiveness and inconsistent responding indexes, measure whether the respondent was presenting themselves in an overly positive manner and whether or not the respondent attended to the content items. This paper and pencil questionnaire is hand scored and written at the second-grade level. An audio version is available which may be appropriate for small children and youth with attention or reading problems (Gurly, 2011; Reynolds et al., 2012).

Only a few studies have examined the psychometric properties of the RCMAS-2; however, the scales correlate to the RCMAS scales and it may be appropriate to extend the research from RCMAS to RCMAS-2 (Reynolds & Richmond, 2012). Etkin et al. (2020) evaluated the RCMAS-2 using the rubric by Youngstrom et al. (2017) determining it to have good test-retest reliability, good construct validity, and adequate discriminative validity.

The Fear Survey Schedule for Children-Revised

The Fear Survey Schedule for Children-Revised (FSSC-R) is one of the most widely used self-report questionnaires that assesses specific fears in children 7–16 years old (Ollendick, 1983). Updated twice from the original version, the FSSC-R is an 80-item measure that asks respondents to rate their level of fear for each situation, animal, or object on a 3-point scale (i.e., none, some, or a lot). The FSSC-R assesses five fear factors including: failure and criticism, the unknown, minor injury and small animals, danger and death, and medical fears. FSSC-R scores do not provide an overall level of fear that is associated to a specific anxiety disorder. Instead, particular FSSC-R items are related to particular anxiety disorders such as SAD (Ollendick, 1983).

The psychometric properties for the FSSC-R are fairly strong. Ollendick (1983) provided evidence for its high internal consistency, test-retest reliability, and convergent and divergent validity. Muris et al. (2002) investigated the daily life occurrence of five danger and death fears (i.e., not being able to breathe, being hit by a car or truck, falling from high places, bombing attacks or being invaded, and fire or getting burned). Findings indicated that the items assessing danger and death ranked high when using the FSSC-R and were lower when using a fear list procedure and had low probability of actually happening in daily life. The FSSC-R has been translated into languages for a number of other countries, though psychometric data is not available (Ollendick, 1983).

The Child Behavior Checklist 6–18 (CBCL 6–18) and Related Questionnaires

The Child Behavior Checklist 6–18 (CBCL 6–18; Achenbach & Rescorla, 2001) is widely used to assess behavioral and emotional problems in youth. It is one of several instruments within the Achenbach System of Empirically Based Assessment that includes the CBCL 6–18, the Teacher Report Form (TRF), the Youth Report form (YRF), and the Caregiver-Teacher Report Form (Achenbach & Rescorla, 2000; Achenbach & Rescorla, 2001). The CBCL 6–18 is completed by the parents, the TRF is completed by teachers, and the YSR is completed by youth aged 11–18 years. They each have parallel items, 20 of which measure social competence and the remaining 120 measure problem areas. The CBCL 6–18 provides scores on internalizing, externalizing, total problems, as well as *DSM-IV* related scales. Open-ended questions are included to assess physical problems, concerns, and strengths. All forms use a 3-point scale (0 = not true, 1 = somewhat or sometimes true, 2 = very true, very often true) to assess behavior that has occurred in the last six months. The Caregiver-Teacher Report Form is used by caregivers and preschool teachers to assess young children between the ages of 1½ and 5 years and includes 91 problem items that uses the 3-point scale used with the CBCL 6–18 and nine open-ended questions. The various measures are self-administered using paper-and-pencil or computer. Items can be given verbally for people with inadequate literacy (Achenbach & Rescorla, 2001).

In terms of psychometric properties, Achenbach and Rescorla (2001) reported high test-retest reliability, high internal consistency, substantial interrater reliability, and good construct validity for non-clinical, clinical, and diverse samples. The CBCL 6–18 has been translated into many languages and multicultural norms are available (Achenbach & Rescorla, 2007).

Screen for Childhood Anxiety Related Emotional Disorders (SCARED)

The Screen for Childhood Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997) is a self-report questionnaire that is used to screen for a variety of childhood anxiety disorders including generalized anxiety disorder, separation anxiety disorder, panic disorder, and social and school phobia. The questionnaire is used for youth aged 8–18 years and has a child version that the child completes about themselves and a parent version that is completed by a parent or caregiver. The SCARED has 41 items that are answered using a 3-point Likert scale (0 = not true or hardly true, 1 = somewhat true or sometimes true, 2 = very true or often). The SCARED yields a score for each of five factors (panic/somatic, generalized anxiety, separation anxiety, social phobia, and school phobia) and a total score. It may be taken in a handwritten form, online or by computer (Birmaher et al., 1997).

The SCARED's psychometric properties have been recently evaluated by Etkin et al. (2020) which showed the child version to have good test-retest reliability, construct validity, and discriminative validity. The researchers evaluated the parent version and found it to have excellent test-retest reliability, good construct validity, and excellent discriminant validity. Birmaher et al. (1999) included African American and Latino participants, though most were Caucasian. Several researchers have investigated the cross-cultural application of the SCARED. Hale et al. (2011) conducted a meta-analysis of the cross-cultural psychometric properties of the SCARED as a screening questionnaire for youth in various countries and found it had construct validity. Boyd et al. (2003) found support for the reliability and construct validity of the SCARED in an African American sample of high school students. Su et al. (2008) found that the SCARED demonstrated moderate to high internal consistency and test-retest reliability, moderate parent-child correlation, and good discriminant validity. Finally, Isolan et al. (2011) found that the Brazilian-Portuguese version of the SCARED showed good internal consistency, test-retest reliability, and construct validity. The SCARED is available in 10 languages (Birmaher et al., 1997; Birmaher et al., 1999).

Physiological Assessment of Anxiety

Anxiety is experienced as a response to perceived threat or danger that has a physiological component directed by the autonomic nervous system (ANS). The ANS, which consists of the sympathetic and parasympathetic branches, controls the body's energy in response to threat. When a threat is experienced, a built-in system known as the flight or fight is engaged to get ready to respond by engaging the threat (fight) or fleeing from it (flight). The sympathetic system gets the body ready for action while the parasympathetic system restores the body to normal. When the fight or flight process is engaged, adrenaline and noradrenaline are released from the kidneys which then travel through the body's major systems to prepare for fight or flight. The resulting physiological effects include an increase in heartbeat rate and heartbeat strength, increase in respiration rate and shallowness, sweating, trembling and shaking, cold extremities, and muscle contractions that can lead to a “freeze” response. The parasympathetic branch of the nervous system works to stop the fight or flight process and restore balance to the body, though restoration takes some time and some effects may remain long term (Bourne, 2015).

Physiological Measures

The assessment of anxiety is often performed with interviews and questionnaires that do not directly measure the physiological experience of anxiety in youth (Davis et al., 2011). Thomas et al. (2012) recommend the use of subjective measures in combination with objective measures of physiological experiences allowing for a more comprehensive assessment. There are several physiological measures that yield information about autonomic nervous system functioning. Heart rate is an indication of sympathetic activation that is determined by measuring the inter-beat intervals (time between beats) in milliseconds with longer intervals representing slower heart rate. Heart rate can be displayed on an electrocardiogram to be viewed by the clinician and youth. Heart rate variability (HRV) measures the change in the distance between heartbeats over time and is influenced by both sympathetic and parasympathetic processes (Thomas et al., 2012). Prinsloo et al. (2013) used an HRV biofeedback device with participants that were instructed to adjust their breathing so that breathing and heart rate covaried, which resulted in decreased anxiety. Another measure of autonomic nervous system activity is blood pressure which is typically taken by a blood pressure monitor. Both systolic (time of heart pumping) and diastolic (time of heart not pumping while filling with blood) pressures are taken and must be interpreted according to age, gender, body mass, and other factors (Thomas et al., 2012). Another way to measure physiological experience is measuring galvanic skin responses. A psychogalvanometer measures the skin conductance or electrodermal activity from the amount of sweat on the skin released secondary to anxiety. Epidermal sweat provides a conduit for the electrical current, which is then recorded. A measure of the galvanic skin response functions as an inference of the autonomic arousal in response to stressful situations (Najafpour et al., 2017). In addition, there are even newer technologies slowly making their way into research assessments (e.g., fMRI, EEG).

Observational Methods

Behavioral observations are another category of assessment methods with youth that allows the clinician to directly observe how youth respond in one or more specific situations, thus objective information can be gathered across settings.

Behavior Avoidance Tasks (BATS)

Behavior avoidance tasks (BATS; Castagna et al., 2016; Haynes, 2001) are designed to quantify/evaluate the degree to which youth approach/avoid a previously feared/avoided situation, such as petting a dog or riding an escalator. The youth is asked to engage a situation or stimulus (e.g., an elevator or a dog) and using low demand instructions (recommended) asked to perform as much of a predetermined task as she chooses. After the youth engages in the feared/avoided situation, a percentage of the possible steps that could be accomplished are usually computed; additionally, other measurements can be taken before, during, and after the task including assessing the youth’s level of compliance, level of distress, and other experiential components, such as heart rate (Castagna et al., 2016; Davis et al., 2017). BATs have been used in the treatment of phobias, social phobia, and obsessive-compulsive disorder (Davis et al., 2017). An adapted form of the BAT, the Revised Behavioral Assertiveness Test for Children (BAT-CR), allows the clinician to assess the youth’s behavior through direct observation of a series of role plays (Ollendick, 1981). The role plays create social situations that are both positive and negative in order to evaluate social skills. Several behavioral measures can be obtained, such as latency of response, eye contact, and length of response (Davis et al., 2017).

The Trier Social Stress Test-C

The Trier Social Stress Test-C (TSST-C) is the children's version of the Trier Social Stress Test (TSST), a well-established observational assessment method that allows the clinician to evaluate the reciprocal relationship between social evaluative threat and physiological responses (Buske-Kirschbaum et al., 1997; Kirschbaum et al., 1993). The TSST-C was developed for youth aged 7–16 years using a story telling situation instead of a mock interview that is used in the adult version. The TSST-C begins with the youth being told the beginning of a story with the task of finishing the story in front of a committee that praises the youth verbally and nonverbally (unlike the adult version where no feedback is given during the mock interview). Additional instruction given to the youth is to tell a story that is more interesting and more exciting than that told by other youth their age. Then, the youth is given a numeracy skill task which is the complement to the arithmetic task given to adults. Finally, physiological measures of stress, such as cortisol and salivary amylase levels and cardiovascular changes, are taken to assess the level of stress responses (Frisch et al., 2015). Variations of the TSST-C have been examined such as changing the task from finishing a story to introducing oneself to a new class at school which more closely resembles real life youth experiences (Yim et al., 2015).

A number of researchers have studied the use of TSST-C with youth. Hellhammer et al. (2009) suggested that the social evaluative level of threat may be increased or decreased when youth are being evaluated by an adult panel. Foley and Kirschbaum (2010) determined that the social evaluative component may have a different impact based on the course of adolescent development as sensitivity to social stress increases in adolescence. Additionally, more supportive and engaged actions of the panel may mediate the physiological response to the stress task. Stroud et al. (2009) found the physiological reactivity may be present in some measures (i.e., cortisol) and not others (i.e., salivary amylase). Laurent et al. (2015) found that physiological reactivity increased with age and developmental stage, though this was not consistent across physiological measures. More research is needed to investigate the effects of age, puberty, and developmental components on the physiological response to TSST-C (Allen et al., 2017).

Assessment of Anxiety Disorders in Special Populations

The majority of the literature on assessing for anxiety disorders in youth has focused on typically developing children, despite research consistently highlighting high rates of anxiety disorders in youth with other neurodevelopmental concerns like autism spectrum disorder (ASD; Steensel & Heeman, 2017) and Intellectual Disability (ID; Green et al., 2015). Youth with ASD can experience physical and cognitive distress as well as functional impairment from comorbid anxiety symptoms just like neurotypical youth, but these symptoms are often overlooked or overshadowed by their primary ASD diagnosis. For instance, youth with ASD exhibit higher rates of anxiety compared to typically developing youth (Steensel & Heeman, 2017), and 39.6% of youth with ASD have also been found to have at least one comorbid anxiety disorder (van Steensel et al., 2011). These comorbidities highlight the need for multi-method, multi-reporter—particularly parent report—assessments tailored for youth in these populations, especially given the reduced insight and expressive communication abilities some youth in these populations experience (Davis et al., 2012). Moreover, clinicians must be knowledgeable in the core features of ASD, multiple anxiety disorders, symptom overlap between these disorders, and differing presentations of anxiety in youth with ASD to properly differentiate these symptom clusters and identify comorbidities, as merely extending assessment techniques from typically developing populations to these youth may prove inappropriate (Davis, 2012).

While few diagnostic interview schedules have been developed specifically for youth with developmental disabilities, multiple diagnostic interviews have found promising psychometric properties in neurodivergent youth. The Autism Comorbidity Interview—Present and Lifetime (Leyfer et al., 2006), an interview schedule adapted from the K-SADS to assess for comorbidity specifically in children with ASD, may be an especially promising choice for youth in this population, although it was not designed for youth specifically with ID. While not originally designed for youth with ASD, the ADIS-IV: C/P has demonstrated excellent interrater reliability between parent and child ratings for anxiety and other comorbid disorders in a sample of youth with ASD (Ung et al., 2014). More recently, Kerns et al. (2017) created an ASD addendum to the ADIS:P—ADIS/ASA. This addendum assesses specifically for ambiguous, anxiety-like symptoms that have traditionally been associated with either traditional anxiety presentations, like GAD, or subsumed under symptoms associated with ASD with five new categories: fears of change, negative reactions to change, social fear, unusual phobias, and special interest fears (Kerns et al., 2017). Promising interrater reliability was found for both traditional anxiety symptoms and the ambiguous anxiety-like symptoms measures on the ADIS/ASA in a sample of parents reporting on their youth with ASD (Kerns et al., 2017).

Questionnaires may also provide additional useful information on specific symptom clusters that may require additional attention in the assessment process. Three broad psychopathology questionnaires have been developed specifically for youth with intellectual or developmental disabilities: The Reiss Scale for Children's Dual Diagnosis (Reiss & Valenti-Hein, 1994), the Nisonger Child Behavior Rating Form (Aman et al., 1996), and the Developmental Behavior Checklist (Einfeld & Tonge, 2002) have all been developed to assess for broad psychopathology in youth with ID or other developmental disabilities. Additionally, the ASD Comorbidity for Children Scale was designed specifically to assess for broad psychopathology in youth with ASD (Matson & Wilkins, 2008). When these questionnaires are not available, some questionnaires originally designed for neurotypical youth have also demonstrated promising psychometrics. For instance, the CBCL has historically been used successfully to identify potential comorbidities in youth with ID or developmental disabilities (Reardon et al., 2015), and the BASC-2 (Kamphaus & Reynolds, 2007) was normed on one percent of children with ASD.

While broad psychopathology measures can be useful in informing the clinician on broad symptom clusters that may require further assessment, anxiety-specific questionnaires may provide more detailed information on specific fears, worries, or negative thoughts that may be present. The SCARED (van Steensel et al., 2013), MASC (White et al., 2015), Revised Children's Anxiety and Depression Scale (RCADS) and the Pediatric Anxiety Ratings Scale (PARS; Wigham & McConachie, 2014) have all been used to assess for anxiety in youth with ASD, although these ratings should be interpreted with caution due to differing factorial structures in these populations on some questionnaires (Vasa et al., 2016).

Similar with neurotypical youth, a clinician must understand how to disentangle similar symptom presentations and transdiagnostic constructs in order to make accurate diagnoses. Clinicians must also have particular knowledge on varying presentations of ASD and how various comorbidities may present differently in these populations. For instance, avoidance of social interactions could be due to a lack of interest in social relationships associated with one's ASD diagnosis, a fear of being negatively evaluated by others associated with SocAD, or a lack of understanding on how to navigate these social interactions, which could be associated with one or both of these diagnoses (Kreiser & White, 2014; Vasa et al., 2016). Likewise, specific hand movements or body postures could be indicative of repetitive body movements associated with ASD, restlessness associated with Attention-Deficit/Hyperactivity Disorder (ADHD), or nervousness associated with anxiety. Moreover, the content of specific fears or worries may differ in youth with developmental disabilities compared to neurotypical youth. Kerns et al. (2014) found that 48% of their sample of youth with ASD met criteria for a typically presenting anxiety disorder based on *DSM-5* criteria. Moreover, promising psychometrics were found in this population for an atypical anxiety presentation marked by impairing fear or worry about ASD-related challenges (e.g., social rejection, sensory aversions, adaptability to change), and this presentation was found to be associated with both ASD-traits and risk for anxiety (Kerns et al., 2014). Given potential difficulties in perspective taking or expressive language abilities, behavioral observations and functional assessments may be useful in eliciting these behaviors to then be differentiated. Moreover, as previously stated, diagnostic interviews specifically designed to assess for these atypical presentations can aid in differentiating diagnoses, including differentiating social fears that are and are not associated with fear of negative evaluation from others, phobias with an unusual focus (e.g., men with beards), anxiety surrounding access or loss of access to a special interest, and anxiety surrounding from abrupt changes or changes in routine (Kerns, 2015).

Overall, comorbidities in youth with ASD is common, and recent work has strived to create and adapt tools to accurately assess for these comorbidities, although there is still much to be done. Further, ASD and various anxiety disorders can often have similar symptom presentations, and youth with ASD may demonstrate more atypical presentations of anxiety, requiring skilled clinicians with experience in differentiating between these constructs using diagnostic interview, questionnaires, behavioral observations, and functional assessments.

Case Conceptualization

Following an integrated assessment process, the clinician should have a detailed conceptualization of the client that includes their family and environmental history, fears or worries endorsed about specific ideas, situations, or scenarios, cognitions and/or behavioral avoidance associated with these anxiety-inducing situations or concepts, physiological responses during these experiences, and the level of intensity and interference resulting from these worries. The clinician must then begin to disentangle the reported information into distinguishable disorders that the client does or does not meet *DSM-5* criteria for. Specifically, the assessor must determine (1) the normality of the endorsed symptom, (2) the frequency and/or severity of that symptom, (3) the interference resulting from that worry in the individual's life, (4) the specificity of that symptom (i.e., some symptoms may be characteristic of several disorders), and (5) the length of time the symptom has persisted.

For instance, if a specific fear or worry is endorsed, the clinician must first discern if this worry is normative for the client's age, environment, and culture (e.g., a fear of talking to unfamiliar adults may be somewhat normative for a toddler or young child, depending on the intensity of that fear). The clinician must then determine the frequency and intensity of these fears or worries and the resulting interference in the individual's life. For instance, most individuals may report some worry about their school or work performance, but this worry may be atypical in its intensity if the individual reports worrying about this for hours a day and reports difficulty distracting themselves from that worry. Likewise, while many individuals may report some fear before performing in front of others (e.g., public speaking), if the fear is so great that the individual attempts to stay home from school on the days of a class presentation or can only complete it while experiencing great distress (e.g., a racing heart, shaky muscles, sweating, catastrophic cognitions), then this fear is likely interfering with the individual's ability to complete tasks required of them. The length of time symptoms persist for also helps differentiate clinical from subclinical anxiety. While worries or fears regarding transitions or upcoming stressors in life (e.g., worry about starting a new school year, fear before giving a presentation) may be normative, symptoms that persist for longer periods of time may be more indicative of a more relentless and impairing clinical diagnosis.

Obtaining the following information provides a clearer depiction of the presenting concerns first brought up during the unstructured interview and begins to elucidate potential explanatory factors behind these concerns; however, the information obtained through this process can often be inconsistent and, at times, contradictory. Myriad factors—including comorbidity, symptom specificity, and multiple informants—can impact the consistency and decipherability of information provided and understanding of how to disentangle these factors can aid in reducing barriers to accurate clinical assessments.

Comorbidity and Differential Diagnosis

Comorbidity within youth anxiety is more common than not. Additionally, several anxiety disorders have similar symptom presentations, which can be partially explained by similar explanatory constructs underlying multiple disorders. For instance, fear is the central construct across several clinical disorders (e.g., SP, SocAD, PD), but the content of these fears is critical in differentiating these diagnoses. Fears about the same stimuli can also be indicative of different disorders depending on the specificity of the automatic thought associated with the fear (e.g., a fear of using public restrooms could be indicative of a SP, SocAD, or OCD depending on the associated cognitions). Worry is also a transdiagnostic construct that is a component of several disorders. While pervasive worry is the hallmark of GAD, youth with pure GAD and pure SocAD often report similar levels of worry (Hearn et al., 2017; Whitmore et al., 2014).

Likewise, the physical symptoms and resulting avoidance following exposure to these feared stimuli is often very similar. For instance, a child with a SP of dogs may report various physical symptoms (e.g., racing heartbeat, shortness of breath, sweating) and may scream, cry, or attempt to escape when exposed to a dog, while youth with SocAD may also report intense physical discomfort before presenting in front of a group and even cry or attempt to avoid the situation. Youth with either of these disorders may demonstrate similar symptom presentations; however, while the resulting symptoms in SocAD and SPs arise following a fear of a specific stimulus (e.g., threat, being observed or evaluated by others), the panic symptoms indicative of a PD result from the fear of the panic attack itself (Crozier et al., 2011).

These similarities in both content and symptom presentation can further complicate interpretations made from various assessment tools and create barriers to accurate assessments. For instance, while many clinicians use questionnaires as a barometer for presenting concerns, they may need to probe further throughout the assessment as many questionnaires have not demonstrated diagnostic efficiency at identifying specific anxiety disorders. Van Meter and colleagues found the internalizing subscale of the CBCL 6–18 cannot significantly discriminate youth with any anxiety disorder from others as well as youth with GAD from others, with no combination of subscales significantly improving on the performance of the internalizing subscale (Van Meter et al., 2014). However, the items on the CBCL 6–18 prevent accurate identification of other anxiety disorders. Additionally, the original MASC (designed specifically to identify multiple types of anxiety disorders) demonstrated moderate predictive power at identifying female adolescents with GAD, but it did not have adequate predictive power at identifying female adolescents with SocAD (Dierker et al., 2001). Several diagnostic interviews have promising psychometrics at identifying multiple anxiety disorders (see previous sections), but skilled clinicians still need the tools to disentangle the similarities between symptom content and presentations and comorbidities to create an accurate conceptualization of the client.

Knowledge of current comorbidity rates may provide clinicians with information on other potential diagnoses that should be assessed for when a specific symptom is endorsed. Further, knowledge of explanatory factors (e.g., harm avoidance, fears of negative evaluation, being watched, disgust sensitivity) underlying transdiagnostic constructs like fear and worry can aid clinicians in disentangling similar symptom presentations.

Multiple Reporters

Obtaining information from multiple sources reporting about several environments provides valuable context into the youth's life; however, integrating this information into a cohesive conceptualization can also further complicate assessment processes, particularly when the provided information is often discordant or contradictory. Diagnostic interviews like the ADIS-IV: C/P and the DISC-IV have both been historically demonstrated low levels of parent-child agreement (Grills & Ollendick, 2003; Jensen et al., 1999). Moreover, questionnaire data has also revealed moderate correlations between parent and child's ratings of internalizing symptoms, with some indication that parents' ratings are more highly related to symptom interference (Pereira et al., 2015), while child ratings may be more closely related to observed avoidance (Lebowitz, 2017). In addition, newer statistical approaches are revealing ever more about the parent-child agreement phenomenon by incorporating such techniques as polynomial regression (e.g., Castagna et al., 2019; Laird & de los Reyes, 2013).

Several explanatory factors have been proposed to contribute to parent-child agreement, including the child's age, social desirability, parent psychopathology, and parent accommodation of the child's anxiety; however, research in all of these areas is inconsistent and subsequently inconclusive (Silverman & Ollendick, 2005). Hamblin et al. (2016) have recently explored many proposed explanatory factors regarding parent-child agreement. As predicted, the ADIS-IV: C/P demonstrated poor parent-child agreement for all diagnoses. Interestingly, age and comorbidities only impacted agreement ratings for SocAD, with older children with fewer comorbidities demonstrating greater parent-child agreements. Family accommodation also significantly impacted parent-child agreement in various contexts for SocAD and SAD, while it did not significantly impact agreement for GAD and SPs. Overall findings differed from previous research suggesting that parents may be better reporters for specific symptoms compared to children and vice-versa, depending on other mechanistic factors. Further, findings instead illustrated that the greatest endorsement of symptoms typically came from the party who experienced the greatest burden resulting from them and observed the symptoms in the context they occur, thus providing research on *how* many of these long-discussed explanatory factors actually mitigate parent-child concordance (Hamblin et al., 2016).

This data provides clinicians with information on when and how to potentially differentially weight information from multiple reporters as well as remind clinicians that reporter discordance is not always a reason for concern. Discordance between reporters on a specific symptom or disorder does not necessarily mean that the disorder is not present and knowledge on disproportionate reporting depending on the reporter (Jensen et al., 1999), as well as how these disproportionate reports are impacted by the environment and perceived burden resulting from symptoms (Hamblin et al., 2016), aids the clinician in increasing the validity of their diagnoses and furthers the argument for utilizing multi-reporter assessment strategies.

Summary

The prevalence of anxiety disorders in children and adolescents is quite high. Merikangas et al. (2010) reports that about one-third of youth will meet *DSM-5* criteria for at least one anxiety disorder by the age of 18. If left untreated, clinically significant anxiety can persist for years, even into adulthood, causing considerable impairment. The *DSM-5* identifies seven specific anxiety disorders, that have been previously described, whose overlapping and defining symptoms must be distinguished. Appropriate treatment of youth anxiety is contingent on proper assessment and clinician knowledge and skill. Evidence-based assessment measures increase the accuracy of diagnosis, thus paving the way for the establishment of an efficacious treatment plan. In order to integrate and fully evaluate the many components of emotional functioning, symptom presentation, and environmental factors that comprise anxiety disorders, Silverman and Ollendick (2005) suggest that the best assessment approach is the use of a multi-method, multi-informant process.

There are a number of efficacious evidence-based assessment measures that may be used in the multi-method, multi-informant approach to anxiety assessment in youth. Commonly used assessment measures have been described and empirically reviewed. In alignment with the multi-method, multi-informant approach, it is recommended that a comprehensive assessment begin with an unstructured interview, ideally followed by a combination of diagnostic interviews (in part or whole), questionnaires, and physiologic and observational methods that include data gathering from both the youth and parents/caregiver. In order for clinicians to consistently practice making detailed, accurate diagnoses, they should begin each assessment by weighing all possibilities and then continuing to update these possibilities and hypotheses throughout to prevent resting on confirmation biases (Suhr, 2015). Information on family history, community base rates, and comorbidities regarding any one specific disorder are also helpful at forming and tailoring hypotheses to fit each client. The assessment of anxiety disorders among ASD/ID youth, a very common comorbidity, deserves even more specialized consideration. The multi-method, multi-informant approach is recommended for ASD/ID youth but must be more reliant on the parent report due to communication limitations characteristic of this population. Additionally, other considerations will be needed since few measures have been developed specifically for youth with developmental disabilities. It is incumbent on the assessing clinician to have a clear understanding of the symptom presentations of ASD/ID, comorbidities and presentation of anxiety, and to differentiate between them using various assessment measures.

Properly assessing for comorbidities and making differential diagnosis is equally important in neurotypical populations. Understanding how many disorders may consist of similar underlying constructs that can lead to similar symptom presentations can aid the clinician in understanding multiple potential explanations for any one endorsement. The clinician must skillfully use the assessment measures to disentangle the information gathered in order to garner an accurate, comprehensive understanding of the youth's identified problem. An important component of the assessment process is the case conceptualization, which integrates the aggregate of information gathered to determine if/which *DSM-5* criteria are met. Viewing information from multiple reporters through the lens of the time and environment these symptoms are presented in, as well as who may be most affected by them, may influence each reporter's rating and may help the clinician make sense of discordant information for the decision-making processes. Although the multi-informant approach lends itself to discrepant information, this is not always a cause for concern. Understanding the origin of these varying results can increase understanding and accuracy of the diagnosis.

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Depression Assessment

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Depressive Disorders in Children and Adolescents

Prior to the 1970s, depression was thought to rarely manifest in childhood. As such, research on the assessment and treatment of youth depression was rare, and evidence-based practices were very limited (Rie, 1966). Because of the prevailing psychoanalytic theory, depression as described in adults was considered an issue of the superego, and given that children did not yet have an internalized superego, it was thought that children could not experience depression (Rochlin, 1959). By the 1980s, there was increasing recognition that children and adolescents could meet diagnostic criteria for major depressive disorder (MDD) and dysthymic disorder (later changed to persistent depressive disorder; PDD) using the *Diagnostic and Statistical Manual of Mental Disorders* (DSM; Carlson & Cantwell, 1980). Since then, research on the assessment of depression in children and adolescents has grown considerably and has led to the development of a number of reliable and valid measures for use beginning in early childhood and through adolescence.

Prevalence of Depression in Children and Adolescents

Although the prevalence of depressive episodes increases dramatically in adolescence compared to earlier in childhood (Avenevoli et al., 2008), clinically significant symptoms of depression are observable in young children at least by preschool age. In a community sample of preschool-aged children, 1.8% of the sample met DSM criteria for a depressive disorder in the 3 months preceding the assessment using a diagnostic interview administered to parents (Bufferd et al., 2011). A review of the literature found that estimates of current depression prevalence in preschoolers as young as 2 years old in

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the general population range from 0% to 2.1%, with percentage varying depending on the type of assessment used (Egger & Angold, 2006). Specifically, two studies using questionnaire or clinical consensus as assessment approaches documented lower rates of current depression diagnoses (0–0.3%) compared to two studies using structured diagnostic interviews (1.1–2.1%; Egger & Angold, 2006). In a more recent national survey conducted in 2016 and 2017 of children aged 3–17 years in the United States using caregivers as informants, 3.2% of youth had a depressive disorder (Ghandour et al., 2019).

For adolescents, the National Comorbidity Survey conducted in 2004 in the United States found that approximately 11.0% of adolescents aged 13–18 years met criteria for MDD during their lifetime and 7.5% in the previous year (Avenevoli et al., 2015). The prevalence of PDD or dysthymia tends to be lower than the prevalence of MDD; about 1.8% of adolescents met PDD/dysthymia criteria during their lifetime and 1.3% in the previous year (Avenevoli et al., 2015). There is also evidence that rates of depression in youth may be increasing across time. For example, prevalence of past year MDD increased from 8.7% to 13.2% between 2009 and 2017 in adolescents aged 12–17 years in the 2017 National Survey on Drug Use and Health (NSDUH) in the United States (Twenge et al., 2019). Further, gender differences in the prevalence of depression emerge during adolescence (Hankin et al., 1998), with higher rates in female adolescents compared to male adolescents. In one study, 22.8% of female youth and 6.3% of male youth aged 12–17 years reported past year MDD (Twenge et al., 2019). There is also some evidence of variation in occurrence of depression based on race or ethnicity. For example, in the 2017 NSDUH, adolescents who identified as two or more races had the highest prevalence of a major depressive episode in the past year (16.9%), followed by adolescents who identified as American Indian/Alaska Native (16.3%), White/Caucasian (14.0%), Asian (11.3%), and Black/African American (9.5%) (NIMH, 2019). Adolescents who identified as Hispanic or Latinx had a prevalence of 13.8% (NIMH, 2019).

Depression commonly presents with other co-occurring psychological disorders. In particular, comorbid anxiety is common among youth with depressive disorders (Essau, 2008; Garber & Weersing, 2010). In a study of 12- to 17-year-olds, approximately 50% of adolescents in both community and clinical settings who met criteria for a depressive disorder also met criteria for another disorder (Essau, 2008). Comorbid anxiety was the most common, with high rates of comorbidity in both community (31.4%) and clinical (47.0%) samples of youth with depression (Essau, 2008). Comorbid substance use disorders were also common but somewhat more prevalent in the community (18.9%) compared to the clinical (11.3%) setting in youth with depression (Essau, 2008). Disruptive behavior disorders, including attention-deficit hyperactivity disorder (ADHD), conduct disorder, and oppositional defiant disorder, also frequently co-occur in youth with depression. A review of general population studies found that rates of ADHD and conduct/oppositional defiant disorder were as high as 57.1–83.3%, respectively, among youth with depression, although exact rates varied considerably across studies and samples (Angold et al., 1999).

In summary, research indicates that depression can be identified beginning in preschoolers, and the prevalence of depression increases from childhood into adolescence, especially for girls. Also, prevalence of depression in youth appears to be increasing in the population over time. Depression often presents with other comorbid forms of psychopathology, particularly anxiety disorders. Knowledge of the prevalence of depression in children and adolescents is important for consideration in assessment, as it can set expectations related to the percent of the population estimated to meet criteria for a given disorder or set of disorders when evaluating symptom presentation, as well as trajectories of change in depression across time and development.

Developmental Course of Depression

In clinical samples, the average duration of a major depressive episode in youth aged 7–17 years ranges from 8 and 13 months (Birmaher et al., 2002; McCauley et al., 1993). Average duration of PDD/dysthymia episodes has been found to be approximately 36 months in youth aged 8–13 years (Kovacs et al., 1984). Longer episode duration has been associated with a number of variables, including greater suicidality, more family conflict, earlier age of onset, greater depressive symptom severity, and increased rate of comorbid anxiety or disruptive behavior disorders (Birmaher et al., 2002). In terms of gender differences, trends have been observed such that girls tend to experience a more chronic course of depression compared to boys (Birmaher et al., 2004; Essau et al., 2010).

Recovery rates from a depressive episode are approximately 50–90% for children and adolescents (Birmaher et al., 2002). However, between 30% and 70% of youth experience relapse or recurrence often within 24–70 months after recovery (Birmaher et al., 2002). Lower rates of recovery have been observed in youth with a past history of depression and those with a paternal history of depression (Birmaher et al., 2004). Biological factors may also impact depression prognosis, with some evidence that lower cortisol levels are associated with faster recovery time (Rao et al., 2010). Several factors have been associated with increased risk of recurrence, including female gender, paternal history of depression, greater depression severity, symptoms following recovery from the previous episode, psychotic symptoms, suicidality, child history of recurrent depression, negative cognitions, family history of depression, higher cortisol, and recent stressful life events (Birmaher et al., 2002, 2004; Burcusa & Iacono, 2007; Lewinsohn et al., 2000; Rao et al., 2010).

Depression in youth is associated with long-term impairment in functioning across a number of domains. Early onset of depression has been shown to predict reduced life satisfaction as a young adult, medical comorbidity, greater severity of depressive symptoms, poorer quality of life, and increased suicide risk (Lewinsohn et al., 1998, 2003; Zisook et al., 2007). Depressive symptoms in youth aged 6–11 years have also been associated with reduced cognitive functioning and academic performance (Lundy et al., 2010). Adolescents who experienced a past history of dysthymic disorder also reported lower social support from friends, as well as higher rates of internalizing and externalizing behavior problems and daily hassles compared to adolescents with no history of psychopathology (Klein et al., 1997). Given long-term impairments in functioning and negative outcomes associated with youth depression, careful assessment of depression in children and adolescents is needed in clinical practice and research.

Risk Factors for Youth Depression

A large literature has examined a range of risk factors for depression in children and adolescents. Although a detailed review of this literature is beyond the scope of the current chapter, we provide a brief overview of key risk factors with the goal of informing case conceptualization and treatment planning for youth with depression. In general, this research illustrates multiple, complex pathways to depression and indicates that a combination of genetic, biological, cognitive, and emotional risk factors interact with each other and experiences of life stress and interpersonal problems to shape the development of depression.

Familial and Genetic Risk

Results from twin, family, and adoption studies all suggest familial factors are heavily implicated in the pathophysiology of depression risk as a result of both genetic and environmental factors (Rice, 2010). Familial studies indicate offspring of depressed parents are approximately three to four times more likely to develop depression relative to offspring of nondepressed parents (Hammen, 2009a; Weissman et al., 2016). Parental concordance for depression (i.e., both parents with MDD) is associated with greater risk of depression in offspring compared to one parent with depression (Weissman et al., 2016). Further, there is evidence that offspring with a parental history of MDD exhibit higher rates of depression recurrence and more impairments in functional and health outcomes as they mature (Weissman et al., 2016). Familial studies indicate that both genetic and environmental influences and their interplay play a role in these pathways (Goodman & Gotlib, 1999; Goodman & Tully, 2006), though relations between parental depression and other depression risk factors (e.g., maladaptive parenting styles, stress, childhood adversity) have impeded progress in understanding causal mechanisms of the intergenerational transmission of depression (Abela & Hankin, 2008).

Heritability estimates for childhood and adolescent depression range substantially across studies, which may be due in part to age and informant differences (Rice, 2010). Overall, research suggests that genetic influences on risk for youth depression are moderate, accounting for approximately 40% of phenotypic variation (Rice, 2010), which is consistent with a meta-analysis of adult twin studies reporting a heritability estimate of 37% (Sullivan et al., 2000). There is evidence that the influence of genetic factors on depression increases from childhood to adolescence (Rice, 2010; Thapar & Rice, 2006), which may be due in part to gene-environment correlations as adolescents exert greater control over their environment. Functional modifications in the genome as a result of the changing environment from childhood to adolescence have also been hypothesized to play a role (Bagot & Meaney, 2010). Although there are documented age effects on genetic influences of depression, there appears to be limited evidence for sex differences in genetic contributions, with depression heritability estimates comparable for males and females (Bartels et al., 2004; Franić et al., 2010; Happonen et al., 2002).

Finally, despite extensive research devoted toward the discovery of specific genes underlying depression, no genomewide association studies exist, though several consortia have been established (Franić et al., 2010). Single candidate gene studies provided initial evidence for gene-environment interactions in the development of youth depression, most notably with the serotonin transporter as a susceptibility gene that confers risk for depression in the presence of high stress (Uher et al., 2011). However, this body of work is limited by studies with small samples that differ conceptually and methodologically, which has led to problems with replicability (Dunn et al., 2011; Risch et al., 2009). Although still in its infancy, more recent work has focused on the role of multiple genes acting together to produce youth depression risk (e.g., polygenic risk scores; Halldorsdottir et al., 2019), as well as studies of methylation and gene expression, to gain a more detailed understanding of the activity of specific genes within an individual in relation to depression risk (Heim & Binder, 2012).

Biological Factors

A large body of work indicates that depression is characterized by disruptions in the hypothalamic-pituitary-adrenal (HPA) axis system, one of the major biological stress response systems in humans (Nestler et al., 2002). Further, neurotransmitters implicated in the pathophysiology of MDD (i.e., serotonin, dopamine) are known to regulate functioning of the HPA axis (Bao & Swaab, 2019). There is also evidence that atypical HPA axis functioning precedes the emergence of clinically significant MDD in youth, and HPA dysfunction in depression becomes more apparent across development (Guerry & Hastings, 2011).

Affective neuroscience studies indicate that alterations in brain systems involved in cognitive and affective processing are present in youth at high risk for depression and prospectively predict future depression. This work supports self-report and behavioral studies indicating that depression risk is characterized by deficits in emotional reactivity and regulation across development (Joormann & Stanton, 2016; Schäfer et al., 2017). Tools such as functional magnetic resonance imaging (fMRI) and event-related potentials (ERPs), derived from electroencephalography (EEG), have been used to characterize the neural correlates of these deficits. In a comprehensive review, youth depression vulnerability was characterized by abnormalities in components of the National Institute of Mental Health (NIMH) Research Domain Criteria (RDoC) positive valence systems, including blunted activation in the striatum and reduced reward-related ERPs during reward anticipation and feedback (Kujawa & Burkhouse, 2017). Similarly, alterations in components of the RDoC negative valence systems, such as neural processing of sadness, loss, and threat, have been observed in youth at high risk for depression, though effects vary depending on task and method (Kujawa & Burkhouse, 2017). In systematic reviews, blunted reward-related brain activity (e.g., reduced striatal activation, reduced frontal EEG, reduced reward-related ERPs) has been identified as a biological marker for both depression onset and course (Keren et al., 2018; Toenders et al., 2019). On the other hand, structural brain measures as risk markers for depression have been shown to be more inconsistent across studies.

Cognitive Risk Factors

Cognitive models of depression highlight the role of biases in attention, interpretation, and memory in the development and maintenance of depression (Beck, 2002). Biases toward negative or depressogenic information are thought to develop in childhood and stabilize in adolescence, increasing risk for depression across the lifespan (Gibb et al., 2013). In a review, there was consistent evidence for associations between negative attention and interpretation biases and youth depression, with evidence for these biases emerging as vulnerabilities for the later development of depression in adolescents (Platt et al., 2017). There is also support for the role of memory biases in depression risk, particularly in regard to overgeneral autobiographical memory. For instance, relative to psychiatrically healthy adolescents, at-risk and currently depressed youth report fewer specific autobiographical memories (Champagne et al., 2016; Woody et al., 2015, 2019), and overgeneral autobiographical memory to negative cues has been shown to predict the first onset of depression in adolescents (Rawal & Rice, 2012).

Consistent with vulnerability-stress models, some studies indicate that negative attributional or inferential styles increase youth depression risk in combination with exposure to negative life events (Hankin, 2008a; Joiner & Wagner, 1995). Further, some research indicates that cognitive vulnerability by stress interactions may be stronger predictors of depression in adolescents versus children (Abela & Hankin, 2008). Finally, consistent with the response-styles theory of depression (Nolen-Hoeksema, 2004), there is also consistent evidence for the role of rumination, the tendency to passively reflect on one's thoughts and feelings of sadness (Nolen-Hoeksema, 2004), as a prospective predictor of later depressive symptoms and onset in girls and boys (Abela & Hankin, 2011; Broderick & Korteland, 2004; Gibb et al., 2012; Hankin, 2008b; Rood et al., 2009).

Temperament

A considerable amount of research has linked temperament styles with depression risk, both as correlates and prospective predictors, as well as potential diatheses that interact with other factors (e.g., stress) to predict later depression in youth. High negative emotionality or negative affect, referring to experiences of a broad range of negative emotions, including sadness, irritability, fear, and emotional distress, is predictive of depressive symptoms and diagnoses (Lonigan et al., 2003; Phillips et al., 2002) and the generation of stress in youth (Hankin, 2006). At the same time, high negative emotionality is thought to characterize most forms of psychopathology and may not be specific to depression risk. On the other hand, low positive emotionality or positive affect, characterized by experiences of positive emotions like joy, pleasure, sensitivity to rewards, approach motivation, and sociability, has also been identified as a risk factor for depression across development that may be particularly relevant to depression as opposed to other forms of psychopathology (Khazanov & Ruscio, 2016; Lonigan et al., 2003; Phillips et al., 2002). Finally, there is evidence that individual differences in temperament style moderate the effect of experiences of stress and social rejection on depression outcomes in youth (Garber & Rao, 2014).

Negative Life Events and Stress Generation

Exposure to stressful or negative life events, such as trauma, parental divorce, community violence, poverty, and interpersonal stress, is an established risk factor for depression across development (Hammen, 2009b). This research highlights cumulative and chronic negative stressors as particularly salient in the development of depression and supports a prospective association between exposure to stress and the emergence of depression (Sheth et al., 2017). In addition to stress exposure models of depression, there is evidence of a bidirectional relationship between stress and depression, such that the interpersonal styles and behaviors of individuals with depression can actually generate additional, dependent negative events in their lives (i.e., stress-generation model; Hammen, 2006, 2009b; Liu & Alloy, 2010).

Interpersonal Factors

Relatedly, interpersonal theories of depression emphasize the reciprocal relationship between individuals and their social environment (Rudolph et al., 2008). For instance, meta-analyses indicate that peer victimization, encompassing overt and relational forms, is an established risk factor for depression development in youth (Reijntjes et al., 2010). Although there is evidence that youth depression is associated with increased familial and peer discord, there is also evidence that depressed youth engage in behaviors that elicit negative responses and conflict with others (Rudolph et al., 2008). In addition to peer influences, parenting behaviors have been associated with depression risk in youth, even in the absence of parental psychopathology. In particular, parenting styles that are characterized by low parental warmth and high levels of criticism, overcontrol, and rejection are associated with higher rates of depressive symptoms and diagnoses in youth (McLeod et al., 2007; Pinquart, 2016).

General Considerations for Depression Assessment in Youth

When assessing depression in children and adolescents, clinicians and researchers must make a number of decisions regarding the method of assessment (e.g., interview versus rating scale), selection of informants (e.g., child versus parent or teacher), and scoring approach (e.g., dimensional symptoms versus categorical diagnoses). Selection of assessment methods will depend on the setting as well as the purpose and goal of assessment. In clinical settings, assessment is needed to establish diagnoses, plan treatment, and monitor treatment outcomes (Klein et al., 2005). As such, it may be useful to administer clinical interviews at intake that allow for a diagnosis of a depressive episode and the ability to rule out commonly comorbid disorders such as anxiety disorders (Axelson & Birmaher, 2001; Cummings et al., 2014) that could impact treatment selection and prognosis. At the same time, dimensional assessments, such as rating scales and general measures of functioning (e.g., Bird et al., 1993; Shaffer et al., 1983), are also needed to monitor treatment progress, detect change in symptoms, and inform clinical decision-making (Bickman et al., 2011; Liu & Adrian, 2019). When assessing treatment progress, it is important to note that symptom scores commonly decrease between the first and second administration, referred to as a retest artifact or attenuation effect (Durham et al., 2002; Klein et al., 2005), and clinicians should consider this factor as a possible explanation for initial improvement on rating scale measures. In research studies, researchers have been moving beyond selection of participants based on a single categorical diagnosis to an examination of dimensions of symptoms and functioning in transdiagnostic samples, driven in part by the NIMH RDoC initiative (Sanislow, 2020). In many cases, assessment of categorical diagnoses is still useful to characterize the sample, but researchers are relying more heavily on dimensional rating scale measures to assess psychopathology, which can include both broad categories of symptoms (e.g., general psychopathology) to depressive symptoms or even more narrowly defined dimensions of depressive symptoms (e.g., anhedonia or irritability), which we describe in more detail below. Finally, given that thoughts of death are a symptom of depression and rates of adolescent suicide in the United States appear to be increasing, it is critical that both clinicians and researchers assess suicidal thoughts and behaviors in order to facilitate prevention efforts (Brent, 2019; Sommers-Flanagan & Shaw, 2017).

Developmental Considerations

Developmental considerations in assessment include both developmental change in the presentation of depression and the source of information on depressive symptoms. Diagnostic criteria for youth depression differ from adults in that mood symptoms in youth may manifest as prominent irritability, although irritable mood commonly occurs in combination with depressed mood (Stringaris et al., 2013). Within youth depression, there is also evidence that presentations may differ in very young children compared to later childhood and adolescence. Modified MDD criteria for preschool children have been developed given that the 2-week minimum duration criteria may be too stringent to capture clinically significant depression in young children (Luby et al., 2002). As such, a more flexible and developmentally informed understanding of symptom criteria may need to be applied in assessment of depression in preschool-age children.

A second key developmental consideration involves which informant is most appropriate for determining a depression diagnosis in youth. For young children, self-reports of symptoms are limited by cognitive and language development. Young children have particular difficulty reporting on time frames, and as such, it is likely important to rely on parent report for assessing the onset and duration of depression in younger children (Klein et al., 2005). At the same time, given that some symptoms of depression may not be outwardly observable to others, it is important to also use developmentally appropriate and validated measures for asking the child or adolescent directly about experiences of depression. Compared to younger children, parents may have less involvement in the daily lives of adolescents, and there is evidence that parents tend to under-recognize and under-report symptoms of depression in youth (Baumgartner et al., 2020; Orchard et al., 2019). Further, with more advanced cognitive development, adolescents are thought to be more accurate reporters of depressive symptoms than younger children, and a greater reliance on self-reported information is warranted compared to earlier in childhood. Nonetheless, obtaining information from multiple informants is generally the strongest and recommended approach across development (Achenbach, 2006).

Diversity and Cultural Considerations

Consideration of diversity and culture is always important in the assessment of psychopathology, including depression. In terms of sexual orientation, there is evidence that youth identifying as lesbian, gay, or bisexual are more likely to report suicidal thoughts or attempts and experience higher rates of MDD compared to youth who identify as heterosexual (Fergusson et al., 1999). Further, in a community sample of adolescents age 16–20 years, approximately 15% of adolescents identifying as lesbian, gay, bisexual, or transgender (LGBT) met criteria for MDD within the past year (Mustanski et al., 2010). Gender identity also impacts risk, with evidence that youth who identify as transgender are at increased risk for both depression and suicidality (Connolly et al., 2016). For example, in a study of high school students, 41.3% of transgender youth compared to 11.8% of non-transgender youth endorsed depressive symptoms and 19.8% of transgender youth compared to 4.1% non-transgender youth reported a suicide attempt in the past year (Clark et al., 2014). Childhood and adolescence can be a particularly challenging time for youth who identify as LGBT because of peer victimization, fear of rejection from family and friends, as well as risk of hate crimes (Duncan & Hatzenbuehler, 2014; Potoczniak et al., 2009; Robinson et al., 2013). Additionally, youth questioning their sexual orientation have reported greater depressive symptoms, more suicidal thoughts, greater levels of victimization, and more substance abuse compared to those who did not identify as questioning their sexual orientation (Poteat et al., 2009). Given increased risk of depression and suicidality in sexual and gender minority youth, it is important to assess sexuality and gender identity to integrate this important contextual information into case conceptualizations. Further, in establishing rapport, it is critical to demonstrate respect for and acceptance of individual differences, including by asking about and using youths' preferred pronouns and names and avoiding making assumptions about experiences, background, and identity.

Cultural background, race, and ethnicity are also important to take into account in the assessment and conceptualization of youth depression. Careful assessment requires cultural humility, consideration of cultural context, and awareness of factors that could influence youths' and parents' perceptions and descriptions of symptoms. For example, culture-specific terms used to describe symptoms and culture-specific experiences may deviate from the DSM (APA, 2013) and may be misinterpreted by providers (e.g., "Ataque de nervios" to describe specific symptoms often experienced in reaction to a stressor or upsetting situation in some Hispanic/Latin cultures; Guarnaccia et al., 2003). Further, differences in thresholds for observed symptoms between racial or ethnic groups could lead to variability in reported symptoms and symptom severity, which may be particularly relevant when obtaining informant reports from parents (Liang et al., 2016). For example, in one study, Black/African American, Asian American, and Native Hawaiian parents tended to report fewer internalizing symptoms in their children compared to non-Hispanic White parents (Nguyen et al., 2007). Clinicians and researchers must also make efforts to recognize and minimize cultural and racial biases in assessment and diagnosis. For example, Black youth are more likely to be diagnosed with severe forms of psychopathology like psychotic and disruptive behavior disorders compared to youth from other racial backgrounds (Liang et al., 2016). Further, there is evidence that Black children are more likely to be diagnosed with disruptive behavior disorders than White children despite similar ratings from parents on an externalizing symptom scale (Nguyen et al., 2007), highlighting the importance of reducing bias in assessment.

Interviews Versus Rating Scales

Although there has been growing progress in recent years in understanding the underlying neurobiological processes involved in the development of depression (e.g., Kujawa & Burkhouse, 2017), clinical assessment continues to rely on informant or self-reports of symptoms, rather than behavioral or biological measures (Klein et al., 2005). One key decision when selecting assessment measures is whether to use an interview measure, which involves a trained interviewer or clinician asking the child or informant (generally a parent) a series of questions to assess depressive symptoms, or rating scales in which informants (e.g., parents, teachers) and children complete ratings of symptoms independently. Interview measures are generally better suited than rating scale measures for deriving categorical diagnoses of depressive disorders and assessing comorbid psychiatric disorders, but interviews are also more time consuming and require more clinician effort than rating scales. Interviews can range from fully structured, in which the interviewer reads items as written without elaboration or clarification, to semi-structured, in which the interviewer follows a structured format but also provides additional probes as needed to clarify responses and derive ratings, to unstructured, in which the clinician selects and asks questions without using a specified set of items. Fully structured interviews are well-suited for large scale studies as they can be reliably and efficiently administered by lay interviewers with little to no clinical training, but they are also less flexible in terms of allowing interviewers to clarify questions and assessing and understanding symptoms that may not fully align with the questions. Less structured interviews allow for more flexibility but require training in clinical interviewing skills and psychological disorders to aid in clarifying questions and rating criteria (Klein et al., 2005).

Compared to interviews, rating scales tend to be less time-consuming and typically administered without the support of a clinician or staff member, although younger children may require assistance reading items. General rating scales for depression typically assess a broad range of symptoms including DSM (APA, 2013) criteria for depressive disorders and related features (e.g., low self-esteem, feelings of loneliness) and offer a dimensional measure of depressive symptom severity. Although cutoffs and norms can be applied to rating scales to interpret data and determine that a clinically significant depressive episode is likely, interviews are generally better suited to determine whether full DSM criteria for a depressive episode is present. Further, rating scales typically assess current depressive symptoms (e.g., past 2 weeks), rather than lifetime experience of depression. Interview and rating scales each have strengths and weaknesses, and as such, both are often administered in clinical and research settings. Interviews are likely to be the best option when it is essential to establish a diagnosis of a depressive disorder and to assess lifetime experiences of depression, but rating scales tend to be less time consuming and more effective at capturing subthreshold symptoms and changes across time.

Informant Reports

Interview and rating scales often include versions validated for self-report by a child or adolescent and informant reports by a parent, caregiver, or teacher. Obtaining information on youth depressive symptoms from multiple informants is generally recommended (Achenbach, 2006), and there is emerging evidence that multi-informant approaches to depression assessment may be more predictive of later episodes (Cohen et al., 2019). At the same time, multi-informant assessment poses challenges in terms of how to best integrate informant information for specific disorders (Achenbach, 2006; Martel et al., 2017). That is, reports of child symptoms from multiple informants are often only weakly to moderately correlated, and assessment results can vary considerably depending on how information is integrated across informants (Achenbach, 2006; De Los Reyes et al., 2015; De Los Reyes & Kazdin, 2005). There are many reasons for discrepancies in reports between children and parents or other informants, including differences in perspectives and attributions, variability in behavior across settings, the extent to which the behavior of concern is observable, type of measurement, variability in parent-child relationships, and child and parent characteristics, including parental depression (De Los Reyes et al., 2008, 2015; De Los Reyes & Kazdin, 2005, 2006; Madsen et al., 2020; Martel et al., 2017).

Limited agreement between informants raises questions about how to integrate discrepant information from multiple sources, and there are few clear guidelines on this process. One approach is to assume that a symptom is present if endorsed by any of the informants, while a more conservative approach would require the symptom to be endorsed by multiple informants to count as present (Klein et al., 2005; Martel et al., 2017). Alternatively, clinicians may decide to use their own judgment to resolve discrepancies. In this case, a final determination about the presence of the symptom could depend on the age of the child or adolescent, reliability of both reporters, and the clinician's own observations when talking with the family. One limitation of this approach is the potential to reduce reliability of measures by relying more on clinical judgment (Klein et al., 2005), and it is recommended that clinicians establish guidelines in advance, and in the case of multiple raters, ensure that all are trained on the procedures for integrating information obtained from each informant. For example, clinicians may weigh adolescent reports more highly for symptoms that involve internal thoughts and feelings, of which parents may be less aware (e.g., feelings of worthlessness, inappropriate guilt), but weigh parent report more highly for symptoms assessed in young children or symptoms that may manifest in observable behavior (e.g., difficulty concentrating, appetite or weight change, sleep disturbances). Obtaining specific examples of symptoms from both the child or adolescent and the parent can help to clarify their understanding of the symptom and inform clinicians' determinations of how to rate discrepant findings.

Critically, discrepancies in how youth and parents perceive the child's symptoms and the potential reasons for discrepancies can be clinically informative (Achenbach, 2006; De Los Reyes et al., 2011), and it is recommended that clinicians integrate information across informants and take discrepancies into account when treatment planning. There is growing interest in more advanced statistical approaches to integrating information across informants in order to further leverage this useful information in clinical and research settings (Makol et al., 2020; Martel et al., 2017).

Categorical Versus Dimensional Perspectives

From a categorical perspective, youth either meet criteria for a current depressive disorder or not, depending on the number of threshold symptoms with sufficient frequency and duration, as well as the presence of significant distress or impairment. Traditional clinical approaches to diagnosis (e.g., DSM) and medical billing relies predominantly on a categorical approach, with diagnoses often obtained through an interview with a clinician, potentially integrating information obtained from rating scale measures. At the same time, there are limitations to categorical approaches including arbitrary cutoffs, a lack of sensitivity for subthreshold symptoms, heterogeneity within the diagnostic category of depression (Ballard et al., 2018), and high comorbidity (Rohde et al., 1991) and symptom overlap across disorders. From a dimensional perspective, youth can fall along a continuum of depressive symptom severity ranging from none to severe depressive symptoms. Advantages of dimensional approaches to assessing depressive symptoms include greater sensitivity to subthreshold depressive symptoms, which often predict the later development of full threshold disorders (Shankman et al., 2009), and ability to track more subtle changes in symptom severity across treatment. Although many interview measures also allow clinicians or researchers to sum the total number of symptoms to form a dimensional measure, there are many well-validated rating scales for efficiently obtaining dimensional measures of depressive symptom severity, which we describe in detail below. In addition to increasing recognition of the need for an empirically derived dimensional approach to classifying psychopathology (Kotov et al., 2017), there has been growing interest in assessing more specific mood symptom dimensions (e.g., anhedonia, irritability) to better understand variability in presentations of depression and related disorders and move toward more personalized approaches to treatment.

Assessment of Suicidal Thoughts and Behaviors

Up to 20% of adolescents report lifetime suicidal ideation, with the prevalence of suicide attempts between 4% and 7%. Given that depression in youth is a strong predictor of suicidality (Andrews & Lewinsohn, 1992; Georgiades et al., 2019; Zubrick et al., 2017), clinicians and researchers working with youth experiencing depression must also develop competence in assessing and monitoring suicidal thoughts and behaviors (Sommers-Flanagan & Shaw, 2017). Assessment measures for depression generally include at least one item related to thoughts of death, but many do not differentiate between youth's passive thoughts of being better off dead and active thoughts of killing themselves, which could include intent, plans, and/or suicide attempts. The Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS) provides a particularly useful, developmentally appropriate framework for assessment of both parent and child report of the frequency, intensity, and severity of suicidal thoughts and behaviors (Kaufman et al., 2016). These items (part of the screen interview of the K-SADS) can be readily and efficiently implemented in combination with other depression measures to ensure careful assessment of suicidality. Although several interview and rating scales are available for assessing suicidality specifically in adolescents, options for younger children are more limited. The Columbia-Suicide Severity Rating Scale (C-SSRS) has strong empirical support, is commonly used for suicide risk assessment in adolescents, and allows for assessment of multiple domains of suicidal thoughts and behaviors (Posner et al., 2011). For a brief measure, the Ask Suicide-Screening Questions is a 4-item measure for assessing suicide risk in youth as young as 10 years old (Horowitz et al., 2012). Following assessment of suicidal thoughts and behaviors, clinicians and researchers must be prepared to intervene to prevent suicide risk through lethal means restriction, evidence-based interventions for suicidality including Dialectical Behavior Therapy and brief safety planning approaches (Czyz et al., 2019; King et al., 2018; Stanley & Brown, 2012), and more intensive interventions (e.g., inpatient or partial hospital programs) as needed.

Overview of Measures

Diagnostic Interviews

Several diagnostic interviews have been developed and validated specifically for use with children and adolescents and include the assessment of depressive episodes. Here we review commonly used and empirically validated structured and semi-structured interviews, including the K-SADS (Kaufman et al., 2016), Child and Adolescent Psychiatric Assessment (CAPA; Angold & Costello, 1995, 2000), Preschool Age Psychiatric Assessment (PAPA; Egger & Angold, 2004), Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID; Sheehan et al., 2010), and the Diagnostic Interview Schedule for Children (DISC; Shaffer et al., 2000).

Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS)

The K-SADS is a semi-structured interview that assesses current and past episodes of psychopathology in youth aged 6–18 years old and has been updated to assess DSM-5 criteria (Kaufman et al., 2016). An extension of the adult Schedule for Affective Disorders and Schizophrenia interview, the K-SADS provides a range of possible prompts that can be adjusted to the developmental level of the child and language used by the informants. Information is gathered separately from a parent and child for each symptom, and the interviewer derives a summary rating taking all information into account. The K-SADS includes a screening interview that assesses core criteria for a range of diagnoses, with supplements to assess remaining criteria for suspected diagnoses based on the screen. Because of the flexibility in conducting the interview and integration between multiple sources, the K-SADS requires clinical training and experience to be administered. Duration of administration of each interview can range from 35 min to 2.5 h depending on the number of symptoms reported by the child and parent (Ambrosini, 2000; Kaufman et al., 1997). The K-SADS has demonstrated the potential for good interrater reliability for depressive disorders (Ambrosini, 2000; Kaufman et al., 1997). Test-retest reliability has been found to be strong for depressive disorders in more recent versions of the interview (Ambrosini, 2000). In terms of concurrent validity, one study found that youth diagnosed with depressive disorders had significantly higher scores compared to children without depressive disorders on a composite of self-report measures of depression (Kaufman et al., 1997). The K-SADS has been translated into and evaluated in several languages, including Spanish (Ulloa et al., 2006), Korean (Kim et al., 2004), Icelandic (Lauth et al., 2010), Farsi (Ghanizadeh et al., 2006), and Japanese (Nishiyama et al., 2020).

Child and Adolescent Psychiatric Assessment (CAPA) and Preschool Age Psychiatric Assessment (PAPA)

The CAPA (Angold & Costello, 1995, 2000) is a semi-structured interview designed for use with parent(s) and their children aged 9–17 years old. There are child and parent versions of each interview, which are comprised of modules that can be administered in the order deemed appropriate to the interviewer. Assessment of each system is completed using both mandatory and optional prompts. The interview questions assess the previous 3 months, although for less frequent acts, such as suicide attempts, information can be gathered outside of that period. Administration time can range from 1 to 2 h depending on the number of informants and the modules administered (Angold & Costello, 2000). Test-retest reliability has been found to be strong for depressive disorders on this interview (Angold & Costello, 2000). Unlike other diagnostic interviews, the CAPA provides a glossary of terms in assessing symptoms. Each symptom includes detailed descriptions of DSM criteria for the interviewer's reference. The interview also includes separate modules to further investigate environmental factors, such as school performance and family structure. These factors of the interview may assist interviewers with less clinical experience in administering the interview so long as they closely follow the provided definitions and information. Limited data are available on interrater reliability of the CAPA and correlations with other measures of depression.

The PAPA was designed to be administered with parents only for diagnoses of emotional and behavioral problems in children aged 2–5 years old (Egger & Angold, 2004). However, Egger and

Angold (2004) suggest that the measure can be used for children aged 2–8 years old. Modified from the CAPA, the PAPA was created to be developmentally appropriate for this age range. The PAPA takes approximately 1.5–2 h on average to be administered depending on the severity of symptoms reported by the parent (Egger & Angold, 2004). Test-retest reliability is moderate for depressive disorders (Egger & Angold, 2004). The PAPA and CAPA modules to assess depressive disorders have been translated into Spanish (Angold & Costello, 2000; Egger & Angold, 2004).

Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID)

The MINI-KID (Sheehan et al., 2010) is a structured interview for diagnosis of DSM-5 and International Classification of Diseases (ICD) 10 psychiatric disorders in youth aged 6–17 years old. The interview follows the same format as the adult version of the Mini International Neuropsychiatric Interview and provides exact wording for questions that are designed for a "yes" or "no" response. Disorders are organized into modules. Each module begins with screening questions that are followed by additional symptom questions if endorsed. Information from the parent and the child is integrated at the individual item level without separate ratings required from each informant, as in the K-SADS. Because of this format, interviews can be conducted quickly and reliably by a less experienced interviewer, with the average administration time ranging from 10 to 30 min (Duncan et al., 2018; Sheehan et al., 2010). There is also a version of the MINI-KID that is based only on parent report (Sheehan et al., 2010). The MINI-KID has demonstrated high interrater reliability for mood disorders (Sheehan et al., 2010). The test-retest reliability of depressive disorder diagnoses has been found to be moderate (Duncan et al., 2018; Sheehan et al., 2010). The adult version of the MINI has been widely translated, and the MINI-KID has been translated into multiple languages, including Spanish, French, German, Turkish, Russian, Hungarian, and Norwegian Sign Language (Øhre et al., 2014; Sheehan et al., 2010).

Diagnostic Interview Schedule for Children (DISC)

Finally, the DISC is a structured diagnostic interview (Shaffer et al., 2000). The DISC was originally developed by NIMH in response to a call for a measure to be used for large-scale surveys of mental health disorders in children. The DISC was designed to be administered by nonclinicians, and, as such, requires interviewers to read each question precisely as written and follow the structure of the interview. Although the DISC has been updated for DSM-5 criteria, there is more information available on the reliability and validity of the version that assesses DSM-IV and ICD-10 criteria. There are two versions of the DISC, one to be administered to parents of children aged 6–17 years old and one version to be completed with youth aged 9–17 years old. The responses gathered by each version of the measure can be combined after administration or considered separately. Most questions are included in both versions with pronouns adjusted to address the informant. Similar to the MINI-KID, questions are designed to elicit "yes" or "no" responses, with a limited set of questions having other response options such as "sometimes" or "somewhat." There are six modules of the interview that assess diagnoses, with depressive disorders assessed in the "Mood" module. Administration time for the full interview ranges from 70 to 120 min per informant, depending on symptomatology of the youth (Shaffer et al., 2000). Interviewers have the option to select the specific modules to be completed, which can reduce administration time. Questions first assess whether symptoms were present in the past year, and if so, whether they were also present in the past 4 weeks. The interview offers an optional "whole-life" module, which assesses whether diagnoses that were not present during the past year were present after age 5 using vignettes that describe each disorder. One unique quality of the DISC is that the interview can be scored by hand or by computer. In the computer algorithm, each version (parent and child) can be scored separately or combined. If combined, symptoms endorsed by either informant are counted toward the criteria for the diagnosis.

Test-retest reliability on the DISC for MDD has been shown to be moderate to strong across the parent, child, and combined versions in clinical samples, but minimal to weak in community samples (Shaffer et al., 2000). Youth individual report demonstrated higher reliability in the clinical sample and lower reliability in the community sample compared to parent and combined reports (Shaffer et al., 2000). There is evidence that the DISC shows good to excellent sensitivity for detecting many disorders, although sensitivity for detecting MDD appears to be lower than other disorders (Fisher et al., 1993). In another study, agreement between diagnoses obtained by the DISC interview and clinician ratings was moderate for depressive disorders (Schwab-Stone et al., 1996). English and Spanish versions of the DISC are available (Bravo et al., 2001). Other investigators have translated and evaluated the DISC in several additional languages, including Xhosa (Flisher et al., 2012) and Korean (Cho et al., 2007).

Questionnaires and Rating Scales

Many questionnaires and rating scales are available for assessing child and adolescent depression. These include measures specific to depression, as well as broader psychopathology measures which include subscales to assess depression. Here we describe several commonly used measures, including the Children's Depression Inventory (CDI; Kovacs, 2011), the Center for Epidemiological Studies Depression Scale for Children (CES-DC; Weissman et al., 1980), the Mood and Feelings Questionnaire (MFQ; Angold & Costello, 1987), the Reynolds Child and Adolescent Depression Scales (RADS/RCDS; Reynolds, 1987, 1989), the Patient Health Questionnaire for Adolescents (PHQ-9; Johnson et al., 2002), the Child Behavior Checklist (CBCL; Achenbach, 1991a; Achenbach & Rescorla, 2001), Youth Self Report (YSR; Achenbach, 1991b), and the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1998). Other youth depression rating scale measures not discussed in detail here include the Kutcher Adolescent Depression Scale (LeBlanc et al., 2002), Revised Child Anxiety and Depression Scale (Chorpita et al., 2000), and Depression Self Rating Scale (Birleson, 1981).

Children's Depression Inventory (CDI)

The CDI (Kovacs, 1981) is among the most widely used self-report scales assessing depression in youth. The CDI was developed for children aged 7–18 years old, includes child and parent report versions, and takes 10 min on average to complete (Kovacs, 1992, 2011). The CDI is based on the Beck Depression Inventory (Beck et al., 1996) and emphasizes cognitive symptoms. The original CDI contains 27 items, while the second edition has 28 items (Kovacs, 2011). Items are rated from 0 to 2, with a range of possible total scores from 0 to 54 for the original CDI or 0–56 for the CDI-2. In addition to the total score, the CDI uses two scales (i.e., Emotional Problems and Functional Problems) and yields four subscale scores (i.e., Negative Mood/Physical Symptoms, Negative Self Esteem, Interpersonal Problems, and Ineffectiveness). Items assess depressive symptoms in the last 2 weeks. Internal consistency for the CDI is good (Brooks & Kutcher, 2001; Stockings et al., 2015), and test-retest reliability is generally high, particularly for relatively short time intervals (Finch Jr. et al., 1987; Mattison et al., 1990; Silverman & Rabian, 1999). CDI scores are correlated with Children's Depression Rating Scale (CDRS) scores and diagnoses of depressive disorders obtained from clinical interviews, as well as academic performance, use of counseling services, and measures of self-esteem and cognitive distortions (Brooks & Kutcher, 2001; Mattison et al., 1990; Myers & Winters, 2002; Stockings et al., 2015). The CDI is also highly correlated with measures of anxiety and does not consistently discriminate youth with depression from youth with other forms of psychopathology (Knight et al., 1988; Myers & Winters, 2002; Ruggiero et al., 1999). Estimates of the specificity and sensitivity of the CDI vary widely, with some studies reporting values as low as 64–65% and others reporting specificity and sensitivity as high as 95–96% (Myers & Winters, 2002; Stockings et al., 2015). The measure has been translated into a number of languages, including Spanish, Arabic, Chinese, Korean, Japanese, Thai, Dutch, Danish, German, Swedish, Estonian, Persian, Kinyarwanda, and Chichewa (Bang et al., 2015; Kim et al., 2014; Ozono et al., 2019; Roelofs et al., 2010; Samm et al., 2008; Sørensen et al., 2005; Sun & Wang, 2015; Trangkasombat & Likanapichitkul, 1997).

Center for Epidemiological Studies Depression Scale for Children (CES-DC)

The CES-DC (Weissman et al., 1980) is a 20-item child and parent report measure of youth's depressive symptoms, adapted from the adult Center for Epidemiologic Studies Depression Scale (Radloff, 1977) for use with youth of all ages. Each item assesses depressive symptoms in the past week and is rated from 0 to 3, with total scores ranging from 0 to 60. The CES-DC takes about 10 min to complete. The internal consistency of the CES-DC is high (Fendrich et al., 1990; Radloff, 1991; Roberts et al., 1991), and its test-retest reliability is generally good, though lower for children compared to adolescents (Myers & Winters, 2002). CES-DC scores are positively associated with other depression rating scales, including the CDI, the CBCL (Weissman et al., 1980), and the Beck Depression Inventory (Roberts et al., 1991), as well as diagnoses of depression obtained from clinical interviews (Weissman et al., 1980). Similar to other rating scales, the CES-DC does not consistently discriminate between youth with diagnoses of depression and youth with other forms of psychopathology (Faulstich et al., 1986; Fendrich et al., 1990; Weissman et al., 1980) and is less sensitive to depressive symptoms in pre-adolescent children compared to older youth (Fendrich et al., 1990; Myers & Winters, 2002). The CES-DC's specificity and sensitivity are moderate (Betancourt et al., 2012; Cuijpers et al., 2008; Logsdon & Myers, 2010), with lower estimates for earlier studies using higher clinical cutoffs (Weissman et al., 1980). The CES-DC has been translated into Spanish, German, Iranian, Persian, Kinyarwanda, Swedish, Arabic, Malay, Japanese, Chinese, Korean, Dutch, Xhosa, Afrikaans, Zulu, and Gujarati (Barkmann et al., 2008; Baron et al., 2017; Benjet et al., 1999; Betancourt et al., 2012; Chapla et al., 2019; Cuijpers et al., 2008; Dardas et al., 2019; Ebadi & Habibpour, 2017; Essau et al., 2013; Ghazali et al., 2016; Heo et al., 2018; Iwata et al., 1994; Li et al., 2010; Olsson & Von Knorring, 1997).

Mood and Feelings Questionnaire (MFQ)

The MFQ (Angold & Costello, 1987; Angold et al., 1995) is a 33-item scale assessing DSM-III-R symptoms of depression and related thoughts and feelings (e.g., feeling lonely, viewing self as ugly) during the last 2 weeks. Each item is scored from 0 to 2, with total scores ranging from 0 to 66. The MFQ takes approximately 10 min to complete, and parent and child versions are available. The MFQ has high internal consistency and test-retest reliability (Brooks & Kutcher, 2001). MFQ scores converge with CDI, RADS, and CDRS scores, as well as diagnoses from the CAPA and K-SADS (Angold et al., 1995; Wood et al., 1995). The MFQ also has acceptable discriminant validity, discriminating between youth with depression and other forms of psychopathology (Brooks & Kutcher, 2001; Thapar & McGuffin, 1998). Sensitivity and specificity of the MFQ are both good, though sensitivity may be higher than specificity (Thabrew et al., 2018; Thapar & McGuffin, 1998). A short 13-item version of the MFQ for children and parents is also available and shows good internal consistency and associations with the CDI and DISC (Angold et al., 1995). The short MFQ also discriminates between youth with depression and psychiatric controls, as well as between youth with depression and youth with other psychopathology, and shows high sensitivity and specificity (Angold et al., 1995; Thapar & McGuffin, 1998). The MFQ has been translated into Spanish, Portuguese, Arabic, Danish, Norwegian, Swedish, Chinese, Korean, and Thai (Cheng et al., 2009; Eg et al., 2018; Fernández-Martínez et al., 2020; Jarbin et al., 2020; Kim et al., 2021; Lerthattasilp et al., 2020; Rosa et al., 2018; Sund et al., 2001; Tavitian et al., 2014).

Reynolds Child and Adolescent Depression Scales (RADS/RCDS)

The RADS (Reynolds, 1987) is a 30-item self-report questionnaire assessing DSM-III depressive symptom severity in adolescents with items rated on a 4-point scale to indicate the symptom frequency. The second edition of the RADS (Reynolds, 2002) was adapted for use with a broader age range and implemented four factor-derived subscales: Dysphoric Mood, Anhedonia/Negative Affect, Negative Self-Evaluation, and Somatic Complaints (Reynolds, 2004). The RADS takes 5–10 min to complete. The RADS shows high internal consistency reliability for the primary total scale, as well as moderate reliabilities for the subscales (Reynolds, 2004). The RADS demonstrates good construct and convergent validity and medium to high criterion-validity coefficients for other measures of depression (Reynolds, 2004). The RADS also shows clinical validity as presented in strong contrasted groups validity (Reynolds, 2004). The 10-item short form (Reynolds, 2008) shows high reliability and acceptable construct, convergent, and clinical validity, with medium to high criterion validity in relation to other measures of depression and the original RADS (Milfont et al., 2008; Ortuño-Sierra et al., 2017; Reynolds, 2008; Szabo et al., 2014).

The RCDS (Reynolds, 1989) assesses DSM-III depressive symptoms and was adapted for use with children aged 8–12 years old. The RCDS takes about 10 min to complete, and demonstrates strong internal consistency, correlations with other measures of depression in children, and test-retest reliability of children's reported depressive symptoms (Del Barrio et al., 1996; Figueras-Masip et al., 2008; Reynolds & Graves, 1989). The second version of the RCDS was developed for use in children aged 7–13 years old and shows high internal consistency reliability (Reynolds, 2010a). The RADS has been used globally and translated into Urdu, Swedish, Spanish, and Korean, showing good internal consistency and reliability for assessing depressive symptoms across cultures (Baron & De Champlain, 1990; Blomqvist et al., 2020; Carrillo, 2020; Del Barrio et al., 1996; Hyun et al., 2009; Reynolds, 2004; Sami et al., 2013). The RCDS and its short form (Reynolds, 2010b) are available in Spanish and demonstrate strong internal consistency (Carrillo, 2020; Del Barrio et al., 1996).

Patient Health Questionnaire for Adolescents (PHQ-9)

The PHQ-9 is derived from the larger Patient Health Questionnaire (Spitzer et al., 1999) and assesses the 9 DSM-IV criteria for depressive disorders. The PHQ-9 was designed for both diagnosis of depression and measurement of symptom severity (Kroenke & Spitzer, 2002). Each item is rated on a scale of 0 (*Not at all*) to 3 (*Nearly every day*). To meet criteria for MDD, participants must endorse either anhedonia or depressed mood and at least five of the nine criteria in the past 2 weeks for "more than half the days" or "nearly every day." Scores range from 0 to 27, with four different cutoff points for categorizing depression severity (Kroenke & Spitzer, 2002). The measure takes only a few minutes to complete. The larger Patient Health Questionnaire and PHQ-9 self-report measure of depression were modified for use with adolescents (Johnson et al., 2002). The adolescent version of the larger Patient Health Questionnaire shows strong diagnostic, criterion, and construct validity, diagnosing adolescents relatively accurately when compared to clinical interview versions (Johnson et al., 2002). The adolescent version of the PHQ-9 and translations of the PHQ-9 have been administered to adolescents across cultures and show acceptable psychometric properties including convergent validity and internal consistency (Al-Amer et al., 2020; Burdzovic Andreas & Brunborg, 2017; Lamela et al., 2020; López-Torres et al., 2022; Mursaloğlu et al., 2021; Panyawong et al., 2020). The PHQ-9 is available in 49 languages with 32 cultural adaptations (Pfizer, Inc., n.d.).

Child Behavior Checklist (CBCL) and Youth Self Report (YSR)

The CBCL for ages 6–18 (Achenbach, 1991a) is a widely used measure of a broad range of child and adolescent emotional and behavioral problems and includes three forms: parent report, teacher report, and self-report (Achenbach, 1991a; Achenbach & Rescorla, 2001; Furlong & Wood, 1998). The Youth Self Report (YSR; Achenbach, 1991b) is a checklist for children aged 11–18 years. It takes about 15–20 min to complete these questionnaires (McConaughy, 2001). Both the CBCL and YSR include assessment of broad dimensions of Internalizing Problems and Externalizing Problems, more specific syndrome scales derived through factor analyses, including the Anxious/Depressed and Withdrawn/Depressed subscales, and DSM-oriented problem subscales (Achenbach, 1991a; Achenbach & Rescorla 2001; Furlong & Wood, 1998; McConaughy, 2001; Robin, 2003). Scores on the CBCL and YSR predict DSM-IV disorders moderately well, with the DSM-oriented Affective Problems subscale scores corresponding closely with DSM-IV depressive disorders (Ferdinand, 2008). One study using a multi-trait and multi-method confirmatory factor analysis to examine convergent and discriminant validity of the CBCL forms determined that the discriminant validity for nearly all scales measured by the three forms was adequate (Gomez et al., 2014). Convergent validity for these three forms was also adequate, with higher consistency coefficients compared to method-specific coefficients for the Anxious/Depressed and Withdrawn/Depressed scales of the CBCL and teacher report (Gomez et al., 2014). Overall, the CBCL, YSR, and teacher report scales demonstrate adequate to strong test-retest reliability and internal consistency, as well as acceptable convergent and divergent validity (Achenbach & Rescorla, 2001; Nakamura et al., 2009). Additionally, there is evidence across cultures supporting the aggregation of CBCL items into the 8 syndrome subscales, demonstrating the utility of the CBCL for transdiagnostic, multicultural research (Achenbach et al., 2017; Ivanova et al., 2019). The CBCL shows good to excellent psychometric properties across at least 57 different societies and in over 100 languages (Achenbach et al., 2017).

Behavior Assessment System for Children

The BASC (Reynolds & Kamphaus, 1998) is a general screening measure of behavioral adjustment for individuals aged 2–21 years old available in parent report, teacher report, and child self-report forms (Robin, 2003). The measure takes approximately 20–30 min to complete. The items on the parent and teacher report versions characterize the frequency of observed positive and negative behaviors in the youth, and the youth self-report items involve self-reported thoughts and feelings (Reynolds & Kamphaus, 1998; Robin, 2003). The second and third versions of the BASC include a broader age range of applicability and the addition of more supplementary components (Community-University Partnership for the Study of Children, Youth, and Families, 2011; Reynolds & Kamphaus, 2004, 2015). Brief screening versions of the second and third editions of the BASC are also available (Kamphaus & Reynolds, 2007, 2015). The measure includes several scales that are relevant for depression assessment, specifically composites, including one for internalizing problems; clinical and adaptive scales, including depression and withdrawal; content scales, including negative emotionality; and clinical indices, including depression. The test-retest reliability of the BASC is high, ranging from 0.85 to 0.97 (Robin, 2003). Criterion validity for the three forms of the BASC scales has been shown to be acceptable, correlating moderately to highly with other behavioral measures (Robin, 2003). For the BASC, construct validity for the conceptually derived composite scales across the three forms was adequate with high concurrence between diagnostic category and relevant scale ratings; the BASC also shows adequate convergent validity (Reynolds & Kamphaus, 2015; Robin, 2003). The BASC has moderate to high internal consistency for all scales across the three forms and adequate to strong test-retest reliabilities (Community-University Partnership for the Study of Children, Youth, and Families, 2011; Reynolds & Kamphaus, 2015). Different editions of the BASC, including some with brief screening versions, are available in Spanish, Chinese, and Korean, demonstrating adequate reliability and validity (Ahn & Ebesutani, 2015; Dever et al., 2016; Reynolds & Kamphaus, 2015; Tan et al., 2020).

Assessment of Specific Depression Symptom Dimensions

Depression is a heterogeneous disorder consisting of a broad range of mood symptoms (i.e., sadness, anhedonia, and irritability in youth), as well as associated affective, cognitive, and behavioral features. There has been growing interest in assessing more narrowly defined symptom dimensions, and evidence suggests that more specific symptom dimensions may differentially predict course, treatment outcomes, and impairment (Fried & Nesse, 2014, 2015). For example, chronic early irritability prospectively predicts later depression and is associated with poorer treatment response and greater impairment across settings (Dougherty et al., 2015; Stringaris et al., 2017; Vidal-Ribas & Stringaris, 2021), while greater anhedonia is associated with increased suicidality, longer depressive episodes, a greater number of episodes, overall depression severity, and poorer treatment outcomes (Gabbay et al., 2015; McMakin et al., 2012). Accordingly, rating scales that provide dimensional ratings of core symptoms of depression in youth have been developed. For instance, the Inventory of Depression and Anxiety Symptoms is a self-report measure that was created in an effort to develop empirically derived dimensions of depressive symptoms through the use of several symptom-specific scales, including scales for insomnia and lassitude (Watson et al., 2007, 2012). In particular, the development and use of scales assessing irritability and anhedonia, specifically, has increased in the last decade. The following section discusses symptom-specific measures to assess anhedonia and irritability.

Anhedonia

Snaith-Hamilton Pleasure Scale (SHAPS)

The SHAPS (Snaith et al., 1995) was initially developed to assess anhedonia in adults. The measure has 14 items presenting examples of enjoyable situations for community samples and takes about 5–10 min to complete. Participants rate how much they would enjoy each scenario on a 4-point scale. The measure was initially designed to be scored such that items endorsed “strongly agree” or “agree” equaled 0 and items scored “strongly disagree” or “disagree” equaled 1, with items totaled for a range of 0 to 14 and higher scores indicating greater anhedonia. Some work has also totaled all items on the scale (e.g., Stone et al., 2017). In adolescents, the SHAPS has demonstrated high internal consistency (Boger et al., 2014; Chasson et al., 2017; Stone et al., 2017) and is correlated with measures of positive affect and hedonic capacity (Leventhal et al., 2015). The SHAPS also shows discriminant validity with questionnaires assessing other internalizing symptoms in adolescents (Leventhal et al., 2015). Although originally developed for adults, the SHAPS is commonly used in adolescents given limited availability of measures for anhedonia specifically, but the items may be less relevant to pre-adolescent children. The SHAPS has been translated into Spanish (Fresán & Berlanga, 2013), Portuguese (Jesus-Nunes et al., 2021), Chinese (Liu et al., 2012), Japanese (Nagayama et al., 2012), Arabic (Thomas et al., 2012), Malay (Ng et al., 2014), Turkish (Yapici Eser et al., 2020), Italian (Martino et al., 2018), and German (Franz et al., 1998).

Child and Adolescent Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS)

The ACIPS (Gooding & Pflum, 2014a) was developed to measure social anhedonia in the context of research on schizophrenia-spectrum disorders but has also been used in internalizing disorders

(Conway et al., 2019; Goldstein et al., 2020; Mumper et al., 2021; Rizvi et al., 2016). The adult, adolescent, and child versions of the ACIPS (Gooding & Pflum, 2014a; Gooding et al., 2016; Mumper et al., 2021) include 17 items related to anticipated and current interpersonal experiences and take about 5–10 min to complete. On the child and adolescent versions, participants report their own enjoyment and pleasure on a scale from 1 to 4, with total scores ranging from 17 to 68. Lower scores reflect less pleasure and greater social anhedonia. The adult version has been validated in several samples and shows convergent validity with other anhedonia scales (Gooding et al., 2015; Gooding & Pflum, 2014a, b). The adolescent version of the ACIPS shows high internal consistency (Conway et al., 2019; Goldstein et al., 2020; Gooding et al., 2016) and is associated with scores on the Temporal Experience of Pleasure Scale and the anhedonia subscales from the Oviedo Schizotypy Assessment Questionnaire but is uncorrelated with a measure of general distress (Gooding et al., 2016). Although less established than the adult and adolescent versions, the child version showed high internal consistency in a sample of 275 12-year-olds (Mumper et al., 2021). The adolescent ACIPS has been translated into Chinese (Gooding et al., 2017).

Anhedonia Scale for Adolescents (ASA)

The ASA is a new 14-item rating scale specifically designed to measure anhedonia in adolescents (Watson et al., 2021). The ASA was developed based on qualitative interviews with clinical and community samples of adolescents about their experiences of anhedonia, along with feedback from child clinical psychologists and psychiatrists. The ASA asks individuals to rate the frequency of each item in the last 2 weeks and takes about 5–10 min to complete. Total scores range from 0 to 42 (some items are reverse-coded), with higher scores reflecting greater anhedonia. The ASA was validated in a community sample of 2098 11- to 18-year-old adolescents and shows high internal consistency and test-retest reliability. It converges with scales assessing depressive symptoms and positive affect, as well as the SHAPS and adolescent version of the ACIPS. The ASA is less strongly correlated with negative affect and behavioral inhibition, demonstrating its discriminant validity (Watson et al., 2021).

Irritability

Affective Reactivity Index (ARI)

The ARI (Stringaris et al., 2012) is a parent- and self-rated measure of chronic irritable mood for youth aged 5–18 years old, although the parent ARI has been used with caregivers of children as young as 3 years old (Evans et al., 2021). The ARI takes approximately 5–10 min to complete and has six items assessing irritability and one item querying impairment, all scored from 0 to 2, for a total score ranging from 0 to 12 (the impairment item is not included in the total score), with greater scores reflecting greater irritability. Individuals are prompted to answer items based on their/their child's behavior in the last 6 months and compared to others the same age. The ARI has high internal consistency (Evans et al., 2020, 2021; Mulraney et al., 2014) and shows good test-retest reliability, though the stability of the self-report ARI is generally lower than the parent report, particularly over longer time intervals (Pan & Yeh, 2019; Stringaris et al., 2012; Tseng et al., 2017). ARI scores are correlated with inattention, hyperactivity and impulsivity, executive dysfunction, and aggression; ARI scores are also associated with measures of emotion dysregulation, anger problems, and peer problems (Evans et al., 2021; Stringaris et al., 2012). ARI scores of children with bipolar disorder and severe mood dysregulation are significantly higher than scores of comparison children (Stringaris et al., 2012). The ARI is uncorrelated with measures of learning problems and social anxiety, supporting its discriminant validity (Evans et al., 2021; Mulraney et al., 2014). A teacher report version of the ARI has shown good internal consistency and convergent validity with other measures of irritability, externalizing problems, and aggression, and higher teacher-reported ARI scores are associated with functional impairment (Ezpeleta et al., 2020). Finally, a clinical interview version of the ARI is also available

(Haller et al., 2020). The clinician-administered ARI is designed to be administered to parents and youth by a clinician at the Master's level or above. It has 12 items assessing frequency, duration, and severity of mild, moderate, and severe temper outbursts, irritable mood between outbursts, and irritability-related impairment across settings over the past week. Each item is scored on a 4–6 point scale, and the total score is comprised of a sum of temper outbursts, irritable mood, and impairment subscale scores and ranges from 0 to 100, with higher scores indicating greater irritability. The clinical interview version total score and subscales have good internal consistency. Scores on the clinical interview version are associated with clinician-rated child functioning, parent- and self-reported ARI scores, and clinician-rated severity of disruptive mood dysregulation disorder (Haller et al., 2020). The ARI is also available in Chinese (Pan & Yeh, 2019), Spanish (Ezpeleta et al., 2020), and Portuguese (DeSousa et al., 2013).

Summary and Conclusions

The past four decades have seen considerable progress in the recognition of depression in youth, research on developmental pathways to depression, and the validation of many interview and rating scale assessment measures for young children through older adolescents. It is now widely recognized that depression can be diagnosed in children beginning in the preschool years and that the prevalence of depression increases dramatically in adolescence (Avenevoli et al., 2015; Egger & Angold, 2006). This work has also defined patterns regarding duration, recovery, and recurrence for depression in children and adolescents (Belsher & Costello, 1988; Birmaher et al., 2002, 2004; Lewinsohn et al., 1994). Several factors have been identified as predictors of recovery and recurrence, including symptom severity, suicidality, and history of depression (Birmaher et al., 2002, 2004). Together, this literature provides insight into the developmental course of depression in youth and aids in prognosis and treatment planning.

Further, growing research has examined etiological pathways to and risk factors for youth depression. Specifically, twin, family, and adoption studies have identified genetic and environmental factors in depression (Hammen, 2009a; Rice, 2010; Weissman et al., 2016). Biological processes have been associated with risk for depression, including disruptions in the HPA axis system (Bao & Swaab, 2019; Nestler et al., 2002) and alterations in brain systems associated with cognitive and affective processing (Joormann & Stanton, 2016; Schäfer et al., 2017). In cognitive models, the development and maintenance of depression is linked to depressogenic cognitive style (Beck, 2002), attention and interpretation biases (Platt et al., 2017), and overgeneral autobiographical memory (Rawal & Rice, 2012). Additionally, negative attributional or inferential styles in presence of negative life events (Hankin, 2008a; Joiner & Wagner, 1995), cognition by stress interactions (Abela & Hankin, 2008), and rumination (e.g., Abela & Hankin, 2011) are also associated with depression risk. In the temperament literature, low positive emotionality (e.g., Khazanov & Ruscio, 2016) and high negative emotionality (e.g., Phillips et al., 2002) have been identified as risk factors for depression. Stress exposure (e.g., Hammen, 2009b) and the relationship between the youth and their social environment (e.g., Rudolph et al., 2008) have been associated with depression risk as well. Understanding risk factors can be particularly useful in forming case conceptualizations and in terms of diagnostic considerations for youth depression.

Assessing depression in youth requires selecting the method of assessment, determining informants, and deciding how to score and conceptualize depression, as well as consideration of cultural and contextual factors. Assessment methods include fully structured and semi-structured diagnostic interviews (e.g., K-SADS; Kaufman et al., 2016) and rating scales, which include depression-specific measures (e.g., CDI; Kovacs, 1981), broadband symptom measures (e.g., CBCL; Achenbach, 1991a;

Achenbach & Rescorla, 2001), and more narrowly defined symptom-specific measures (e.g., ARI; Stringaris et al., 2012). Interviews and rating scales have individual advantages and disadvantages that may make one method more suitable for a given situation depending on the clinical setting and goal for the assessment. For example, fully structured interviews may be useful for large studies in which interviewers with little clinical training are able to administer the interview compared to less structured interviews that require additional training and time. Compared to interviews, rating scales take less time to administer and are better at measuring change in symptoms across time but often do not capture lifetime episodes of depression and are not as well-suited for determining full DSM criteria. The use of multiple informants is generally recommended when feasible and may be more predictive of later depressive episodes (Cohen et al., 2019). The scoring approach of interest can also influence the measure used in assessing depression. For determining if a youth meets criteria for a depressive disorder, categorical scoring would be used. In this case, an interview would be beneficial, and information from rating scales can be integrated with the interview data. If interested in measuring symptoms along a continuum, dimensional scoring is commonly used with depression rating scales, although symptoms can also be summed across interview measures. Additionally, taking the youth's background and cultural context into account is important in assessing depression in order to assist with case conceptualization, establishment of rapport, and accurate, unbiased diagnosis and assessment. Finally, suicidality is an important consideration in the assessment of depression in youth, given that depression is a strong predictor of suicidality (e.g., Zubrick et al., 2017). In assessing suicidality, clinicians and researchers must be ready to intervene to mitigate suicide risk.

Research on youth depression and the development of assessment measures has grown dramatically over the past several decades, refining our understanding of prevalence, clinical course, symptom presentations, and etiological and risk factors. A wide range of well-validated interview and rating scale measures are available for assessing depression in young children through late adolescents based on self- or informant-report. Information provided in this chapter can serve as a guide in determining appropriate measures for assessing youth depression in clinical and research setting, informing evidence-based assessment and practice.

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Part XI

Treatment of Psychopathology in Children

Treatment of Anxiety Disorders in Children and Adolescents

49

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Introduction

Anxiety is common in children and adolescents. In fact, all children and adolescents experience some level of fear and anxiety. These emotions can have evolutionarily advantageous qualities, but when individuals experience anxiety that is atypical in intensity, occurs more frequently or in nondangerous situations, or begins to interfere with the individual's daily life, it can become maladaptive. Without intervention, childhood anxiety disorders often lead to adult anxiety and other disorders (Copeland et al., 2009) and impact both youth and adult's quality of life. This chapter details various behavioral techniques as well as multiple cognitive-behavioral therapies and treatment modalities to treat childhood anxiety disorders.

Prevalence

Collectively, anxiety disorders represent the most common mental health disorder in the United States (Costello et al., 2011; Kessler et al., 2012). Estimates indicate that one-third to one-half of children will meet criteria for an anxiety disorder by the age of 18 (Hammerness et al., 2008; Merikangas et al., 2010). Specific anxiety disorders vary in prevalence rates, with prevalence rates of various disorders ranging from 0.5% (i.e., panic disorder; Diler, 2003) to 16% (i.e., specific phobias; APA, 2013). Additional factors, including age, gender, race, cultural backgrounds, and societal stigma and/or expectations also impact these rates. Below is a brief discussion on the prevalence rates, gender differences, and other additional factors relevant to the rates of various anxiety disorders across children and adolescents. Disorders are discussed in order of their typical age of onset, mimicking the structure of the DSM-5 (APA, 2013). Separation anxiety disorder (SAD) has a prevalence rate of about 4–5% (Mohammadi et al., 2020; Shear et al., 2006; Spence et al., 2018), seems to decrease in prevalence with age (Beesdo-Baum, 2012; Mohammadi et al., 2020; Spence et al., 2018), and affects boys and girls at comparable rates (Mohammadi et al., 2020; Spence et al., 2018). Mohammadi et al. (2020) examined prevalence of SAD in Iranian children aged 6 to 18 years and found that youth with SAD

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were highly likely to develop comorbid disorders (65.3%), with the highest comorbidity rates being with specific phobias (19.3%) and oppositional defiant disorder (16.4%). Selective mutism (SM), like SAD, shows no gender differences and decreases in prevalence with age (Palitz et al., 2019). SM occurs in about 0.7% of youth (Bergman et al., 2002; Elizur & Perednik, 2003) and is most commonly comorbid with social anxiety disorder/social phobia (SocAD), with 69% of youth with SM also meeting criteria for SocAD (Driessen et al., 2020). One of the most common anxiety disorders among youth is specific phobia (SP), with estimates up to 16% in adolescents (APA, 2013). SP is more common in adolescents (Palitz et al., 2019) and has been found to occur more in females and in those with lower socioeconomic status (Grenier et al., 2011). Esau and colleagues (2000) found that over 45% of youth with SP also met criteria for another anxiety disorder. The prevalence of SocAD in children and adolescents is 1-7% (APA, 2013; Spence et al., 2018; Stein et al., 2017). Gender seems to have a small impact on the prevalence rates of SocAD in children; however, this difference amplifies in adolescence, with girls having much higher prevalence rates (Palitz et al., 2019). Most youth (75%) with SocAD will show initial symptoms between the ages of 8 and 15 years (Kessler et al., 2005). Contrastingly, panic disorder (PD), which affects approximately 0.5-5% of youth (Diler, 2003), is more common in adolescents, with extremely low rates in children under the age of 14 (APA, 2013). Examining gender differences in PD has led to some mixed findings; some evidence showing higher rates in girls (Beesdo, 2009) and others implying no gender differences (Diler, 2003). Like PD, agoraphobia is rare in children below age 14 and affects about 1.7% of adolescents and adults (APA, 2013). Agoraphobia is almost always seen in the presence of a PD diagnosis, leading to debate over whether agoraphobia is just a severe case of PD (Greene & Eaton, 2016). When looking at a group of individuals with PD, those who had comorbid agoraphobia were significantly more likely to be female and had a higher prevalence of other comorbidities (Inoue et al., 2016). Finally, generalized anxiety disorder (GAD) affects approximately 2% of youth, with prevalence increasing in respect to age (Spence et al., 2018). GAD is similar across gender in children but has higher rates in females in adolescence (Palitz et al., 2019).

Cross-cultural Variations

While rates of anxiety disorders are relatively consistent across cultures (Higa-McMillan et al., 2014), the rates of certain anxiety disorders, symptom presentation and interpretation, and beliefs about and understanding of symptoms vary across cultural groups (Marques et al., 2011). Across cultural groups, there is a higher prevalence of anxiety disorders in girls than in boys (Abbo et al., 2013). Abbo et al. (2013) examined rates of anxiety disorders in children and adolescents in Uganda and found rates similar to that in the United States (26.6%). In contrast, rates of SocAD and GAD seem to vary across cultures (APA, 2013; Spence et al., 2018). In a cross-national study, Stein et al. (2017) found differences in SocAD prevalence based on country income and geographic location (the lowest prevalence being in low/lower-middle income countries and countries in the African and Mediterranean regions; highest rates in high-income countries in the Americas and the Western Pacific regions). An individual's cultural background can also affect their self-report of symptoms and subsequent interpretation. For example, Latinx children show higher levels of somatic symptoms when compared to European American children (Pina & Silverman, 2004). Further, Chinese youth exhibit significantly lower negative and positive affect than American children (Chorpita et al., 2000).

Treatment Seeking

Considering the high rates of anxiety disorders among youth across various cultures worldwide, the infrequency of these youth receiving services is quite alarming. In light of the 2010 United States census, there are approximately 74.18 million children in the United States (Higa-McMillan et al., 2014). Given the likelihood that children experience anxiety disorders (33%; Merikangas et al., 2011), that leaves approximately 19.46 million children with anxiety disorders that go untreated in the United States alone (Higa-McMillan et al., 2014). Several barriers have been suggested for these low rates of children receiving treatment including knowledge of providers, stigma, cost, and parenting stress (Salloum et al., 2016). Additionally, factors including societal acceptance of diagnoses and an individual's "buy-in" to treatment may vary based on cultural or religious beliefs. Various cultural barriers such as communication, cultural stigmas, acculturation, lack of knowledge of services, and beliefs about mental illness exist and contribute to help-seeking behavior for mental health (Al-Krenawi et al., 2009; Amri & Bemak, 2013), highlighting the need for continued education on multi-cultural perspectives as well as input from individuals of various backgrounds in the mental health field.

Associated Impairments

The presence of anxiety disorders can drastically increase impairment in youth. Negative impacts on functioning, peer relations, school, and recreational activities have been shown in children with anxiety disorders (Essau et al., 2000; Ezpeleta et al., 2001). Other impairments associated with child and adolescent anxiety diagnoses include those that affect the child's family. Families with an anxious child experience greater costs in regard to childcare, missed work, and loss of leisure time (Bodden et al., 2008). Anxiety disorders have also been associated with cognitive impairments in children as well (Davis et al., 2008). Swan and Kendall (2016) found that child anxiety was related to decreased life satisfaction, academic impairments, difficulty adjusting at work, increased family dysfunction, and peer relations impairments.

Impairment Across the Lifespan

Anxiety disorders have a higher lifetime prevalence than any other mood, impulse-control, or substance abuse disorders (Kessler et al., 2005). Not only do anxiety disorders cause immediate impairments to the child and family, but they can have long-lasting effects as well. Additionally, the spontaneous remission rate of anxiety if left untreated is not high; an estimated 50% of individuals with SAD will remit without any formal treatment (Vriends et al., 2014). When a clinical diagnosis of an anxiety disorder is warranted, that indicates interference in daily functioning and significant distress or avoidance (APA, 2013). Interference with daily activities, decreased quality of the child's life or the lives of family members, and impairing avoidance or distress are all reasons to seek treatment (Ollendick et al., 2010). Early intervention and treatment of childhood anxiety disorders can combat this high lifetime prevalence and potentially decrease the risk for other pathologies later in life.

This chapter introduces and outlines various treatment techniques and cognitive-behavioral treatments that can be used to treat anxiety disorders in children and adolescents, including information on how to relay this information to others (e.g., parents) or through different delivery modalities (e.g., computer-based treatments). Additionally, this chapter describes how to evaluate treatment progress by employing commonly used methods. Suggestions for treatment adaptations when working with special populations are outlined along with future directions for research.

Evidence-Based Treatment

Various efficacious treatment techniques have been identified to treat youth anxiety (Higa-McMillan et al., 2016). The treatment techniques discussed below include exposure, systematic desensitization, relaxation, modeling, and contingency management (reinforced practice). In practice, these interventions are often used in combination with each other and with other techniques (e.g., cognitive restructuring, psychoeducation) to address cognition, behavior, and physiology. Taken together, these techniques target each area of the anxious response to increase treatment efficacy (Davis & Ollendick, 2005).

Exposure

Exposure is a fundamental and key component of any treatment for anxiety (Davis et al., 2011; Higa-Millan et al., 2016; Jassi & Kindynis, 2020; Kaskas et al., 2017; Read et al., 2013). The goal of exposure is to allow the young person to approach the anxiety provoking stimuli, focus on the trigger, and resist efforts to decrease the resulting anxiety (Jassi & Kindynis, 2020). Behavioral avoidance is particularly problematic with anxiety disorders as it functions to maintain the fear and anxiety response (Kaskas et al., 2017). Exposure allows the feared stimulus to be presented systematically while utilizing learned coping skills so that behavioral avoidance is not undertaken. Because of its strong efficacy, exposure is used in approximately 80% of anxiety treatment protocols (Chorpita & Daleidon, 2009).

The first step in an exposure protocol is to create a fear hierarchy using the youth's ratings of the feared situation/environment/stimuli (referred subsequently as stimuli) from the least fearful to the most fearful. Parents or caregivers may assist in the identification of the hierarchy for younger and lower functioning children who may not be able to conceptualize the graded nature of their fears. During the exposure steps, the youth may use any combination of various coping techniques (i.e., cognitive restructuring, relaxation, problem-solving) depending on the treatment protocol in order to distinguish between their anxiety-based perceptions and the facts about the feared stimuli. Over repeated exposure through the hierarchical steps, youth can learn the anticipated feared outcome is not consistent with the actual outcome, and they can use their coping interventions to successfully manage their fear (Kaskas et al., 2017). The ultimate goal of exposure is to allow the youth to confront the feared stimuli without resorting to avoidance or the use of safety behaviors (Read et al., 2013).

Exposure is conducted in three primary ways: in vivo (directly experienced), in vitro (imagined), or through virtual reality. In all forms of exposure, the child is exposed to the feared stimuli without the use of avoidance or safety behaviors until the anxiety is decreased. The youth is exposed to the actual feared stimuli in real life during in vivo exposure. During in vitro exposure, the therapist and youth collaborate to create an imaginal scene in rich detail that the therapist then helps the youth to imagine (Mobach et al., 2020). In virtual exposure, various artificial means are used to recreate the feared stimulus. This is typically done with a computerized virtual environment requiring the child to wear special goggles or a headset and other equipment to achieve an immersive experience while interacting with the virtual world. In any case, the youth remain exposed until the anxiety or fear is significantly decreased (Davis et al., 2017). Bioinformational and emotional processing theories indicate that in vivo exposures may be more effective due to increased activation of the emotional network by direct contact with the stimuli (Davis, 2009). In vitro exposure is beneficial when the anxiety or fear is not easy to reproduce or is not safe to do so (e.g., fear of thunderstorms). Clinicians may ask the youth to provide a quantitative measure of their distress using a scale from 0 to 10 or simply use a smiling or frowning face to monitor progress (Davis et al., 2017). Exposure may be administered in a more intense manner in which the exposure is performed all at once, a technique referred to as implosive therapy or flooding. However, gradual, repeated exposure to anxiety-provoking stimuli has been shown to reduce anxiety (Kendall et al., 2005) and is preferred by clients, parents, and professionals (King & Gullone, 1990). When possible, exposure should be performed across several settings to encourage generalization of learning and coping (Choprita, 2007).

Various forms and components of exposure protocols have been studied in youth. Virtual reality and in vivo exposure were found to be as effective as in vitro exposure in maintaining treatment gains

(Wolitzky-Taylor et al., 2008). Avoidance discouragement by parents and therapists, the reduction of safety behaviors, and additional practice at home may be helpful in improving the efficacy of exposure (Plasted et al., 2020). In a meta-analysis, Plasted et al. (2020) conclude the efficacy for exposure strategies derives from inhibitory learning strategies (i.e., the fear originally associated with the particular stimulus is overshadowed by the development of new, nonthreatening associations) as opposed to habituation-based fear reduction as a mechanism of change (Craske et al., 2014). Whiteside et al. (2018) found an intensive exposure-based CBT group modality for anxiety disorders in children and adolescents showed moderate to large effect sizes for anxiety symptoms. Incorporating play into an exposure-based protocol is also supported, especially with young children, which may allow more rapid therapeutic progress (Jassi & Kindynis, 2020; Ora & Shorer, 2017). Additionally, including family in the treatment of childhood anxiety can lead to better outcomes (Jassi & Kincynis, 2020). Researchers compared pre-exposure anxiety management strategies presented in traditional CBT and in parent-coached exposure therapy, which resulted in large pre- and post-effect sizes for both groups, although the parent-coached group had better outcomes (Whiteside et al., 2015). Other researchers found that a parent-led exposure therapy protocol for young children with anxiety disorders showed a greater reduction in anxiety in comparison to the treatment as usual group (Rudy et al., 2017). Overall, exposure has been a key component of anxiety disorder treatments for decades, and it is encouraging that efforts are even being made to study the technique's effects beyond the lab and into the real world through effectiveness studies (e.g., Wright et al., 2018).

Relaxation Training

The relaxation response is a deep state of calm through which a person can change both physical and emotional responses to anxiety (Benson, 1993). Various forms of relaxation training are commonly used in protocols to treat anxiety, and they are cited to be the second most frequent of techniques used in treating anxiety in youth (Chorpita & Daleiden, 2009). Progressive muscle relaxation (PMR) was first introduced by Jacobson (1938) and later used by Wolpe (1958) in systematic desensitization (SD). PMR is performed through a clinician-guided procedure where muscle groups are systematically tensed then relaxed, thus allowing the client to become aware of and have greater control over muscular and physiological reactions associated with anxiety (Schare et al., 2015). Hefner et al. (2003) suggests that younger children may better understand PMR directions that utilize metaphors, such as, "pretend you are a turtle and squeeze your head into your shell," as opposed to instructions to tense and relax muscle groups in the head and neck.

Diaphragmatic breathing (DB) is a relaxation technique in which the diaphragm is contracted during the inhalation, causing air to move downward causing a more effective exhalation (Chen et al., 2017). By regulating oxygen and carbon dioxide levels in the body, DB is thought to reduce the symptoms of hyperventilation associated with stress reactions (La Roche et al., 2014). Another relaxation technique is guided imagery: one's imagination is used to evoke images that will produce a relaxing effect by influencing psychological and physiological states (La Roche et al., 2014).

Relaxation training is not typically a stand-alone intervention and is most often included in multi-component protocols. There is a dearth of research examining the efficacy of relaxation in children, even as part of a larger protocol (Cooke et al., 2020). Ollendick and King (1998) determined that relaxation is an effective treatment component in phobic and anxiety disorders, especially when paired with exposure. In their review of the literature, Chorpita and Daleiden (2007) found that relaxation was deemed as having good support for the treatment of anxiety. More recently, Schare et al. (2015) conducted that PMR, used as a treatment component, significantly decreased anxiety in children both in individual and group sessions. Chapman et al. (2020) conducted a review of the literature of guided imagery used as an intervention in the treatment of social anxiety in children and youth. The limited studies including pre-adolescents, inconsistencies, and lack of good psychometric measures led the researchers to conclude that more evidence is needed.

Systematic Desensitization (SD)

Systematic desensitization (SD) is an exposure technique developed by Wolpe (1958) that employs exposure to change conditioned anxiety responses (Davis et al., 2017). The treatment, based on classical conditioning principles, is founded on the idea that the fear can be counter-conditioned by pairing it with an activity incongruent with anxiety (Wolpe, 1958). However, advances in research and theory suggest that the processes underlying SD are better explained by inhibited learning or new learning, which inhibits or competes with previous fearful or anxious learning (Craske et al., 2014).

SD consists of three basic parts. First, the clinician trains the client to perform an activity that is incompatible with anxiety, most often progressive relaxation or deep breathing. Wolpe (1958) noted that any activity that is incompatible with anxiety, such as eating or playing with a toy, is an appropriate incompatible activity. Next, a rank-ordered fear hierarchy is developed, with the least anxiety provoking stimulus at the beginning of the hierarchy and the most anxiety-provoking stimuli at the top. Finally, the youth is instructed to engage in the competing activity while being gradually exposed to the stimuli represented on the hierarchy. It is important that the youth remain relaxed during the exposure to allow the fearful response to the stimuli to be associated with a newly learned, less fearful response to the stimuli (Davis & Ollendick, 2005). SD can be conducted either in vivo or in vitro. During in vivo administrations, a safety signal (i.e., a raised finger) is used to indicate that a decrease in exposure intensity or a pause is needed (Davis et al., 2017).

Younger children may have difficulty attending to and learning the process in order to achieve the necessary level of relaxation to begin SD (Davis & Ollendick, 2011; Morris et al., 2007). Using relaxation protocols that are shorter, simpler, and use imagery may help facilitate muscle relaxation for younger children more so than traditional techniques (Ollendick et al., 2004).

Research supports the experimental efficacy of SD in the treatment of childhood fears and phobias but has not been found to be efficacious for the treatment of childhood anxiety (Davis et al., 2011). Davis and Ollendick (2005) note that SD may not sufficiently evoke the physiological aspect of the fear response. In a review of the literature, Morris et al. (2007) reported that in pre-1990 studies, research findings indicated treatment success for school, blood, and height phobias. For instance, Ultee (1982) found that in vivo exposure was better than in vitro exposure for 5- to 10-year-olds. Sturges and Sturges (1998) reported elimination of an elevator phobia in an 11-year-old using SD in vivo exposure. However, Morris et al. (2007) argue studies pre-1990 lack the empirical standards used today.

Modeling

Modeling, grounded in social learning theory, operates to reduce anxiety and fear by observing someone else (i.e., clinician, parent, peer) perform a behavior, thus resulting in new inhibitory learning (Bandura, 1969). The modeled behavior, which may be performed in vivo or on video, demonstrates a variety of new behaviors to be learned, such as touching an animal, making a phone call, or introducing oneself to a stranger (Kaskas et al., 2017). Modeling can focus on helping the client master the behaviors required in a particular situation and using helpful coping strategies that can be demonstrated and explained (i.e., self-disclosing and using calming self-statements; Kaskas et al., 2017). Ritter (1968) developed participant modeling (PM), which is a form of modeling where the model demonstrates to the child and then invites the child to help perform the skill as they work together.

Modeling is considered to be well-established for the treatment of childhood fears. In their review of empirically supported treatment for childhood phobias, Davis and Ollendick (2005) found strong support for the reduction of fear but noted more research was needed to identify the underlying mechanisms. Thomsen et al. (2017) found that children and adults rely on the modeled behavior of close persons (e.g., parents, romantic partners) when confronted with novel tasks or new situations. PM had been found to be effective in reducing children's fears of small animals, water, heights, and test-taking. PM is also used as an effective component of CBT for situational and environmental phobias (Davis & Ollendick, 2011). Further, Dunne and Askew (2018) found that models are effective for both fear acquisition and fear reduction.

Contingency Management (Reinforced Practice)

Contingency management, also known as reinforced practice (RP), is a combination of techniques including repeated practice, reinforcement, guidance by the clinician, and feedback. To receive a reinforcer, the child must approach the feared stimulus and either perform the feared activity or remain in the feared situation without avoidance or some other problematic behavior (Davis & Ollendick, 2005). The positive reinforcer may be a social reinforcer, such as verbal praise, or a tangible reinforcement, such as a toy (Moskowitz et al., 2017).

Silverman et al. (1999) researched the efficacy of RP in children with anxiety disorders. Parents were trained to perform RP using a fear hierarchy. The children showed improvement on measures of fear and anxiety, with 55% no longer meeting the criteria for an anxiety disorder. Davis and Ollendick (2005) determined that RP can be considered probably efficacious for the reduction of cognitive symptoms and well-established for the treatment of both subjective fear and the behavioral component. They posit that RP may be quite good at eliminating behavioral avoidance while physiological and cognitive components still remain.

Cognitive Behavioral Treatments

Cognitive behavioral therapy (CBT) combines several of the above-mentioned skills (e.g., behavioral techniques) and incorporates cognitive skills like cognitive restructuring as well as problem-solving, relaxation skills, and contingency management to aid youth in reducing their symptomology. A recent review classified CBT as the most efficacious treatment for anxious youth (Higa-McMillan et al., 2016). In light of these findings, we have detailed some popular CBTs below.

Coping Cat

The Coping Cat program is the first manualized cognitive-behavioral treatment program for youth with an anxiety diagnosis. The program consists of 16 sessions that focus on psychoeducation, relaxation techniques, cognitive restructuring, working through an exposure hierarchy, and problem-solving skills. Two sessions are also dedicated to parenting anxious children in the Coping Cat manual (Kendall, 1990).

In the first RCT utilizing the Coping Cat Program, Kendall (1994) found that 64% of youth with a primary anxiety diagnosis no longer met criteria for their diagnosis, compared with 5% of the waitlist control group. More recently, a meta-analysis of thirteen studies comparing Coping Cat to a control group found the Coping Cat group reported significantly greater reductions on reported anxiety, with a large effect size (Lenz, 2015). Moreover, a meta-analysis of 12 comparison treatment studies found a small effect size for the difference in treatment outcome, with youth who participated in the Coping Cat program reporting anxiety symptoms less than those in the control groups. Interestingly, larger effect sizes were found for community- and university-based locations compared to research hospital and school settings (Lenz, 2015).

In one of the largest multi-site trials to date comparing multiple treatment modalities to one another, the Child/Adolescent Anxiety Multi Modal Study (CAMS), preliminary results comparing CBT, sertraline, their combination, and a placebo group to one another found 80.7% improvement on the combination therapy, 59.7% on CBT, 54.9% on sertraline, and 23.7% on placebo, as determined by changes in scores on the Clinical Global Impression—Improvement Scale (Walkup et al., 2008).

Ginsburg and colleagues later determined that rates of remission differed in each group depending on the method used to measures remission (i.e., presence or absence of a disorder based on a diagnostic interview versus changes in the clinical global impression scale), although similar overall remission rates in each treatment group were found in comparison to Walkup and colleagues' original findings (Ginsburg et al., 2011). Notably, overall remission rates following a 12-week treatment program were significantly lower than overall response rates (i.e., demonstrating a meaningful clinical improvement; Ginsburg et al., 2011). Similar results were also found (i.e., combined treatment was superior to placebo and CBT groups, although its superiority over the sertraline group was less evident) when examining measures of parent report as the outcome variables. Notably, the combination and sertraline groups were superior to the CBT and placebo groups when examining parents' ratings of their child's overall internalizing symptoms; however, these results were not maintained at a 36-week follow-up, and all active treatment groups were comparable based on parent report (Albano et al., 2018).

Adaptations of the Coping Cat program have also been implemented in various settings. For instance, an adaptation of Coping Cat in a Spanish public health setting found significant decreases in anxiety on all child- and parent-report measures following treatment (Olga et al., 2018). Moreover, an effectiveness study in Brazil found Coping Cat to be an effective treatment for Brazilian youth. Anxiety symptoms were significantly reduced on all self-report measures following treatment, although no significant differences were found of quality-of-life measures following treatment (Souza et al., 2013). Finally, an adaptation of Coping Cat in Taiwanese youth found significant reductions in self- and parent-reported child anxiety symptoms as well as significant reductions in reported parent stress (Yen et al., 2014).

Cool Kids

The Cool Kids/Chilled Adolescents Program is a manualized cognitive-behavioral treatment program for youth and adolescents with an anxiety disorder diagnosis. It is a 10-week program that focuses first on psychoeducation, followed by cognitive skills including cognitive restructuring, behavioral experiments (e.g., rewards) and gradual exposure, assertiveness skills and stress management, and skill maintenance and relapse prevention. One session is dedicated to parenting anxious children in the Cool Kids manual, while two sessions are dedicated to parents in the Chilled Adolescent manual (Rapee et al., 2006).

In the first RCT utilizing the Cool Kids manual, Barrett et al. (1996) found active anxiety treatments were mostly superior to waitlist controls (Barret et al., 1996). Rapee (2003) furthered these results by replicating the manual's effectiveness and finding little difference in outcome for those with multiple anxiety disorders compared to only one, demonstrating the manual's efficacy at treating multiple anxiety disorders concurrently (Rapee, 2003). The manual has also demonstrated promising results at treating anxiety disorders in comparison to other active treatments, with a greater percent of youth no longer meeting criteria for their principal anxiety disorder diagnosis after completing Cool Kids than those who completed a Support and Attention group (Hudson et al., 2009). More recently, a meta-analysis of RCTs examining Cool Kids or its successors (e.g., Cool Teens/Chilled Adolescents) found medium standardized mean difference effect sizes based on child report, and large standardized mean difference effect sizes based on parent report. A large aggregated effect size was also found comparing the decrease in youth's negative thoughts throughout the Cool Kids program versus waitlist control groups (Mychailyszyn, 2017).

One-Session Treatment

One-session treatment (OST) is an evidence-based treatment that is well established in the treatment of phobias in youth. OST incorporates a multi-component procedure in the delivery of a massed, up to 3-hour-long, in vivo cognitive behavioral exposure treatment (Davis et al., 2019). Following the diagnostic process, OST begins with a 45-minute cognitive-behavioral assessment (i.e., a functional assessment), ideally performed a week in advance, to obtain information about the phobia and to create the fear hierarchy. The assessment phase is also an opportune time for the clinician and youth to build the rapport needed to perform the exposure component. The next phase of OST includes the massed exposure, cognitive challenges, participant modeling, reinforcement, psychoeducation about the feared stimulus, and skills training (Zlomke & Davis, 2008). The massed session is performed in a step-wise fashion through the fear hierarchy using behavioral experiments. Each component has a specific function. Exposure provides preparation for the next stages by activating the fear. Cognitive challenging allows for the testing of faulty beliefs. Participant modeling involves the clinician demonstrating a proposed step/behavioral experiment in the exposure process while subsequently simultaneously guiding the youth through the exposure requirements. Reinforcement strengthens the youths' approach behavior to the feared stimulus. Psychoeducation provides more cognitive exposure by providing accurate information and filling lulls in between challenging experiments. Skills training strengthens participant modeling, strengthens psychoeducation, and addresses potential weaknesses that may remain. Several slight modifications may be helpful in performing OST with youth, such as using developmentally appropriate language, being patient, and slowing the process as needed (Davis et al., 2019). A detailed explanation of OST procedure with youth can be found in manual for OST, *Intensive One-Session Treatment of Specific Phobias* (Davis et al., 2012). Davis et al. (2019) reported strong, growing empirical evidence for OST with youth in the treatment of phobias, as have other researchers (Davis et al., 2011; Ollendick & Davis, 2013). Davis and Ollendick (2005) have classified OST as a well-established treatment.

Despite its high efficacy as an evidence-based treatment for youth anxiety, exposure therapy is underutilized. Therapists in private practice tend to have limited training in exposure-based therapies in comparison to other approaches (Reid et al., 2018). In nonresearch settings, excluding anxiety clinics, 76.1% of children with anxiety disorders were found not to be treated with exposure techniques in general mental health clinics and primary care settings (Whiteside, et al., 2016). Recently, however, efforts are underway to study bringing OST to clinicians on the frontlines of intervention (Wright et al., 2018).

Computerized CBT

While CBT is an effective treatment for child and adolescent anxiety disorders, stigma associated with these diagnoses and barriers to treatment (e.g., lack of therapists in areas, financial or transportation-related burden) often prevent families from seeking services. These barriers have emphasized the need for less expensive interventions that can be implemented remotely. Many of the previously described treatments have been adapted for computerized formats.

Camp-Cope-A-Lot

Camp-Cope-A-Lot is a computer-assisted treatment intervention for youth with an anxiety diagnosis. Like the traditional Coping Cat program, Camp-Cope-A-Lot is a 12-session program, with each session designated as a distinct "level." The first six sessions (i.e., levels) are dedicated to building skills, including cognitive restructuring, relaxation techniques, modeling, problem-solving, and social rewards, while the remaining six sessions focus on completing a fear hierarchy. Two independent parent-sessions are included at Level 3 and Level 7 (Khanna & Kendall, 2008). Researchers have found the computer-assisted program to be acceptable to parents and children and feasible for implementation from non-CBT providers. Moreover, youth in the Camp-Cope-A-Lot group had significantly greater reductions in both post-treatment diagnoses and parent-reported continuous measures of anxiety compared to the Computer-Assisted-Education, Support, and Attention group, although child ratings of their own anxiety were not significantly different between groups (Khanna & Kendall, 2010).

Cool Teens CD-ROM

Likewise, Cunningham et al. (2006) created the Cool Teens CD-ROM, a self-help CBT specifically for teenagers with an anxiety disorder delivered in a computer-assisted format. The program entails eight modules designed to be taught over 12 weeks. The two main modules taught are cognitive restructuring and exposure, with additional modules detailing psychoeducation, goal setting, and relapse prevention. Youth who participated in a pilot case series demonstrated clinically significant improvements in their anxiety symptoms (Cunningham et al., 2008). In a RCT comparing youth receiving Cool Teens CD-ROM with parent support and therapist phone check-ins following most sessions with youth in a waitlist control, youth receiving Cool Teens demonstrated significantly greater reductions in anxiety diagnoses and in severity of symptoms, and these results were maintained over a 3-month period (Wuthrich et al., 2012).

Parent Involvement

Research in youth anxiety has long demonstrated the importance of parents in both the etiology and maintenance of childhood anxiety disorders. Important factors including genetics, parent anxiety or depression, parenting practices like overprotection, and, more recently, parental accommodation have all been theorized to impact the development and maintenance of childhood anxiety. For many, the natural conclusion following this research is to infer the importance of parental involvement in the treatment of childhood anxiety. However, recent meta-analyses surprisingly have concluded that parent and child involvement in youth anxiety treatment does not significantly enhance treatment outcomes in comparison to child-focused therapy (Thulin et al., 2014).

Triple P Program

Recently, researchers have postulated that parent-only interventions for youth anxiety may be a useful way forward to provide treatment while also providing an option for families of youth who are noncompliant with treatment (Lebowitz et al., 2014). One of these interventions, the Triple P program, is a multi-tiered, parent focused, prevention and intervention system that aims to enhance protective factors and reduce risk factors associated with behavioral and emotional problems in children. The program has five levels, each increasing in intensity (i.e., Level 1: Universal: parenting strategies and advice taught through a multi-media campaign, Level 2: Selected: brief parenting advice through specific, developmentally appropriate parenting tip sheets regarding a specific concern (e.g., tantrums), Level 3: Primary Care: narrowly focused parent skills training provided in a primary care setting following concerns brought up to a primary care physician, Level 4: Standard: broad focused parent skills training, and Level 5: Enhanced: intensive parent skills training provided by a licensed psychologist; Sanders, 2003). Standard Triple P has been utilized in treating child anxiety. The group, parent-only program consisted of four, 2-hour sessions teaching the following parenting skills (i.e., positive parenting, helping children develop, managing misbehavior, and planning ahead) followed by three, 15- to 30-minute phone check-ins to trouble shoot and foster independent problem-solving, and then a final 2-hour session to close the program. Children of parents in the Triple P group demonstrated significant decreases in anxiety symptoms and functional impairment compared to the waitlist control (Özyurt et al., 2019).

Supportive Parenting for Anxious Childhood Emotions

Lebowitz et al. (2014) note that one reason studies utilizing parent involvement may find equivocal results overall is because these treatments typically focus on teaching the parent the CBT skills to be a lay-therapist to their child instead of focusing on specific components of parent-child interactions. Lebowitz et al. (2014) subsequently created the Supportive Parenting for Anxious Childhood Emotions (SPACE) program, a manualized, parent-only treatment for treating anxiety disorders in youth who are resistant to treatment. Unlike treatment modalities focusing on how parents can alter their child's behavior, the SPACE program uses nonviolent resistance to teach parents how they can change their own responses to their child's anxious states and reduce parental accommodation over time. Standard treatment is conducted across eight sessions where anxiety is introduced as a system, the parents and the therapist review and chart daily routines and identify accommodating behaviors, a target behavior is chosen, the therapist and parent work to reduce accommodation, the parent takes the lead in identifying additional target behaviors and reducing accommodation (sessions 6 and 7), and the program is concluded in a final session. Supplemental modules are also included to be implemented as needed based on each family's needs, including Accessing Support, Dealing with Disruptive Behavior, Coping with Threats to Self, and Teaching and Modeling Self-Regulation. In an open trial on the manual, 6 out of 10 children were identified as responders to the treatment (Lebowitz et al., 2014). Lebowitz et al. (2020) recently found that SPACE was as efficacious as child-focused CBT at post-treatment based on the results of several questionnaires (Lebowtiz et al., 2020).

Modular Therapy and Transdiagnostic Treatments

Modular Cognitive Behavioral Therapy

Modular cognitive behavioral therapy is another individualized treatment for youth anxiety (Chorpita, 2007). This treatment consists of 13 individual modules that are designed to be implemented based on each individual client's needs. Chorpita and colleagues assert that exposure is the key component to symptom remission in anxiety treatment and subsequently intend the four specific modules (i.e., self-monitoring, psychoeducation, exposure, and maintenance/relapse prevention) to be implemented with every client. The remaining nine modules (i.e., cognitive restructuring, social skills training, rewards, differential reinforcement, and time-out) are designed to be implemented based on other underlying constructs that may be impeding exposure (e.g., utilizing the cognitive restructuring module when intrusive thoughts are impeding one's ability to participate in an exposure). A pilot study using Modular CBT found none of the original sample met criteria for their primary anxiety diagnosis following treatment (Chorpita et al., 2004), and these modules have also been successfully applied to youth with depression (Chorpita et al., 2005) and one individual with selective mutism (Reuther et al., 2011).

Modular Approach to Therapy for Children with Anxiety, Depression, or Conduct Problems

Chorpita and Weisz later created the Modular Approach to Therapy for Children with Anxiety, Depression, or Conduct Problems (MATCH): a modular therapy combining concepts from other treatments like Coping Cat for child anxiety, Primary and Secondary Control Enhancement Theory for depression, and the Defiant Children manuals for conduct and behavioral problems in youth. This therapeutic format is thought to be especially helpful for youth who may have multiple diagnostic comorbidities. The therapist defines which disorder or concern is primary based on questionnaires, other data, and input from the client and their parents. Like the Modular CBT for anxiety, a flow chart designates appropriate modules for each diagnostic concern, and the therapist chooses to add additional modules for other potential comorbidities depending on their interference with the current treatment (Chorpita & Weisz, 2009). Research comparing modular treatment to individualized treatment found that youth receiving modular treatment had fewer post-treatment diagnoses than those receiving treatment as usual (Weisz et al., 2012).

Unified Protocol for Treatment of Emotional Disorders in Children and Adolescents

The MATCH program advances youth treatment research by attempting to consolidate relevant treatment techniques to treat multiple commonly co-occurring youth disorders without requiring clinicians to be well-versed in several separate treatment manuals (Chorpita & Weisz, 2009). Transdiagnostic treatments attempt to potentially provide an even more parsimonious treatment option by detailing treatment techniques designed to treat various commonly co-occurring disorders based on one unified theory underlying many of the co-occurring behaviors (Kennedy et a., 2019). Child and adolescent anxiety and depression are highly comorbid (Cummings et al., 2014), and some researchers have found poorer treatment response for either anxiety or depression alone when the comorbid disorder was also present (Curry et al., 2006; O'Neil & Kendall, 2012). With these factors in mind, Ehrenreich-May and colleagues (2009) created the Unified Protocol for Emotional Disorders in Children and Adolescents (UP-A, UP-C): a manualized, emotion-focused treatment designed to concurrently address the transdiagnostic constructs that impact youth with many emotional disorders like anxiety and depression (Ehrenreich et al., 2009). The structure of both manuals follows the modal model of emotions and emotion regulation proposed by Gross and Thompson (2007). The UP-A consists of five modules: emotion education and awareness, generalized emotional exposures and nonjudgmental awareness, cognitive reappraisal and problem-solving, interoceptive and in vivo exposures including behavioral activation, and skill consolidation and relapse prevention. It also includes three additional optional modules: dealing with low motivation, dealing with treatment interfering situations (e.g., suicidal ideation), and dealing with parenting issues (Ehrenreich-May et al., 2014). The UP-C includes a mnemonic device (i.e., CLUES) to sequentially introduce each of its five modules: "Consider how I feel," "Look at my thoughts," "Use detective questions," "Experience my fears and feelings," and "Stay happy and healthy" (Ehrenreich-May et al., 2014). Parents also meet weekly in the UP-C manual to learn "ICE" skills: independence, consistency, and empathy (Ehrenreich-May et al., 2014).

An initial multiple-baseline study of three adolescents receiving the UP-A found that each participant demonstrated significant reductions in their reported symptoms, and these symptoms continued to improve over a 6-month maintenance period (Ehrenreich et al., 2009). A waitlist-control trial found youth receiving UP-A showed significantly greater levels of clinic-rated levels of improvement, and these ratings continued to improve over post-treatment assessments (Ehrenreich-May et al., 2017).

Similarly, an open trial of the UP-C found significant reductions in anxious symptomology and anxiety diagnoses post-treatment as well as a significant reduction in parent-reported depressive symptoms, demonstrating its utility at treating transdiagnostic constructs underlying emotional disorders (Bilek & Ehrenreich-May, 2012). An RCT comparing the UP-C to an anxiety-specific treatment found greater reductions in sadness dysregulation and cognitive reappraisal as well as greater reductions in parent-reported depression symptoms in the UP-C group, although there was no difference in anxiety remission between groups (Kennedy et al., 2019).

Treatment Adaptations in Special Populations

Individuals with autism spectrum disorders (ASD) and intellectual disabilities (ID) often have an array of interfering emotional-behavioral problems with comorbidity of anxiety disorders as high as 40-55% for youth with ASD and 22% for youth with ID (Mattila et al., 2010; Reardon & Melvin, 2015). Repetitive and restrictive behaviors are a core feature of ASD and can range from simple to complex (American Psychiatric Association, 2013; Eilers & Hayes, 2015). Researchers have investigated the use of modified techniques to address these issues while accommodating for the developmental and cognitive limitations of ASD and ID children.

Several researchers have investigated the efficacy of exposure techniques with special populations. Storch et al. (2019) examined the efficacy of family-based exposure treatment (FET) in comparison to treatment as usual (TAU) for ASD youth with co-occurring anxiety. The accommodations included tailored language, emphasizing tangible rewards and including family in every session. The findings indicated response rates of 79% and 0% and remission rates of 86% and 0% for the FET and TAU groups, respectively. Guertin et al. (2019) used a modified ERP protocol that emphasized verbal and visual strategies and removed the traditionally included psychoeducational component and cognitive strategies to accommodate the developmental needs of a preschooler with ID. Obsessive compulsive behaviors (OCBs) were decreased and maintained at 3-week follow-up. Eilers and Hayes (2015) paired ERP with cognitive diffusion exercises (word repetition) to reduce OCBs in children with ASD which showed a reduction in OCBs. Lehmkuhl et al. (2008) reported success in reducing OCBs by eliminating the cognitive restructuring component, replacing it with identifying feelings of distress while using coping statements and initiating ERP sooner than in a conventional CBT/ERP protocol. Raven and Hepburn (2003) successfully used visual strategies and manipulatives to modify the ERP component to reduce OCBs. Boyd et al. (2013) found that alternating trials of exposure with trials of academic instruction using concrete, specific tasks while keeping the trigger stimuli visually accessible was successful in reducing repetitive behavior in children with ASD and co-morbid ID.

Utilizing OST with ASD and ID individuals will likely require some modifications to the conventional protocol. The parent or caregiver may be more involved in the behavioral assessment to provide detailed information and identify potential reinforcers. It is recommended that parents and caregivers participate in some or all of the treatment phases so that they may help conduct generalization practice at home. Specific treatment modifications should include concrete, developmentally appropriate use of language (i.e., concrete descriptions of steps), use of visual aids, a slower pace, more breaks as necessary, and cognizance if the youth has a negative response to being touched (i.e., with physical guidance or pats on the back for praise; Moree & Davis, 2010). Particular concern must be given to safety concerns if the youth has the potential to engage in dangerous behaviors, such as tantrums. Under these circumstances, the clinician must operate in a manner not to reinforce the behavior and may have to decide to terminate OST (Rudy & Davis, 2012).

There is a limited amount of research that has been performed using OST with special populations. Rudy and Davis (2012) have written a detailed chapter addressing the assessment and treatment recommendations for conducting OST with ASD/ID individuals. Muskett et al. (2020) examined the efficacy of a modified OST in the treatment of a dog phobia in a minimally verbal 8-year-old child with ASD. The modifications employed included four 3-hour sessions conducted over 4 days, one-to-one parent training to allow the mother to conduct 10 of the 12 hours of treatment, consultation and coaching from the therapist during the exposure sessions, and immediate reinforcement. The researchers reported reduction of phobic symptoms with gains maintained at post-treatment and 3-month follow-up.

SD, relaxation, modeling, and PR have limited empirical investigation regarding their efficacy in ASD and ID populations. Further, they are typically used as treatment components rather than as a stand-alone treatment. SD has received support in several studies. In a review of the literature, Hagopian and Jennett (2008) found empirical support for in vivo SD when combined with positive reinforcement in the treatment of phobic avoidance in individuals with ID. In another review of the literature, Lydon et al. (2015), found SD to be effective in treating fears and phobias among children with ASD. Flood and Luiselli (2016) found home-based in vivo SD combined with positive reinforcement effective for targeting bathroom avoidance for a youth with ASD. Finally, Tyner et al. (2016) reported success with contact desensitization using a distance hierarchy and positive reinforcement to treat dog phobic behavior in ASD youth. Only a few recent studies have explored relaxation techniques in ASD/ID individuals. Beail and Wright (2013) found that relaxation as part of a CBT protocol was effective in reducing anxiety in an individual with ASD, ID, and social anxiety. In a random controlled trial, Bouvet and Coulet (2016) found that relaxation therapy reduced anxiety in adults with ID. Luscre and Center (1996) found that children with ASD and ID were able to complete the steps in a dental exam after viewing a filmed peer model in conjunction with desensitization and reinforcement. PR has also received limited recent empirical support. Moskowitz et al. (2017) reported anxiety reduction in a child with ASD and ID who viewed Sesame Street characters model singing "happy birthday", a fearful stimulus for him. Love et al. (1990) demonstrated success in using PR paired with social and tangible positive reinforcement to decrease fear and increase approach to the feared stimulus in children with ASD. Runyan et al. (1985) reported success using PR in reducing avoidance behavior toward escalators in adults with ID.

Future Directions for Treatment in Anxious Youth

Research in the treatment of youth anxiety has made tremendous leaps over the decades, and there are currently several cognitive-behavioral treatment modalities that have been shown to reduce anxious symptomatology in youth. However, there is still much to learn about how change is made throughout various treatment modalities, how various treatments compare to one another, and how the samples of people these treatments were created for impacts their generalizability. Many RCTs measure treatment change through questionnaire ratings, the presence or absence of a diagnosis based on diagnostic interviews, or the change in overall clinical impressions obtained through clinicians' ratings on measures like the CGI. However, differences in how treatment change is measured can impact results, as evidenced by the differing rates of treatment change found by Ginsburg et al. (2011). Moreover, while most RCTs track change in symptomology (e.g., number of or severity of symptoms present), information on mechanistic factors that may change throughout treatment (e.g., cognitive biases, rumination, attentional biases, thought suppression, experiential avoidance) is often lacking.

Finally, many of the above treatment modalities were originally validated in predominately white, western, typically developing samples, which can impact their overall generalizability or applicability. For instance, while several adaptations of the Coping Cat and Cool Kids manuals have now been validated in various countries (Olga et al., 2018; Souza et al., 2013), Yen and colleagues noted that certain adaptations were necessary in order to reconcile differences between the individualistic culture the manual was originally developed for and the collectivistic culture in which it was being implemented in (Yen et al., 2014). Moreover, researchers exploring racial differences in therapy processes and outcomes found that therapists rated black youth as less compliant, less involved, and demonstrating less mastery of content compared to white youth, although these results were no longer significant after accounting for socioeconomic status and home living situation. The authors also note that the majority of the therapists in the study identified as white, so the therapist's own racial biases or inter-racial therapist-client pairings could have also impacted these relationships (Gordon-Hollingsworth et al., 2015). Scott and colleagues also identify unique proactive and reactive coping mechanisms black children and their families engage in both in preparation for and in response to experiences of racial biases, highlighting unique mechanisms that may not be addressed in many traditional cognitive-behavioral manuals (Scott et al., 2020). Researchers have also examined the efficacy of existing treatment techniques or manuals to youth with ASD or other DDs, but these studies often include adapting pre-existing techniques to youth in these populations without always accounting for potentially differing symptom presentations or developmental or communicative abilities (Davis, 2012). Recently, some treatment manuals have been created specifically with these populations in mind, but more research is needed to further advance the quality of care provided to youth in these populations.

Overall, youth anxiety treatment research has made great strides, and there are several efficacious treatment techniques currently applicable to youth in these populations. Future research should continue to compare specific treatment modalities to one another, examine mechanistic and potentially transdiagnostic factors underlying these disorders, and adapt and create treatment options with diverse, nontypically developing samples in mind.

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Nonsuicidal Self-Injury in Children and Adolescents

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Nicholas J. Westers

Nonsuicidal self-injury (NSSI) is the deliberate, self-inflicted damage of body tissue without suicidal intent and for purposes not socially or culturally sanctioned (International Society for the Study of Self-injury, 2022), such as self-cutting, hitting, biting, and burning. There is no single cause of NSSI, and reasons for engaging in NSSI vary across individuals. Most adolescents who engage in NSSI report doing so to regulate emotions, whether to experience relief from overwhelming feelings or thoughts, punish themselves, or communicate their distress to others, among other reasons (Gillies et al., 2018). Typical age of onset is early adolescence, most commonly between ages 12 and 14 (Gillies et al., 2018; Glenn et al., 2017; Nock & Prinstein, 2004). Prevalence rates of NSSI among adolescents vary depending on whether interviews and self-report surveys use a checklist of specific NSSI behaviors or a general yes/no question if participants have ever engaged in NSSI, the former resulting in higher prevalence rates (Gillies et al., 2018; Muehlenkamp et al., 2012; Swannell et al., 2014). Single-item measures better detect those who specifically engage in self-cutting and/or who identify with the behavior, but these measures may miss individuals who engage in other forms of NSSI, do not view NSSI as part of their identity, or identify as male (Robinson & Wilson, 2020).

In 2014, a systematic review and meta-analysis of 34 studies found lifetime rates of NSSI among adolescents to be 17.2% (Swannell et al., 2014). A more recent meta-analysis of 49 datasets found a lifetime prevalence of 22.9%, which indicates a significant increase of NSSI among adolescents over time (Gillies et al., 2018). Twelve-month prevalence rates vary from 17.6% among US high school students (Monto et al., 2018) to 18.6% internationally (Gillies et al., 2018). Rates are more variable and significantly higher among inpatient samples of adolescents, typically reaching 40% when including adolescents experiencing active psychosis or who have an intellectual disability and as high as 60–82% when excluding them (Darche, 1990; Nock & Prinstein, 2004). Although NSSI among young children is infrequent, one study found 7.6% of third graders (~ages 8–9) had engaged in NSSI, typically via self-hitting (Barrocas et al., 2012). A recent meta-analysis examining a few studies assessing the prevalence of NSSI among children ages 12 and under found lifetime NSSI prevalence rates of 6.2% of children in the community and 37.4% of clinical samples (Liu et al., 2022).

Some researchers and clinicians use the broader term *deliberate self-harm* (DSH) that encompasses both suicidal and nonsuicidal self-harm. That is, suicide and NSSI are not differentiated from

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one another, and the term "self-harm" comprises self-injury with and without suicidal intent (e.g., jumping from heights, overdosing on drugs, self-cutting, self-hitting, consuming non-edible substances, hanging). Prevalence rates of DSH among adolescents are comparable to, but slightly less than, those of NSSI (Gillies et al., 2018). The Child and Adolescent Self-harm in Europe study found adolescent DSH lifetime prevalence rates of 17.8% and 12-month prevalence rates of 11.5% (Madge et al., 2008). A more recent meta-analysis revealed adolescent DSH lifetime and 12-month prevalence rates of 11.4% and 9.0%, respectively (Gillies et al., 2018). Although research and theory often conceptualize NSSI and suicide on a continuum of behaviors (e.g., Joiner, 2005), and not all researchers agree with distinguishing between NSSI and suicide due to concerns about assuming a false dichotomy (Kapur et al., 2013), there remains significant utility in separating them in clinical practice and research (Muehlenkamp, 2005; Siddaway et al., 2018; Turner et al., 2014; Westers & Plener, 2020).

Risk Factors for Engaging in Nonsuicidal Self-Injury

There is no single risk factor or cause of NSSI. Because most individuals report self-injuring to regulate emotions and avoid unpleasant emotional states (Chapman et al., 2006; Coppersmith et al., 2021; Nock & Prinstein, 2004), emotion dysregulation has been implicated as a plausible risk factor for engaging in NSSI. Indeed, meta-analyses reveal greater emotion dysregulation is associated with a greater risk for engaging in NSSI across both clinical and community samples, regardless of age and sex (Fox et al., 2015; Wang et al., 2022; Wolff et al., 2019). This is particularly true for those who report having limited access to emotion regulation strategies (Wolff et al., 2019). Additionally, individuals with diagnosed emotional disorders, especially depressive and anxiety disorders, are more likely to engage in NSSI than those without emotional disorders (Bentley et al., 2015). Panic Disorder and Posttraumatic Stress Disorder (PTSD) showed a stronger association with NSSI than other diagnoses, although these differences were not statistically significant (Bentley et al., 2015). Since not all individuals with emotion regulation difficulties engage in NSSI, it is important to identify factors that moderate the relationship between emotion dysregulation and NSSI. For instance, one study found that emotion regulation was associated with NSSI only in the context of low body regard (Muehlenkamp et al., 2013a).

Early research identified childhood maltreatment (e.g., physical and sexual abuse, emotional neglect), separation, loss, and attachment difficulties as risk factors for NSSI (Gratz, 2003). An early meta-analysis examining the strength of associations between NSSI and childhood sexual abuse from 45 research samples determined that childhood sexual abuse does not directly cause or lead to NSSI but instead may be associated with NSSI through mediating variables that are commonly related to both (i.e., shared risk factors; Klonsky & Moyer, 2008). For example, Swannell et al. (2012) found that self-blame, dissociation, and alexithymia mediated the relationship between childhood maltreatment and NSSI, especially among females. A more recent meta-analysis that included additional, newer studies on childhood maltreatment and NSSI, however, found a modest but significant relationship between sexual abuse and NSSI (Liu et al., 2018). Moreover, overall childhood maltreatment was significantly related to NSSI and severity of the behavior, as were maltreatment subtypes of childhood sexual abuse, physical abuse, and physical neglect, particularly among community samples. Childhood emotional abuse was also significantly related to NSSI, with a larger effect size than any other maltreatment subtype (Liu et al., 2018). Adverse childhood experiences (ACEs), including abuse and other potentially traumatic events, are now recognized as significant risk factors for NSSI (Wang et al., 2022). This is especially true when adolescents with at least one ACE endorse having a negative coping style (Wan et al., 2020). Nevertheless, not all individuals who self-injure have experienced trauma or childhood maltreatment or have a mental health disorder.

Bullying (both as perpetrator and victim) and peer victimization are risk factors for NSSI (Claes et al., 2015; van Geel et al., 2015; Wang et al., 2022), most notably among younger adolescents (van Geel et al., 2015). This relationship is partially mediated by depressed mood (Claes et al., 2015), which is in line with research showing that depressive disorders and depressive symptoms are common risk factors for NSSI (Bentley et al., 2015; Fox et al., 2015; Wang et al., 2022). However, parental support moderates the relationship between bullying and NSSI (Claes et al., 2015). Indeed, parental support and connection have proven to be strong protective factors against NSSI, even more so than peer support (Taliaferro et al., 2020). In contrast, parental criticism and high expressed emotion increase risk for NSSI, especially among youth who internalize and agree with their parents' criticism; that is, adolescent self-criticism moderates the relationship between parental criticism and NSSI (Wedig & Nock, 2007).

Self-criticism is another risk factor for NSSI (Zelkowitz & Cole, 2019) and plays an important role in moderating the relationship between NSSI and changes in mood during the experience of pain (Fox et al., 2017). Among individuals with a history of NSSI, those high in self-criticism demonstrate greater willingness to endure pain for longer periods of time and even experience improvements in their mood during pain, whereas those lower in self-criticism tend to experience improvements in their mood upon the removal of pain (Fox et al., 2017). Like self-criticism, low self-esteem has also been shown to be related to NSSI in both adolescents (Laye-Gindhu & Schonert-Reichl, 2005) and adults (Forrester et al., 2017). Self-criticism and self-esteem mediate the relationship between other psychological risk factors and NSSI (Forrester et al., 2017), including symptoms of personality disorders such as borderline personality disorder (BPD; Cawood & Huprich, 2011).

Until the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013), NSSI was referenced just once in the DSM as one of nine criteria for the diagnosis of BPD. The DSM-5 now includes a separate NSSI Disorder as a proposed diagnosis for further study. Although cluster b personality disorders, most notably BPD, have shown to be a risk factor for NSSI (Fox et al., 2015), research examining the proposed NSSI Disorder diagnosis among adolescents found that the overlap between NSSI Disorder and BPD was not significantly greater than the overlap of other diagnoses and BPD (Glenn & Klonsky, 2013). For instance, 52% of adolescents who met criteria for NSSI Disorder also met criteria for BPD, but 52% of those who met criteria for a mood disorder and 48% of those who met criteria for an anxiety disorder also met criteria for BPD. Even though adolescents with BPD had a significantly greater odds of being diagnosed with NSSI Disorder than those without BPD, they had even greater odds of being diagnosed with a mood or anxiety disorder (Glenn & Klonsky, 2013).

Individuals who engage in NSSI report being more impulsive than those who do not engage in the behavior, especially acting rashly when experiencing unpleasant emotions (i.e., negative urgency; Fox et al., 2015; Hamza et al., 2015). However, objective measurements of impulsivity fail to find a significant difference between those who self-injure and those who do not (Hamza et al., 2015), and ecological momentary assessment studies demonstrate that changes in affect that often lead to NSSI are detectable hours prior to the behavior rather than suddenly before engaging in NSSI (Armey et al., 2011). It is possible that when changes in affect reach a threshold that would typically result in NSSI behavior, the individual subjectively experiences their affect change as sudden and the NSSI as impulsive. It is self-efficacy and the belief that one can resist urges to engage in NSSI that mediates the relationship between impulsivity and NSSI behavior (Hasking et al., 2017).

Finally, a history of NSSI, hopelessness, eating disorder behavior, and suicidal thoughts and behaviors are also clear risk factors for NSSI (Fox et al., 2015). In summary, although more longitudinal studies are needed to determine causal risk factors for NSSI, especially among adolescents, research to date reveals a number of risk factors, including emotion dysregulation, low self-esteem and self-efficacy, self-criticism, perceived parental criticism, poor body regard and body image, disordered eating, depression, anxiety, hopelessness, personality pathology, suicidal thoughts and behaviors, bullying, childhood maltreatment and other ACEs, and negative urgency and subjective experience of impulsivity.

Assessment of Nonsuicidal Self-Injury

A good assessment of NSSI begins with honest self-reflection and evaluation of one's own beliefs about the behavior (Westers & Tinsley, in press). Individuals with lived experience of NSSI are often well attuned to the verbal and nonverbal reactions of healthcare professionals to NSSI behavior and those who engage in it (Westers & Plener, 2020). Readily assuming the behavior is for attention and using inherently pejorative descriptions of NSSI, like "manipulative" or "gamey," are just two examples that reflect negative attitudes toward individuals who self-injure and are associated with lower quality provision of care (Muehlenkamp et al., 2013b; Westers & Plener, 2020; Westers & Tinsley, in press). In fact, self-injuring for attention or to influence the behavior of others is one of the least commonly endorsed reasons for self-injury among both adolescents (Nock & Prinstein, 2004) and adults (Klonsky, 2011). It is essential that assessments be conducted with a kind, low-key dispassionate demeanor and respectful curiosity (Walsh, 2012), which cultivates a safe environment for honest responses.

Screening for Nonsuicidal Self-Injury

Screening for NSSI should be a part of routine intake sessions and psychosocial assessments (Westers et al., 2016; Westers & Plener, 2020). Inquiring about NSSI is best done after building rapport and asking typically more benign questions, such as those related to hobbies, school, friends, and home life. Assessing the intent of any self-harm behavior is critical in differentiating NSSI from suicide behavior and monitoring their co-occurrence. As such, it is recommended that screening for NSSI be done just before or just after screening for suicide (Westers et al., 2016). Research has shown that there are no iatrogenic effects when asking about NSSI (Baetens et al., 2020; Muehlenkamp et al., 2010), meaning that there is no evidence that screening for NSSI will increase the likelihood a child will engage in the behavior. Using a neutral tone and respectful curiosity, clinicians can begin by noting that some young people may self-injure to cope with stress and then ask if they have ever engaged in NSSI. For example, clinicians may screen for NSSI in the following manner: "Some young people who experience stressors like yours think about intentionally hurting themselves as a way to cope with what's going on in their life, but without intending suicide. Have you ever hurt yourself on purpose without intending to end your life or attempt suicide…like cutting, biting, burning, hitting, severely scratching yourself…?" (Westers et al., 2016). As previously noted, using a checklist format in which a variety of NSSI methods are listed is more effective than using a sweeping, single-item assessment question with a simple yes/no option for responding (Gillies et al., 2018). That is, simply asking if someone has ever self-injured without offering examples of what is meant by the term "self-injury" or "self-harm" can lead to false negatives, especially if the respondent is male, engages in a form of NSSI other than self-cutting, or does not identify with self-injury behavior (Robinson & Wilson, 2020).

For clinics that lean on formal screening measures at intake, the Screen for Nonsuicidal Self-Injury (SNSI; Halverson et al., 2022) can be used. It was developed for clinical settings as a brief screen (10 items) for identifying those who have engaged in NSSI during the past year and meet criteria for NSSI Disorder. Individuals who endorse two or more of the 10 items are likely to meet criteria for NSSI

Disorder (sensitivity = 0.93). The measure is also fair at identifying those who do not meet criteria (specificity = 0.78; Halverson et al., 2022). Positive screens using the SNSI or a clinical interview require additional follow-up in order to assess the level of risk and severity of the behavior.

Risk Assessment

Although NSSI should not be conflated with suicidal behavior, NSSI is a robust risk factor for attempting suicide (Franklin et al., 2017), particularly among adolescents experiencing co-occurring major depressive disorder (Asarnow et al., 2011; Tuisku et al., 2014; Wilkinson et al., 2011). As such, assessment of NSSI should address safety and variables most closely associated with suicide attempts while also maintaining a low-key, dispassionate demeanor and respectful curiosity. The three most commonly used assessment models include HIRE (Buser & Buser, 2013), STOPS FIRE (Kerr et al., 2010), and SOARS (Westers et al., 2016). The HIRE model was developed for counselors as an informal diagnostic assessment of the DSM-5 proposed NSSI Disorder and to assess issues related to safety (Buser & Buser, 2013). The HIRE mnemonic highlights the importance of assessing History, Interest in change, Reasons behind the behavior, and Exposure to risk. The "H" domain focuses primarily on the history of past year frequency and methods of NSSI. "I" focuses on interest in change, namely motivations for NSSI cessation or reduction, and "R" explores the reasons and functions of NSSI. The "E" domain assesses exposure to risk that could result in serious harm in four main areas: severity (e.g., tissue damage), addictiveness (e.g., increased tolerance), lack of control during episodes of NSSI, and suicidal ideation (Buser & Buser, 2013). In support of the use of HIRE in clinical settings, the authors evaluated a 2.5-hour training for graduate counseling students using the model and found improvements in their assessment skills and confidence (Rutt et al., 2016).

Clinicians who have extended time to complete a comprehensive risk assessment may choose to use the STOPS FIRE model. STOPS FIRE was developed to be utilized in primary care settings as a tool for physicians and other medical providers to evaluate the level of severity of NSSI and risk for attempting suicide (Kerr et al., 2010). The mnemonic underscores several risk-related aspects of NSSI behavior: Suicidal ideation, Types, Onset, Place/location, Severity of damage, Functions, Intensity of self-injury urges, Repetition, and Episodic frequency.

The STOPS FIRE model overlaps with the SOARS model (Westers et al., 2016), which is briefer, more targeted, and draws directly from empirical studies demonstrating specific characteristics of NSSI that are associated with suicide attempts. The SOARS model was developed for busy pediatricians and medical professionals who treat adolescents, but it was also created to be used by mental health professionals and can be applied to adults who self-injure. SOARS is intended to be administered as part of the psychosocial interview and outlines what specific questions to ask and why (based in research and theory), advises how to ask each question, and is a mnemonic for: Suicidal ideation; Onset, frequency, and methods; Aftercare; Reasons; and Stage of change. The order of each assessment question and letter in SOARS is flexible. Using a combination of validating statements and suggested wording, SOARS is intended to be completed within five minutes and extended as a more thorough interview if needed or desired (Westers et al., 2016). In situations in which mental health clinicians only have time to assess three of the five letters of the model, they should assess suicidal ideation; onset, frequency, and methods; and reasons, shortening the acronym to SOR. Medical professionals, on the other hand, should assess suicidal ideation, aftercare, and reasons (SAR) during appointments in which they are limited to just three questions (Westers et al., 2016; Westers & Tinsley, in press). Pediatric medical residents trained in using the SOARS model demonstrate increases in knowledge and competence in caring for adolescents who self-injure (Matsumiya et al., 2021; Westers et al., 2023). A more detailed discussion of the SOARS model is provided below.

Stage of Change

The original SOARS model begins with assessing suicidal ideation as the first “S,” but based on the perspective of individuals with lived experience who have offered feedback that being asked about suicide at the outset may feel intrusive and overwhelming, it has been revised by flipping the two S’s of the model so that clinicians may consider first assessing motivation for change and then ending with the assessment of co-occurring suicidal ideation (Westers & Tinsley, in press). Not all youth who self-injure consider NSSI a problem, especially if they find it helpful in managing uncomfortable emotions. Furthermore, not all young people who self-injure believe they can stop or have considered stopping an option, and some may have low self-efficacy in believing they can resist NSSI urges (Hasking et al., 2017). Upon screening positive for NSSI, clinicians can respectfully ask, “Is this something you’d like to stop, or have you ever considered stopping?” (Westers et al., 2016). Their response may suggest how invested they will be in treatment or how likely they are to follow a referral to therapy. Furthermore, simply offering cessation as an option may move a young person from the precontemplation stage of the transtheoretical model of behavior change (Prochaska & DiClemente, 1983) to contemplation.

Onset, Frequency, and Methods

Early onset of NSSI (i.e., at or before age 12), longer history of the behavior, greater lifetime number of episodes (i.e., frequency), and greater number of methods (e.g., cutting, carving, burning, hitting, biting) have each been shown to increase risk for attempting suicide. Therefore, it is important to assess each of these variables when completing a risk assessment (Kerr et al., 2010; Westers et al., 2016). For instance, some research has shown that individuals with a longer history of NSSI are at increased risk for suicide attempt (Nock et al., 2006). Compared to those who began self-injuring at a later age, individuals who report having begun self-injuring at or before age 12 are more likely to report having engaged in more frequent NSSI, used a greater variety of methods, engaged in more medically severe NSSI, and visited the hospital for more NSSI-related reasons, and they are more likely to have experienced suicidal thoughts and made a suicide plan and attempt (Ammerman et al., 2018; Muehlenkamp et al., 2019). Hence, it is important to assess age of onset and duration of NSSI.

Studies have also shown a significant positive relationship between the number of lifetime episodes of NSSI and both likelihood of having attempted suicide and actual number of suicide attempts among both adolescents (Matney et al., 2018) and adults (Andover & Gibb, 2010). In other words, a greater frequency of NSSI is associated with increased risk for attempting suicide and for attempting suicide multiple times. Kerr et al. (2010) advise that 11–50 NSSI episodes are considered moderate risk, whereas those who engage in the behavior more than 50 times are at high risk. Other researchers, however, have found that risk for suicide attempt increases as the number of NSSI episodes increases but peaks around 21–50 episodes (Paul et al., 2015; Whitlock & Knox, 2007). Practically speaking, if an adolescent discloses having begun self-injuring 6 months ago and continues self-injuring 3–4 times a month, this implies a total of 18–24 episodes and may lead clinicians to be conscientious of the adolescent’s increased risk for suicide. However, research has not yet differentiated levels of risk among those who report having engaged in a specific number of episodes across various windows of duration. It is not yet known if there are differences of risk among adolescents who report having self-injured 21–50 episodes within 6 months, for example, compared to those who have engaged in the same number of episodes over the course of 6 years.

Research has consistently demonstrated that a greater number of NSSI methods is associated with increased risk for suicide attempt, especially in the context of greater NSSI frequency (Anestis et al., 2015; Matney et al., 2018 ; Turner et al., 2013). Although most individuals who self-injure use more than one method, Kerr et al. (2010) suggest that three or more methods of NSSI indicate high risk. According to the Interpersonal Theory of Suicide (IPTS; Joiner, 2005 ; Van Orden et al., 2010), individuals who experience suicidal ideation may attempt suicide when they have acquired the capability to act on such thoughts. Because suicide requires an individual to bypass the instinct for self-preservation, it is theorized that the capability for suicide increases over time through repeated exposure to painful and provocative experiences. Examples of painful and provocative experiences include physical and sexual abuse, disordered eating, substance misuse, military combat exposure, past suicide attempts, and NSSI. Each painful and provocative experience may lead individuals to become habituated to pain and become less fearful of death over time, thereby resulting in a greater capability of attempting suicide should they experience suicidal thoughts (Joiner, 2005; Van Orden et al., 2010). Different methods of NSSI may cause different types of pain, each method serving as its own painful and provocative experience and increasing the capability for suicide (Matney et al., 2018; Turner et al., 2013). For example, severe self-scratching, cutting, and carving (i.e., cutting symbols or words into one's skin) may serve as one form of pain (tearing), whereas self-biting and hitting and self-burning or using an eraser to cause an abrasion on one's skin may serve as additional forms of pain (bruising and burning, respectively). A greater number of methods, greater NSSI frequency, and longer duration of the behavior may increase the capability for suicide over time as the individual becomes more habituated to self-inflicted pain and more fearless about death. Hence, it may be clinically useful to ask, "Have you found that you have begun to self-injure more often or more deeply than a year ago (or when you first started)?" (Westers et al., 2016).

Aftercare

A respectful verbal assessment of NSSI wound severity and how young people care for their wounds provides useful information during a risk assessment. Although some individuals may hurt themselves more severely than intended, most injuries do not rise to the level of concern for safety (Washburn, 2014). Nonjudgmentally asking, "How do you typically take care of the wounds afterward?" and, "Have you ever hurt yourself so badly that you needed medical attention, like stitches, even if you never got it?" can elicit the subjective perspective of the young person (Westers et al., 2016) and inform if a referral to a medical provider is warranted. Of course, all wound care should be provided with the same empathy and treatment quality as injuries that are accidental or non-self-inflicted (Plener et al., 2016). For risk assessment recommendations for medical providers, see Westers and Tinsley (in press).

If a wound is not concealed, some therapists choose to take an inconspicuous glance or use their peripheral vision to make sure no immediate medical care is needed. However, other therapists and mental health professionals believe it is their responsibility to conduct a direct, visual assessment of NSSI wounds. In general, and with few exceptions, this should be avoided. First, without proper medical training, taking responsibility for assessing and caring for wounds is outside the scope of practice of most mental health professionals and could breach ethical practice and increase liability. Second, it would be inappropriate to assess wounds in personal, private areas on the body. Delineating what is appropriate to assess and what is inappropriate to assess is often arbitrary and, again, may increase concerns of liability. Furthermore, if a therapist or clinician trusts the response of their client when conducting a verbal assessment of wounds in concealed private areas, it is reasonable to trust their response during a verbal assessment of wounds in non-concealed, less personal locations on the body. Third, checking wounds can inadvertently reinforce the behavior due to offering unique interest, empathy, and/or special care (Linehan, 1993). Relatedly, asking to view wounds can be perceived as voyeuristic and intrusive. Fifth, therapists are unlikely to take responsibility for visibly assessing and providing care for accidental or non-self-inflicted wounds, and few psychotherapists have the medical supplies to offer the proper care of even minor injuries (e.g., bandages, topical ointment). Finally, severity of wounds can be effectively assessed verbally (Klonsky et al., 2011) as most wounds do not raise safety concerns (Washburn, 2014). If medical care is deemed necessary after completing a verbal assessment, the mental health professional can refer them to a medical professional for further evaluation and treatment.

Sometimes a young person may offer to show their therapist their wound. Immediately declining and responding that this is not necessary may be perceived by the young person as dismissive and unempathetic and lead to a rupture in the therapeutic relationship. In these cases, therapists can gently explore the reasons behind this request. For example, the adolescent's parents might be conducting daily body checks for any new wounds, and the young person may come to expect that this is the norm, even in therapy. Caregivers may need to be discouraged from conducting such intrusive searches for many of the same reasons outlined above. Another reason for offering to show their therapist any NSSI wounds could be to be provocative and elicit a specific response from their therapist. On the other hand, and perhaps more likely, it is possible that their behavior has been dismissed as "attention-seeking" and they are simply looking for someone to take them and their NSSI wounds seriously. Therefore, if a young person offers to show their wounds, the therapist might say, "I feel comfortable verbally assessing your wound instead of visibly examining it. Would you like me to look at your wound, or would you prefer that I just ask you questions about it?" In this way, the therapist can respect the adolescent's autonomy and still do a good verbal assessment. If the young person asks that they be visibly assessed, the therapist can do a quick visual check and continue with a verbal assessment so as not to socially reinforce the behavior.

Reasons

One of the most important components of any NSSI risk assessment is understanding the function(s) of the behavior. Most people self-injure for more than one reason (Paul et al., 2015), most often to regulate emotional states and find relief from unwanted feelings (Coppersmith et al., 2021). Sometimes NSSI serves multiple functions at once, and the reasons someone engages in NSSI can change over time (Coppersmith et al., 2021). However, the more functions the behavior serves, the greater likelihood of reporting having attempted suicide (Paul et al., 2015). Additionally, certain functions are more closely associated with a suicide attempt than others and require clinical judgment about when to break confidentiality and disclose a young person's NSSI to their parents. For example, self-injuring to cope with suicidal thoughts and avoid suicide is the function of NSSI most strongly associated with attempting suicide (Paul et al., 2015). Clinicians should, therefore, inform parents about their child's NSSI and suicidal thoughts in these cases. Parents expect to be informed about suicidal safety concerns, and because NSSI functions can change over time, it is possible that self-injuring to avoid suicide could become ineffective for that adolescent, potentially leaving them without other coping strategies for suicidal thoughts and, therefore, increasing their risk for attempting suicide (Westers et al., 2016). Engaging in NSSI for the reason of self-hatred or to end dissociative experiences are two additional functions closely related to suicide attempts (Paul et al., 2015).

Audibly acknowledging that a young person engages in NSSI for reasons that are likely helpful to them can offer validation to many who otherwise feel misunderstood. Clinicians should start with a validating observation such as, "It sounds like this has been helpful for you," and then ask, "In what ways does it help you?" or, "What does it do for you?" (Westers et al., 2016). This bypasses any assumptions held by the clinician and allows the young person to feel heard. The adolescent's responses may also guide the treatment plan, especially when exploring alternative coping strategies with the same or similar functions as their NSSI. For examples, see Westers et al. (2016) and Westers and Tinsley (in press). Actively listening with a nonjudgmental stance also opens the door for the use of motivational interviewing strategies in which therapists can, after learning how NSSI helps them, explore what it is costing them.

Suicidal Ideation

As previously discussed, NSSI should not be conflated with suicide behavior, as this can result in invalidation of the adolescent's experience, dismissal of the function of their NSSI, and costly visits to the emergency department and/or psychiatric inpatient programs when unnecessary (Muehlenkamp, 2005; Westers & Plener, 2020). Nevertheless, NSSI is a strong risk factor for attempting suicide, particularly among adolescents with co-occurring depression and who self-injure to avoid suicide. Research has shown a time lag between the onset of NSSI among adolescents and later suicide attempt, with thoughts of suicide beginning up to six months prior to first engaging in NSSI, and the onset of NSSI occurring up to one to two years prior to attempting suicide. There appears to be an important 6- to 12-month window of opportunity to intervene after the onset of suicidal thoughts in order to prevent NSSI and suicidal behavior (Glenn et al., 2017). Hence, mental health professionals should neither underreact by assuming NSSI is completely unrelated to suicidal thoughts and behaviors nor overreact by assuming suicidal thoughts always accompany NSSI (Westers & Tinsley, in press).

Before assessing co-occurring suicidal thoughts and behaviors, clinicians should demonstrate to the young person their competence and understanding of how NSSI is and is not associated with suicide, such as by stating, "I know self-injury isn't usually about suicide, but some people may think about suicide when they self-injure." They may then straightforwardly ask, "Do you ever think about suicide whenever you [NSSI behavior]?" (Kerr et al., 2010; Westers et al., 2016). If clinicians choose to ask about co-occurring suicidal ideation at the end of the SOARS assessment, by this point, they will likely have an adequate understanding of suicide risk and can make appropriate, clinically informed decisions regarding the next steps in treatment.

Treatment Options for Nonsuicidal Self-Injury

Similar to interventions for suicidal youth, no treatments have been fully demonstrated to be effective for youth who engage in NSSI, though several treatments have shown promise. This is due to several reasons. First, most treatments that affect NSSI tend to do so within the context of treating co-occurring diagnoses (e.g., BPD, depression) rather than aiming to address NSSI alone. Next, it is difficult to design treatment studies because NSSI Disorder is still in the proposed diagnostic stage of the DSM, and diagnostic criteria have yet to be well established by research (Butler & Malone, 2013). Third, most treatment studies include adult participants rather than children and adolescents. Finally, when NSSI is assessed in treatment studies, including in systematic reviews and meta-analyses, it is rarely differentiated from suicidal self-harm (e.g., Iyengar et al., 2018; Ougrin et al., 2015; Turner et al., 2014). For example, a systematic review of 16 randomized trial intervention studies for adolescent NSSI and suicide attempts found 5 studies that demonstrated a significant effect for decreasing self-harm (Iyengar et al., 2018), but the researchers did not differentiate between suicide attempt and NSSI. One systematic review (Turner et al., 2014) did examine the efficacy of psychological interventions in which suicide attempts and NSSI are differentiated. Even so, of the 25 intervention studies in this review, not all of the treatments used randomized controlled trials (RCTs) or were developed specifically to treat adolescents, NSSI, or adolescent NSSI. Even among those studies that do differentiate between NSSI and suicide and assess intervention efficacy for children and adolescents, a recent, sobering meta-analysis found nonsignificant treatment effects for all self-injurious thoughts and behaviors, including NSSI (Harris et al., 2022). Similar results were found in a meta-analysis examining the utility of psychotropic medications in reducing NSSI among children and adolescents. That is, there are no current efficacious pharmacologic interventions for addressing NSSI among youth (Eggart et al., 2022).

Treatments Targeting Emotion Regulation

The mechanism of effect in treatments targeting NSSI is still unknown (Turner et al., 2014), but those treatments showing some efficacy in reducing severity and frequency of NSSI suggest emotion regulation as a primary mechanism of change (e.g., Gratz et al., 2015). Decreasing emotion dysregulation is proposed to mediate the relationship between treatment intervention and decreases in NSSI. It is with this approach that third wave, acceptance-based cognitive behavioral therapies such as dialectical behavior therapy (DBT), Emotion Regulation Group Therapy (ERGT), Emotion Regulation Individual Therapy for Adolescents (ERITA), and mentalization-based treatment (MBT) have demonstrated effects.

Dialectical Behavior Therapy

DBT views NSSI as a maladaptive problem-solving strategy aiming to solve the problem of emotional distress (Linehan, 1993; Rathus & Miller, 2002). DBT incorporates four skills-based modules that address emotion dysregulation to some degree: (1) emotion regulation, (2) distress tolerance, (3) interpersonal effectiveness, and (4) mindfulness. For example, emotion regulation skills include increasing awareness and understanding of emotions, and distress tolerance skills include increasing acceptance of, and altering behavioral responses to, emotions. Mindfulness practice, a core element of DBT, emphasizes nonjudgmental observation of emotions as they are experienced rather than acting on or labeling emotions as “good” or “bad.” If an intense emotion is experienced as “bad,” NSSI may be viewed as a useful behavioral response and solution to regulate the emotion or to avoid the emotion altogether. Mindfulness, on the other hand, is a behavioral response that enables the individual to experience the intense emotion without attributing a negative meaning to it, thereby eliminating the need to engage in NSSI to regulate or avoid the emotion (Lynch et al., 2006).

Among adults, DBT has demonstrated mixed results regarding its benefits over treatment as usual in decreasing NSSI specifically (Turner et al., 2014). Results are similar among DBT adapted for adolescents (DBT-A). Fleischhaker et al. (2011) used a 16- to 24-week manualized version of DBT-A with 12 adolescent females in Germany and found a significant reduction in NSSI frequency at follow-up one month later and one year later, although there was no control group for comparison. Mehlum et al. (2014) implemented an RCT to evaluate a 19-week version of DBT-A in Norway and found a significant reduction in self-harm when compared to the treatment as usual group, mediated by reductions in hopelessness (Mehlum et al., 2019). Improvements were maintained one year later (Mehlum et al., 2016) and three years later (Mehlum et al., 2019), but results specifically for NSSI were not reported as the researchers did not differentiate between NSSI and suicide attempt. Indeed, meta-analyses examining treatment effects of DBT-A compared to control groups have found small to moderate effect sizes for decreasing self-harm (Kothgassner et al., 2021), but the studies included in the analyses typically combine both suicide and NSSI under the umbrella category “self-harm” and do not examine suicidal and nonsuicidal behaviors separately.

In one of the only RCTs to date in which NSSI is differentiated from suicide, McCauley et al. (2018) randomized participants to a 6-month DBT-A intervention or individual and group supportive therapy (IGST). DBT-A participants demonstrated a significantly greater decrease in both NSSI and suicide attempts at the end of treatment compared to IGST, but no between-group differences were found at 12-month follow-up. An RCT of the Safe Alternatives for Teens and Youths (SAFETY) family intervention, which draws from DBT, also did not find any benefit over enhanced treatment as usual in decreasing NSSI among adolescents (Asarnow et al., 2017).

Emotion Regulation Group/Individual Therapy

Emotion regulation therapy, such as ERGT (Gratz & Gunderson, 2006) and its adapted version for adolescents, ERITA (Bjureberg et al., 2017; Bjureberg et al., 2018), is an acceptance-based behavioral therapy that draws from DBT and Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) to specifically target NSSI. It views NSSI as an attempt to control or avoid certain emotions, and it emphasizes control of behavior in the presence of emotional distress rather than control of emotions (Gratz & Gunderson, 2006). Consistent with DBT, principles include increasing awareness, understanding, and acceptance of emotions, as well as improving one's ability to metabolize emotions in a healthy way by altering behavioral responses to emotions rather than eliminating, avoiding, or controlling emotions themselves. Consistent with ACT principles, treatment also includes increasing the willingness to experience difficult emotions as they arise and emphasizing the pursuit of meaningful activities and goal-directed behavior in light of emotions (Gratz & Gunderson, 2006). In the context of NSSI, emotion regulation therapy highlights the paradoxical effect of emotional avoidance: when emotional distress occurs and is perceived as intolerable, NSSI short-circuits the emotional distress in the moment but reinforces the perception that difficult emotions are intolerable and, therefore, must be avoided or controlled. When emotions are present, ERGT and ERITA teach participants the importance of being willing to experience emotions in order to pursue meaningful life activities. This is framed as a choice, and again, emphasis is on controlling behavior (e.g., NSSI as an emotionally avoidant response) rather than on controlling emotions. Participants are not expected to always choose emotional willingness but are encouraged to do so more frequently than before (Gratz & Gunderson, 2006).

Two RCTs evaluating the effectiveness of ERGT with adults found significant reductions in NSSI frequency and severity among participants in the 14-week intervention group when compared to treatment as usual (Gratz et al., 2014; Gratz & Gunderson, 2006). Uncontrolled trials of ERGT have shown similar results in both the US (Gratz & Tull, 2011) and Sweden (Sahlin et al., 2017). ERGT has been adapted for adolescents in the form of a 12-week individual therapy, or ERITA, with an online parenting program. Two uncontrolled trials of ERITA have been carried out in Sweden among adolescents who meet DSM-5 proposed criteria for NSSI Disorder. The first study found significant improvements in NSSI among 17 adolescent females, showing significantly lower frequency (large effect size) and fewer number of methods (medium effect size) of past month NSSI at posttreatment and 6-month follow-up (Bjureberg et al., 2017). The second study, which was an online version of ERITA, showed similar results among 25 adolescents meeting criteria for NSSI Disorder (Bjureberg et al., 2018). An RCT for the internet-based version of ERITA, known as the TEENS trial, is currently underway (Olsen et al., 2021). Other researchers have borrowed components from ERGT and ERITA and have found promising results in decreasing NSSI among adolescents (Ataie et al., 2022; Larsson et al., 2020).

Mentalization-Based Treatment

MBT views NSSI as a result of poor mentalization amidst emotionally challenging situations. Mentalization, a core component of MBT, is a skill developed through healthy attachment and interactions with caregivers during childhood that enables an individual to regulate emotions by reflecting on one's own thoughts and feelings and putting oneself in others' shoes to better understand or "mentalize" thoughts and feelings of the self and others (Malda-Castillo et al., 2018). Without this ability, individuals may feel overwhelmed and impulsively engage in NSSI amidst emotional distress. As a treatment, MBT aims to improve mentalization during emotionally difficult situations as well as to decrease attachment avoidance, thereby reducing NSSI (Rossouw & Fonagy, 2012).

A systematic review of 23 studies assessing the effectiveness of MBT found some support for decreasing overall self-harm among adults with BPD (Malda-Castillo et al., 2018). At the time, only one study had assessed the use of MBT for adolescents (MBT-A) who self-harm. In this RCT, Rossouw and Fonagy (2012) evaluated the efficacy of a manualized 12-month psychodynamic MBT-A in the United Kingdom and found that MBT-A was significantly more effective than treatment as usual at reducing self-harm. A more recent RCT examining the effectiveness of a 12-week version of MBT-A for adolescents compared to treatment as usual found significant reductions in self-harm in both groups over time but with no significant group differences (Griffiths et al., 2019). In each study, self-harm included both suicidal and nonsuicidal self-harm, so results for NSSI specifically were not reported.

Treatments Targeting Differential Reinforcement of Alternative Behaviors

Rather than viewing emotion regulation as the primary mechanism of effect, cognitive-behavioral therapies view differential reinforcement of alternative behaviors as a mechanism of change (Andover et al., 2015, 2017). This approach takes a functional assessment of the behavior (Nock & Prinstein, 2004) by assessing the antecedents and consequences and exploring alternative behaviors that may serve similar functions. It also aims to alter maladaptive cognitions related to the behavior (Andover et al., 2015, 2017; Kaess et al., 2020). Examples of Cognitive Behavioral Therapy (CBT) treatments that have shown some efficacy in reducing NSSI include Manual-Assisted Cognitive Therapy (MACT), Treatment for Self-Injurious Behaviors (T-SIB), and the Cutting Down Program (CDP).

Manual-Assisted Cognitive Therapy

Most studies have examined CBT as an intervention for general self-harm. Randomized controlled studies evaluating MACT have shown some efficacy in decreasing self-harm among adults (Evans et al., 1999; Tyrer et al., 2003), and one RCT of a 12-week CBT plus treatment as usual intervention showed a significant reduction in self-harm among adolescents and adults compared to treatment as usual alone (Slee et al., 2008). However, these studies did not differentiate between suicide attempt and NSSI. A meta-analysis of eight studies evaluating CBT for suicidal and NSSI behaviors among adolescents found a small but significant effect on decreasing NSSI (Labelle et al., 2015). Only a few studies to date have examined CBT as an intervention for NSSI specifically. For example, an RCT of a 6-session MACT for adults found significant decreases in NSSI frequency and severity at 6-month follow-up (Weinberg et al., 2006).

Treatment for Self-Injurious Behaviors

T-SIB was developed as a 9-session CBT intervention to target NSSI among young adults with and without BPD (Andover et al., 2015). The first session provides psychoeducation about NSSI, conceptualizes the behavior as a coping strategy, and utilizes motivational interviewing strategies for individuals who are ambivalent about change. Using antecedent-behavior-consequent (ABC) charts, sessions 2–6 conduct and practice detailed functional analyses of NSSI behaviors, identify alternative behaviors to NSSI that serve the same or similar functions, and practice using these alternative behaviors (i.e., application of differential reinforcement of alternative behaviors for NSSI). Sessions 7 and 8 include one of three individualized modules chosen by identifying the most common antecedent to NSSI behavior: interpersonal communication, cognitive distortions, or distress tolerance. Early studies have shown T-SIB to significantly decrease the frequency of NSSI in both uncontrolled (Andover et al., 2015) and controlled trials (Andover et al., 2017).

Cutting Down Program

CBT interventions such as MACT and T-SIB have yet to be studied among adolescents who engage in NSSI. The CDP is the only CBT treatment package specifically for adolescents who engage in NSSI that has been developed. It is an 8–12 session manualized CBT program composed of 4 modules (Kaess et al., 2020; Taylor et al., 2011). The first module focuses on using motivational interviewing for those with low motivation, and introducing behavior analyses and providing psychoeducation about thoughts, feelings, and behaviors for those with higher motivation. The second module focuses on identifying reasons for engaging in NSSI by exploring the link between thinking errors, emotions, and behaviors. The third module then tests alternative behaviors to NSSI, including problem-solving and exploring coping strategies other than NSSI. Finally, the fourth module works toward stabilizing the use of these alternative behaviors, consolidating gains, and preventing relapse (Taylor et al., 2011).

An initial evaluation of the CDP showed significant decreases in self-harm among 16 adolescents in the United Kingdom at 3- and 6-month follow-ups (Taylor et al., 2011). Although this study did not have a comparison group or differentiate NSSI from suicide attempts, a separate team of researchers in Germany designed an RCT to evaluate the CDP compared to treatment as usual in reducing NSSI specifically among 74 adolescents (Kaess et al., 2020). Participants in both groups experienced significant reductions in NSSI frequency by 10-month follow-up, but there were no differences between the two groups. However, participants in the CDP group experienced reductions in NSSI more quickly compared to the treatment as usual group (Kaess et al., 2020). A large RCT of an online version of the CDP for adolescents and young adults is currently underway (Kaess et al., 2019).

Digital Interventions for Nonsuicidal Self-Injury

With recent technological advancement and increasing interest in improving mental health treatment accessibility, researchers and clinicians have developed innovative digital interventions for a variety of diagnoses and concerns. A small number of digital interventions for NSSI have been designed for online use or via mobile app (for a review, see Kruzan & Whitlock, in press). For example, Hooley et al. (2018) created Autobiographical Self-Enhancement Training (ASET), an online daily diary intervention focused on decreasing self-criticism and increasing positive self-image among individuals who self-injure. An RCT examining the effect of ASET compared to an expressive writing group and daily journaling group revealed a decrease in the frequency of NSSI across all three groups during the intervention, although NSSI frequency returned to baseline across all groups by 3-month follow-up. A series of three RCTs examining the efficacy of a brief app called Therapeutic Evaluative Conditioning (TEC), which is designed to increase aversion to stimuli associated with NSSI and other self-injurious thoughts and behaviors and to decrease avoidance of the self, also found decreases in NSSI episodes during one-month use of the app (Franklin et al., 2016). Importantly, both studies of ASET and TEC included only adult participants, and neither is currently available to the public.

Individuals seeking information and support in online communities may turn to publicly available peer-support apps. There are risks and benefits to seeking support for NSSI behavior online (Lewis & Seko, 2016) or through mobile apps (Westers & Plener, 2020). One study followed 268 users (ages 13–38) of a mobile peer-support app for four months and assessed time spent engaging the app, posting triggering content, and viewing triggering content, and their association with NSSI thoughts, intentions, and behaviors (Kruzan et al., 2021). Results revealed that actively using the app was related to reduced thoughts and intentions of engaging in NSSI but did not have any effect on actual NSSI behavior or the ability to resist urges. Posting triggering content was related to greater likelihood of endorsing NSSI thoughts and behaviors. Interestingly, viewing triggering content was associated with both greater intention to self-injure and greater self-efficacy to resist urges to self-injure (Kruzan et al., 2021).

Single-session interventions (SSIs) delivered online have shown promise for treating several psychiatric problems among youth and making treatments accessible (Schleider & Weisz, 2017). Project SAVE (Dobias et al., 2021) is an online, self-guided 30-minute SSI developed specifically to target NSSI and suicidal ideation among adolescents. An RCT found that immediately following the intervention, Project SAVE participants reported a significant decrease in self-hatred and a significant increase in desire to cease NSSI compared to participants in the control group, although both groups reported significant decreases in self-hatred at 3-month follow-up when differences in self-hatred between the two groups were no longer significant (Dobias et al., 2021). There were also no changes or differences between groups in terms of NSSI frequency or suicidal ideation immediately following the intervention or at 3-month follow-up. Clearly, digital interventions show promise for reducing NSSI among youth, but much work is yet to be done.

Considerations for Treatment Choice

When choosing which approach to take in treatment, clinicians are likely to consider at least three factors: (1) feasibility, (2) duration, and/or (3) format. DBT may be the most feasible treatment approach to date, although the empirically supported comprehensive DBT treatment packages are much rarer than DBT-informed treatments (i.e., those treatments that include elements of DBT but not the full program). Similarly, emotion regulation therapies like ERGT and ERITA are considered feasible (e.g., Bjureberg et al., 2017) but, like MBT, training in these modalities is not easily accessible. Digital interventions have demonstrated both high feasibility and acceptability (Dobias et al., 2021; Hooley et al., 2018). Regarding duration, both DBT and MBT require long-term treatment, usually ranging from 6 to 18 months. Emotion regulation therapy and T-SIB are time-limited, ranging from 9 sessions (T-SIB) to 12–14 weeks (ERITA and ERGT). Some evidence suggests ERITA can serve as a standalone treatment for adolescent NSSI (Bjureberg et al., 2017). Mobile app interventions, like TEC, can be used briefly or indefinitely if needed, and SSIs take very little time (about 30 min). Finally, because process group therapy is contraindicated for NSSI, clinicians may consider a skills-based group therapy format like DBT or ERGT to reach more individuals; individual therapy format like MBT, ERITA, or T-SIB to tailor to the individual; or virtual and/or self-guided formats like those offered digitally.

Summary of the Current Evidence-Base for Nonsuicidal Self-Injury

To summarize, published reviews of potentially efficacious treatments frequently cite DBT, ERGT, MBT, and CBT as holding promise for the treatment of NSSI, particularly among adults. Nevertheless, no intervention has shown to be superior to others or the treatment of choice for reducing adolescent NSSI. To date, most studies evaluating treatment for NSSI assess intervention effectiveness among small samples of Caucasian women with diagnoses of BPD or subthreshold BPD. Few outcome studies have been replicated or extended to adolescents, and of those that have, male and non-White participants are rarely included, and few treatments have been evaluated by more than one research team. Treatment studies require replication, larger and more diverse samples of participants, trials with children and adolescents, clear definitions that differentiate NSSI from suicidal self-harm (that can clearly determine efficacy for each), and randomized controlled designs with comparison groups. A final consideration includes length of treatment; brief interventions for adolescent NSSI that transcend any specific diagnosis are needed (Andover et al., 2015; Gratz & Gunderson, 2006).

Conclusion

Approximately one in five adolescents report having engaged in NSSI at some point in their life, most often to regulate or manage emotions and sometimes for interpersonal reasons. There is no single risk factor for NSSI, but emotion dysregulation, depression, anxiety, maltreatment (particularly childhood emotional abuse), self-criticism, eating disorder behavior and poor body image, suicidal thoughts and behaviors, and past NSSI behavior are all significant risk factors, among others, for future NSSI behavior. Extant risk assessment models that address these factors as well as variables specific to NSSI include HIRE, STOPS FIRE, and SOARS. Most treatments that demonstrate effectiveness in reducing NSSI behavior are not specific to NSSI (e.g., DBT, MBT, CBT) but address the context in which it occurs (Westers et al., 2016). Nevertheless, RCTs of interventions developed specifically to address NSSI have shown promise.

Conflict of Interest I have no conflict of interest to disclose.

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Understanding Selective Mutism: A Comprehensive Guide to Assessment and Treatment

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Definition and Diagnostic Criteria for Selective Mutism

Children and young people (hereafter referred to as children unless referring to particular age groups) with a diagnosis of Selective Mutism (SM) fail to speak in select social situations where speech is anticipated and/or expected (APA, 2013). Whilst this group of children have been shown to understand spoken language and are able to use spoken language to communicate in some settings (such as the family home), they often fail to speak in other situations, most commonly with adults and peers at school (Letamendi et al., 2008). SM typically has its onset in early childhood (i.e., age 2–5 years; e.g., Bergman et al., 2013; Black & Udhe, 1995; Dummitt et al., 1997), with a proportion of parents reporting that their child was always socially reticent (e.g., Andersson & Thomson, 1998; Krohn et al., 1992). The upper age of onset coincides with the first year of formal schooling which varies between countries (Andersson & Thomsen, 1998; Ford et al., 1998; Kumpulainen et al., 1998; Steinhausen & Juzi, 1996). Prevalence studies show that SM affects 0.4–1.5% of preschool children (Bufferd et al., 2011; Elizur & Perednik, 2003, Ezpeleta et al., 2014) and 0.03–2.0% of children in the first 3 years of school (Bergman et al., 2002; Karakaya et al., 2008; Kumpulainen et al., 1998). Prevalence rates in adolescence and adulthood are unknown but likely extremely rare. Moreover, there is an increased prevalence of SM in those for whom the dominant community language is their second language (Elizur & Perednik, 2003).

With regard to gender, epidemiological studies show mixed results, with some reporting a greater frequency in males (e.g., Andersson & Thomsen, 1998; Karakaya et al., 2008) and others reporting a greater frequency in females (e.g., Ezpelata et al., 2014; Kumpulainen et al., 1998) or no gender differences (e.g., Elizur & Perednik, 2003). Clinical samples, on the other hand, tend to have a higher ratio of females to males (e.g., Chavira et al., 2007; Diliberto & Kearney, 2016; Oerbeck et al., 2014), suggesting that females with SM may be more likely to be brought in for treatment.

Interestingly, studies show that children are often referred for treatment 2–5 years following the onset of the SM, usually due to the parents' and educators' expectations that the observed failure to speak is a normal developmental behaviour that the child will outgrow (Andersson & Thomsen, 1998; Black & Udhe, 1995; Bergman et al., 2013; Dummitt et al., 1997). Moreover, treatment is generally

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sought after a period of formal schooling (Bergman et al., 2013; Krohn et al., 1992) because the mutism severely compromises the child's academic participation and friendships (Cline, 2015; Ford et al., 1998). However, earlier assessment and a collaborative treatment response is essential given the increased risk of an enduring impact on functioning across the lifespan when left untreated (Oerbeck et al., 2018; Remschmidt et al., 2001).

When considering a formal DSM-5 (*Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*: APA, 2013) diagnosis of SM, first, the mutism needs to have been present for at least 1 month, but this should not include the first month of (pre)school. Second, the diagnosis is not given if the prolonged failure to speak can be understood as being part of a speech and language delay or Autism Spectrum Disorder (APA, 2013). Third, for children who are learning a new language, the diagnosis is commonly withheld whilst the child builds competency and confidence in speaking the new language, and the mutism then needs to be present in the primary and new language (Toppelberg et al., 2005). Finally, diagnosis also requires that the reason treatment is sought is due to the functional impact of the prolonged mutism on the child's level of academic, social and community participation, friendships and achievement of developmentally appropriate independence (APA, 2013).

History

The first published account of children failing to speak in select situations appeared in 1877, termed "aphrasia voluntaria" (Driessen et al., 2020), and then in 1934 the descriptive term "Elecktiver Mutismus bei Kindern" or Elective Mutism was coined by Tramer (Salfield, 1950). Various other terms were used in the first half of the 1900s to describe the mutism, including speech shyness, speech avoidance, negativism, functional mutism and psychogenic mutism (e.g., Adam & Glasner, 1954; Kratochwill et al., 1979). It was not until 1980 that Elective Mutism (EM) was first introduced as a distinct disorder in the section "Other Disorders of Infancy, Childhood or Adolescence" of the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition* (DSM-III: APA, 1980).

Published research to the 1980s from single case studies (e.g., Brison, 1966; Chethik, 1973), case study series (e.g., Morris, 1953; Reed, 1963; Salfield, 1950) and retrospective reviews of clinical cases (e.g., Adam & Glasner, 1954; Hayden, 1980) uncovered commonalities in the descriptions of children with mutism. These common descriptions included no neurological cause and a sensitive/hypersensitive, timid, shy, "slow to warm up", negativistic and/or inhibited, socially avoidant temperament. The mutism most commonly occurred in relationships outside of the immediate family. Clinically, it was hypothesised that these children were "electing" not to speak to suppress the expression of negative emotions (most commonly thought to be anger, hostility, defiance or depressive feelings), arising from either the intra-psychic conflict in the child (e.g., a traumatic event preceding and/or during language development) or in response to hostile and/or unsafe family interactions (e.g., ongoing family and/or marital relationship problems) and/or parent behaviour (e.g., potential and/or real loss of the maternal relationship; parent mental health problems) (e.g., Adam & Glasner, 1954; Morris, 1953; Salfield, 1950).

As such, treatment up to mid-1960s focused on resolving these hypothesised causal and maintaining factors rather than directly addressing the speech itself. Treatment predominately consisted of intensive individual therapy with the child, individual inpatient admissions of 1 or more years with infrequent, time limited contact with the family and/or special school placement (e.g., Browne et al., 1963; Chethik, 1973; Elson et al., 1965; Pustrom & Speers, 1964). In some cases, concurrent individual therapy with the child's mother or family group therapy was included (Wright et al., 1994). Irrespective of the mode of therapy, clinicians often highlighted the difficulties associated with treating the symptoms of mutism (Kratochwill et al., 1979), and improvements would often arise outside of therapy in contexts with no pressure to speak (Pustrom & Speers, 1964; Reed, 1963).

In the mid-1960s, a shift in treatment took place that coincided with the emergence of Behaviour Therapy. This saw speech become the focus of treatment, with mutism viewed as a learned pattern of behaviour rather than intentional (Porjes, 1992). Treatment often consisted of a single behavioural technique or multimodal behavioural therapy (including contingency and token reward programmes, response costs, shaping, self-modelling, escape-avoidance and stimulus fading) which was implemented in outpatient clinic sessions and at the child's regular school with the active involvement of the teacher. These interventions were considered to be most effective due to the observed increase in speech that was attributed to the intervention itself rather than natural remission over time (e.g., Kratochwill et al., 1979; Krysanski, 2003; Tancer, 1992).

This shift in treatment protocol also saw a change in the view of mutism as a volitional behaviour where the child "elected" not to speak to a behavioural response that occurred in "select" social interactions (Dummitt et al., 1997; Krysanski, 2003). This view was incorporated into the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) in 1994 (APA, 1994) and the disorder was renamed "Selective Mutism". Following this, studies started to compare larger groups of children with SM to other clinical disorders and controls using well-validated multi-respondent semi-structured interviews, questionnaires and observational behavioural experiments. This research showed empirical evidence that SM was an anxiety-based disorder which emerged in social interactions with adults and children outside of the home (Cohan et al., 2008; Muris & Ollendick, 2015). As such, SM was reclassified as an "Anxiety Disorder" in *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5; APA, 2013).

Descriptive Features of Selective Mutism

Symptom Profile

Speaking Behaviour

Speaking behaviour in children with SM varies greatly and depends upon a number of factors such as:

Context A recent study showed that in the school context children with SM spoke significantly less frequently than children with Social Anxiety Disorder and both groups spoke less than nonclinical controls (Milic et al., 2020). In contrast, no difference emerged in the frequency of speech for children with SM compared with Social Anxiety Disorder when speaking with new or less familiar adults and/or peers and both groups spoke less frequently in these interactions than nonclinical controls (Milic et al., 2020). Finally, in interactions with extended family and familiar family friends, and with parents in the presence of an audience, the frequency of speech was similar across all groups. Moreover, Milic et al. (2020) found that children with SM as young as four were aware of the context(s) in which they failed to speak. This lends support to the clinical observation that children with SM hold a stable self-view of people, places and activities where they are comfortable talking (or not) (Schwenck et al., 2021).

In sum, mutism is most commonly observed at school followed by the community. In more severe presentations, children fail to speak at (pre)school, in less familiar and regular community social activities (particularly physical movement activities such as sport) and with extended family even with immediate family in the vicinity (e.g., Black & Udhe, 1995; Kumpulainen et al., 1998; McHolm et al., 2005; Schwenck et al., 2021).

Audience A proportion of children are totally mute with almost all adults and children outside of their immediate family (Andersson & Thomsen, 1998; Steffenburg et al., 2018). The mutism is more commonly observed with less familiar adults who speak directly to the child with an expectation of a verbal response, who are perceived by the child to be more authoritarian, loud or firm in their manner, and who do not give the child the time or space to warm up in the interaction (Schwenck et al., 2021). In the more severe presentations of SM, if the child does speak at school, it is likely to be only in select situations, most often to a parent and possibly one or two peers away from the classroom (Karakaya et al., 2008; Kumpulainen et al., 1998; Steinhausen & Juzi, 1996). Other variables that increase the likelihood of mutism include larger groups of people in the space as the potential audience, the amount of noise in the immediate environment, and the chance that someone might speak to them (Schwenck et al., 2021).

Content of the Speech The beginning (e.g., hello) and ending (e.g., goodbye) of an interaction, initiating a topic of conversation during an interaction, social expectations (i.e., saying thank you, sorry) and the expectation of performance (i.e., modelling speech in the moment) are often considered the more anxiety-provoking aspects of speaking which trigger a "freeze" response (Bergman, 2013; McHolm et al., 2005). In contrast, responding to a forced choice question or spontaneous sharing are likely to trigger a lower fear response (McHolm et al., 2005).

In summary, the frequency, duration and quality of speech with people with whom children with SM do speak to varies depending on the context, potential audience and content of speech. If children with SM do speak in any of the situations previously described, safety behaviours are often observed, including restricted speech (single words or short phrases), speaking in a whisper, increased latency to respond verbally to a parent, hiding behaviours to decrease being observed and no or minimal spontaneous speech (e.g., Ford et al., 1998; Milic et al., 2020).

Nonverbal Social Behaviour

Another important aspect of SM requiring consideration is the child's level of nonverbal responsiveness with both people with whom they do feel comfortable and those they do not. The range of nonverbal responses can vary greatly, with some children with SM completely freezing in social interactions (Østergarrd, 2018; Vogel et al., 2019) and others exhibiting some level of nonverbal responsiveness and comfort in interactions with children and adults with whom they do not speak (Andersson & Thomsen, 1998; Kumpulainen et al., 1998; Yeganeh et al., 2003). Research has shown that according to observer- and teacher-reports both children with SM and children with high social anxiety display similar nonverbal social anxiety behaviours (including restricted nonverbal gestures and movement, fewer smiles) and both groups show more of these behaviours than nonclinical controls (Milic et al., 2020; Poole et al., 2020).

Internalising Symptoms

When children with SM were compared to nonclinical controls across various studies using parent-, teacher- and child-report, children with SM were shown to experience significantly higher levels of internalising symptoms, particularly general and social anxiety (e.g., Alyanak et al., 2013; Bergman et al., 2002; Elizur & Perednik, 2003).

Studies comparing children with SM to children with Social Anxiety Disorder found that children with SM showed more severe levels of clinician- and observer-rated social distress than children with Social Anxiety Disorder (e.g., Yeganeh et al., 2003, 2006; Young et al., 2012). However, parent and self-reports reflected similar levels of anxiety between these groups (McInnes et al., 2004; Yeganeh et al., 2003, 2006; Young et al., 2012). These mixed results led some authors to question whether observers might rate severity of overall anxiety higher among children with SM relative to children with Social Anxiety Disorder because of a stronger emphasis placed on speaking behaviour (e.g., Carlson et al., 2008; Yeganeh et al., 2003, 2006). Social anxiety measures used in these studies typically contain items related to speaking, hence producing spurious overlap with SM. In an attempt to overcome this limitation, two studies administered questionnaires focussing only on nonverbal features of social anxiety and found that children with SM and children with Social Anxiety Disorder showed similar scores, both of which were higher than nonclinical controls, according to teacher-report (Bergman et al., 2002; Milic et al., 2020) and parent-report (Milic et al., 2020).

Cognitions

Research shows that children with SM and children with Social Anxiety Disorder were more fearful of negative evaluation compared to nonclinical controls, with few differences between the clinical groups (Vogel et al., 2019). While the DSM-5 guidelines for differential diagnosis of Social Anxiety Disorder and SM note that “individuals with selective mutism may fail to speak because of fear of negative evaluation, but do not fear negative evaluation in social situations where no speaking is required (e.g., are responsive in nonverbal play)” (American Psychiatric Association (APA), 2013, p. 207), emerging research does not support this differentiation. In fact, Schwenck et al. (2019) showed that participants aged 8–18 years old with SM and participants with high social anxiety did not differ in their subjective rating of anxiety to hypothetical nonverbal social situations that were potentially embarrassing and/or drew others’ attention, and both groups reported higher levels of anxiety than typically developing participants. Instead, children with SM reported higher subjective ratings of anxiety and anxious behaviours in situations potentially requiring speech than children with high social anxiety (Poole et al., 2020; Schwenck et al., 2019)

Studies investigating the content of this anxiety and fear-related cognitions in children with SM are sparse. Researchers note that children with SM fear negative consequences of speaking (Diliberto & Kearney, 2016) and social unfamiliarity (Gensthaler et al., 2016). Most recently, Vogel et al. (2019) identified that in speech-related situations children and young people with SM most commonly reported social fears, particularly fears of a negative reaction or social evaluation (e.g., fear of being laughed at, an unfriendly reaction from others, being excluded) and fears associated with drawing attention to themselves, others noticing their anxiety symptoms and/or uncertainty about their response or the quality of their response. Children with SM did not differ from children with Social Anxiety Disorder in the frequency of negative fear-related cognitions and both groups reported significantly higher rates than nonclinical controls.

Interestingly, the lack of speech frequently results in fewer positive reactions, and on occasion, overtly negative reactions from others (Roe, 2015), suggesting that the cognitions related to speech in children with SM may not be biased. Anecdotally, children report being questioned and reprimanded by their peers and by adults about their lack of speaking and response (Roe, 2015) or the child themselves and their family members, teacher or classmates respond with “I/they don’t” talk. Such comments reinforce the above-mentioned fears of negative evaluation and contribute to the self-perception of the child with SM as someone who “does not” or “cannot” speak in select social situations (Schwenck et al., 2021).

Attentional Focus

Attentional focus is important given social anxiety is the prominent feature for almost all children with SM (Muris & Ollendick, 2021) and research on attentional focus in social anxiety disorder shows that in social situations the focus of attention for people with social anxiety is typically on themselves and the environment rather than the activity itself (McEvoy et al., 2018). More recently, Vogel et al. (2019) found that 58.8% of the children and young people with SM in their study reported attentional focus on the self (their thoughts and feelings) in social situations when they failed to speak. Nowakowski et al. (2011) measured joint attention amongst the parent and their child with SM, mixed anxiety, or their typically developed child in two experimental conditions of unstructured free play and a structured verbal task. No differences were found between children with SM, mixed anxiety and typically developing children in joint attention when the parent and child were engaged in unstructured free play. However, on the structured tasks in which the child was expected to respond verbally to questions from the parent, children with SM and their parents established significantly fewer joint attention episodes following parent initiation when compared to children and parents in the mixed anxiety and the typically developing groups. Thus, in interactions where there is an expectation of speech, the SM's task-focused attention may be reduced resulting in the child being less likely to socially engage with the parent in practicing helpful coping skills, to detect social cues and to notice positive feedback (Nowakowski et al., 2011).

Externalising Symptoms

Research comparing children with SM to community controls has not supported early clinical hypotheses that viewed the mutism behaviour as an expression of anger, oppositionality or hostility (e.g., Browne et al., 1963; Pustrom & Speers, 1964). In fact, on measures of externalising behaviour, studies have found either no difference between children with SM and community controls (Cunningham et al., 2004; Elizur & Perednik, 2003; Vecchio & Kearney, 2009), or evidence of externalising behaviour in only a subgroup of children with SM (Cohan et al., 2008; Diliberto & Kearney, 2016; Kristensen, 2001). Interestingly though, this subgroup of children with SM who displayed higher levels of behavioural problems also scored highly on the internalising measures leading clinicians and researchers to suggest that the externalising behaviour may reflect underlying anxiety and an attempt to avoid the anxiety-provoking social situations (e.g., Alyanak et al., 2013; Cohan et al., 2008; Kristensen, 2001; Yeganeh et al., 2006). Thus, clinical assessment of whether defiance is present in other areas of life or whether it appears only in situations related to speaking or social interactions is necessary (Bergman, 2013).

Comorbidity

When considering comorbidity, children with SM most commonly also display Social Anxiety Disorder or Avoidant Disorder (Driessen et al., 2020). Other common comorbidities in children with SM include Specific Phobia, Separation Anxiety Disorder and Generalised Anxiety Disorder (Driessen et al., 2020). On the other hand, lower levels of comorbidity were found between SM and autism spectrum disorder, attentional problems, disruptive behaviour and mood disorders (e.g., Capozzi et al., 2018; Elizur & Perednik, 2003; Muris & Ollendick, 2021; Steinhausen & Juzi, 1996). These patterns support the decision within the DSM-5 to place SM among the anxiety disorders.

For the past two decades, the consistent finding of social anxiety in the majority of children with SM, together with evidence of higher behavioural inhibition, has raised the question of whether SM should be considered a subtype of Social Anxiety Disorder with SM being an earlier childhood expression and/or a more severe variant (e.g., Black & Udhe, 1995; Gensthaler et al., 2016; Kumpulainen et al., 1998). On the other hand, other researchers have postulated that SM is specific-speech-related anxiety disorder (Omdal & Galloway, 2008). Further research is required to understand where SM fits in relation to other anxiety disorders.

Trajectory of SM

"Little is known about the naturalistic course of SM" (Chavira et al., 2007, p. 1464). A prevalence study measuring incidence across time indicated that some children begin to speak without structured interventions (Brown & Lloyd, 1975). However, in a review of available follow-up studies, Remschmidt et al. (2001) concluded that the average rate of remission of SM symptoms after a mean follow-up period of 5 years was 74% with treatment, but lower for those children who had not received treatment.

Moreover, little is known about the amount and quality of speech for those who do begin to speak. Two recent randomised controlled trials showed a significant increase in speaking behaviour in children with SM who had been treated for 3 months relative to the waitlist controls (Bergman et al., 2013; Oerbeck et al., 2014). However, at the 3-month mark, Bergman et al. (2013) found 33% of children continued to meet criteria for SM, and Oerbeck et al. (2014) showed that for three quarters of the children speech was restricted to teachers and select peers in select settings. Consistent with these poor outcomes, children, adolescents and young people classified as being in remission (either with or without treatment) continued to speak less than average (Bergman et al., 2002; Oerbeck et al., 2018). Furthermore, other studies showed that even once they had started to speak, this group of children may continue to experience higher levels of social anxiety that caused them distress and interfered with their level of functioning at school, socially and vocationally (e.g., Ford et al., 1998; Remschmidt et al., 2001; Steinhausen & Juzi, 1996).

Risk Factors for Selective Mutism

Internal Risk Factors

Genetics

Research clearly shows that genetic factors play a modest but significant role in the development of anxiety in children (e.g., Czajkowski et al., 2010). Consistent with these findings, clinical interviews with families suggest a higher prevalence of SM, Social Anxiety Disorder and Avoidant Personality Disorder in families with a history of SM (Black & Udhe, 1995; Brown & Lloyd, 1975; Remschmidt et al., 2001; Steinhausen & Adamek, 1997) and personality styles reflecting social fearfulness and reticence (Kristensen & Torgersen, 2001; Steinhausen & Adamek, 1997). The few studies that have compared parents of children with a primary diagnosis of SM with parents of children with other anxiety disorders point to the possibility of a higher prevalence of internalising disorders in the parents of children with SM (Capozzi et al., 2018, Chavira et al., 2007). Most recently, a Finnish population-based study found 41.4% of parents of a child with SM had a mental health diagnosis, relative to 24.7% parents of children with no internalising or neurodevelopmental diagnosis (Koskela et al., 2020). Moreover, the risk of SM appeared to be greater if both parents had a mental health diagnosis.

Temperament

Often children with SM are considered to be behaviourally inhibited mainly due to their reluctance to spontaneously speak, but also because they demonstrate similar nonverbal social behaviour to those observed in the temperament style of Behavioural Inhibition (BI). These nonverbal social behaviours include extreme wariness and avoidance of unfamiliar, novel and challenging situations, objects and people (Kagan, Reznick & Gibbons, 1989). Recent studies have demonstrated a link between SM and BI with higher levels of parent-reported behavioural inhibition among children with SM (Gensthaler et al., 2016; Kristensen & Torgersen, 2002; Muris & Ollendick, 2021). These similarities between the behavioural manifestations of SM and BI may prompt adults to view the failure to speak as a developmentally appropriate behaviour that the child will outgrow given BI is a relatively stable temperament style that is observed in 10–15% of young children (Kagan et al., 1989).

However, it is important to note that BI is an early risk factor for the development of multiple anxiety disorders, particularly social anxiety (Clauss & Blackford, 2012; Rapee et al., 2009). Using

Kagan's behavioural observation of inhibition, Milic et al. (2020) showed that children with SM exhibit stronger inhibition than children with Social Anxiety Disorder, and both groups showed more behavioural inhibition than a nonclinical control group. Gensthaler et al. (2016) also found retrospective reports of higher behavioural inhibition in response to social stimuli relative to non-social stimuli in children with a life-time diagnosis of SM.

Auditory Processing Skills

Research has identified a higher prevalence of abnormalities in auditory efferent feedback pathways among children with SM relative to normally speaking, nonclinical controls (Henkin & Bar-Haim, 2015). Specifically, their ability to simultaneously speak and process incoming auditory signals about quality of voice and speech is impaired, resulting in an abnormal subjective experience of their voice. In fact, some children with SM have reported that their voice sounds different and strange (Henkin & Bar-Haim, 2015). Henkin and Bar-Haim (2015) hypothesised that for a subgroup of children with SM, the difficulties with auditory processing may result in restricting or avoiding speaking in environments where there are more people and consequently more background noise (e.g., classroom, playground).

Speech and Language Skills

Numerous studies also point to a higher incidence of speech and language difficulties among children with SM (e.g., Andersson & Thomsen, 1998; Black & Udhe, 1995; Steinhausen & Juzi, 1996). Studies investigating the nature of these difficulties indicated that the receptive vocabulary skills of children with SM were in the lower average range compared to nonclinical controls (e.g., Milic et al., 2020; Cohan et al., 2008). When considering expressive language, children with SM used linguistically simpler language and provided fewer details when retelling a story than children with Social Anxiety Disorder (Klein et al., 2012; McInnes et al., 2004), and some had articulation difficulties (Steinhausen & Juzi, 1996). Having poorer receptive and expressive language skills may exacerbate the language- and voice-related fears reported by children and young people with SM and consequent anxiety and mutism experienced in situations where speech is anticipated and/or expected (Vogel et al., 2019).

Social Performance Skills

There is limited research available investigating social functioning in children with SM. Observational research has shown that children with SM do participate in activities in the classroom and playground at school (Kumpulainen et al., 1998) and they participate as much as their peers in extracurricular activities and play dates (Cunningham et al., 2006). In a recent study, no significant group differences emerged among 4- to 8-year-old children with SM, Social Anxiety Disorder or nonclinical controls with regard to self-ratings of who they would choose to play with (another child, adult or alone), suggesting the failure to speak is not due to disinterest in social engagement (Milic et al., 2020). This was corroborated by parent-reports on a measure about social withdrawal showing no significant difference between groups on the subscale for disinterest in social engagement (Milic & Rapee, 2015). In contrast, Cholemkery and colleagues (2013) found that children with SM had significantly greater difficulties with social motivation and social communication compared to children with Social Anxiety Disorder and both clinical groups experienced greater difficulties than nonclinical controls. However, the items in the subscales used to measure social motivation and social communication in their study overlapped with safety behaviours and avoidance typically indicative of social anxiety and high BI. The authors themselves note the need for caution because of the lower validity of screening measures for autism spectrum symptomatology in differentiating between SM, social anxiety disorder and autism spectrum disorder (Cholemkery et al., 2013).

Nevertheless, much of the limited evidence on social functioning suggests that children with SM have more difficulties making friends and they have fewer friends than nonclinical controls (Milic et al., 2020). Furthermore, they display less socially competent behaviours than children with other anxiety disorders and nonclinical controls. Specifically, parent- and teacher-report indicates that children with SM display fewer verbal and nonverbal social interaction skills with peers than children with a clinical anxiety disorder and nonclinical controls (Cunningham et al., 2006; Yeganeh et al., 2003). Similarly, observers rated children with SM as demonstrating poorer social performance than children with Social Anxiety Disorder during a behavioural assessment (Yeganeh et al., 2003; Young et al., 2012). In sum, whilst children with SM are interested in interacting with their peers, fewer successful and positive experiences may be misinterpreted as negative evaluation by others, exacerbating their level of social anxiety and mutism (Rapee & Spence, 2004).

Environmental Factors

Parent-Child Interaction

When considering environmental factors, parent-child interactions and parenting specifically are thought to influence childhood anxiety (McLeod et al., 2007). Yet, parents of children with SM did not differ significantly from controls on measures of discipline practice (Alyanak et al., 2013; Cunningham et al., 2004: Yeganeh et al., 2006), overprotective behaviour (Alyanak et al., 2013; Yeganeh et al., 2006), or parental acceptance (Yeganeh et al., 2006). However, these null findings could be due to inherent bias in parent-report (McLeod et al., 2007). Observational studies can reduce this limitation and one such study identified that mothers of children with SM displayed more parental control (i.e., granted their children less autonomy and were more directive), in comparison to mothers of children with anxiety and no-anxiety, and greater parental control was associated with higher levels of observed child anxiety and decreasing child age (Edison et al., 2011).

Anecdotally parents describe themselves as oscillating between being supportive and feeling frustrated at their child's lack of speech outside of the home environment (McHolm et al., 2005). Milic and Rapee (2015) showed that mothers and fathers of children with SM acknowledged more thoughts of frustration with their child's reticent behaviour than mothers and fathers of nonclinical controls. This possibly suggests less warmth in the way parents of children with SM may at times think about their child's mutism.

Negative Life Events

Finally, while early hypotheses emphasised the association between negative or stressful life events and SM, most studies report that children with SM do not experience more personal, family or environmental negative life events than other children (Black & Udhe, 1995; Brown & Lloyd, 1975; Milic & Rapee, 2015; Steinhausen & Juzi, 1996). In fact, for children who have experienced negative or stressful life events, there is no evidence of a temporal or causal relationship between the negative life event and the development of SM (Andersson & Thomsen, 1998; Black & Udhe, 1995; Capozzi et al., 2018; Muris & Ollendick, 2015).

Assessment

When assessing SM, it is important to note that a comprehensive assessment should include (1) a family clinical assessment interview with the child, (2) a clinical interview with the parent(s) where the child may be present and (3) questionnaire information from the parents, teacher and, where possible, the child. The following section contains additional information specific to the assessment process for SM.

1. *Family Clinical Interview Assessment with the Child and Their Parent(s)*

It is necessary to adapt the process and structure of this first interview for children with probable selective mutism. Specifically, it is not recommended that the child or young person be seen alone at assessment as this process contains many known triggers to their anxiety, particularly around asking them to engage verbally with a new adult (clinician) in an unfamiliar space (therapy room) doing an unfamiliar activity. This process is likely to trigger a high fear response, safety behaviours and avoidance.

Given that the main treatment goal of increased communication and social interaction with a new person commences at the initial assessment interview, there are two important modifications to make to the assessment process of SM. It should be noted that although we refer to children, the same principles of assessment apply across the lifespan, with appropriately age-relevant presentation. First, early in the interview the continuum of communication or "talking", which covers no nonverbal and verbal communication (the amygdala "flight and freeze" response) through to comfortable and confident nonverbal interactions and verbal communication, is explained to the child and their family. There are various stages along this continuum beginning with increased nonverbal social behaviours of engagement and communication, progressing to speaking with the people the child comfortably speaks with in settings and around people with whom they have no or minimal speech, and building up to comfortable verbal communication with more people they had previously failed to speak with (e.g., SM – Social Communication Comfort Scale, SM-SCCS: Klein et al., 2016). Having a pictorial representation of the continuum is beneficial and often helps arm the child and their parents with information about the new adult's expectations around participation and communication. Moreover, it is also helpful to establish a contingency reward program for all observed attempts by the child to interact and communicate in the interview with a family member or the clinician (e.g., "joining in" through attentive behaviours like looking towards the clinician, sitting in their own seat, or nonverbal gestures; "listening talking" moments when the clinician can see or hear the child speaking to a parent or in independent play). The reward program also provides the child with evidence to challenge their fears around the possible negative consequences of their mutism and provides them with subtle positive feedback for desired behaviours. Furthermore, it provides the child and their parents with the lived experience of the child beginning to communicate for themselves with a new adult in a new environment in the presence of their parents.

Second, there are some important behavioural strategies for interacting with a child with probable SM that should be employed by the assessing clinician to help lower the fear response. For instance, it is important that the clinician does not pressure or coerce speech, as SM centres around a fear of speaking rather than a choice not to speak. The clinician's initial interactions with the child should be welcoming statements that do not require a response from the child. If the child is not displaying significant safety behaviours early in the interview process (e.g., hiding behind a parent, avoiding direct eye contact with clinician), the clinician may ask one or two closed questions to which the child can respond with either a gesture or speech. It is also important that throughout the interview, opportunities for the child to communicate with a parent or the clinician are created. For example, when asking questions, the clinician should model and facilitate nonverbal ways of communicating (e.g,. head gestures, pointing to choice responses on a page) and permit the use of safety behaviours to facilitate the beginning of communication (e.g., clinician looking away from the child and parent after they have asked a question so the child can gesture or whisper their response to their parent). It is important to give the child time to respond and to pace the number of direct questions to the child as it is likely the child's fear response and safety behaviours will increase if the child is asked a series of questions in rapid succession. It is also essential that the clinician acts in a matter-of-fact way when they hear the child's voice and if the verbal interaction is with a parent (rather than the clinician), the clinician should allow the parent to respond to the child. The clinician may then comment on the content of the information the child has shared or ask a follow-up question that can be answered by the child or parent. Finally, the clinician should shift the language used to assess communication from "do or do not" speak to how does the child communicate in particular interactions and how much do they communicate (e.g., asking the child to point on the SM-SCCS communication continuum "how do you talk to (person's name)?", "How much do you talk to (person's name) with (stage of communication)?").

Lastly, behavioural observation of fear responses, safety behaviours and avoidance within the family interview is essential to the assessment process. Behavioural experiments used by the clinician as the assessment progresses provide information about how responsive the child will be to treatment strategies (e.g., the clinician going outside the assessment room for a defined few minutes to allow the child to respond verbally to their parent about a question set by the clinician or to play a short speaking game with the family before knocking and re-entering the room, provides information about the intensity of the fear response and avoidance in the therapy space without the clinician physically present in the room). In addition to observing an increased fear response and reduction in communication, it is also important to monitor reductions in the fear response, referencing the parent, comfort in playing and moving around the therapy space and any decline in safety behaviours.

2. *Clinical Interview with the Child's Parent(s)*

Given the research showing frequent comorbid anxiety disorders (Driessen et al., 2020), a comprehensive clinical interview is also conducted with the child's parents to identify concurrent presenting concerns and any possible speech and language delays or articulation difficulties (Muris & Ollendick, 2015). It is first necessary to obtain detailed information about current and past frequency and quality of the child's speaking, nonverbal social behaviour, observed fear response, safety behaviours and avoidance. This information aids the planning of graded exposure and assessment of change during treatment. With regard to speaking, qualitative information that should be obtained includes the latency of initiating and responding with speech, frequency of spontaneous speech with the parent and others, who the child responds to, the number of words and how audible and clear their spoken words are. On the other hand and in light of the research showing high behavioural inhibition and high comorbidity with social anxiety disorder, it is important to assess nonverbal social behaviours in situations where the child might attract attention or be observed, such as initiating and remaining engaged in play and moving around the classroom for example, eating, drinking, going to the toilet, making a choice and public nonverbal performances (e.g., a dance with their class in front of an audience of students and teachers). The clinician should then assess whether and how the child initiates essential interactions (e.g., asking permission to go to the toilet during class time, requesting assistance with schoolwork, letting an adult know when unwell or injured).

In addition, as SM is a social anxiety-based disorder, other important information to gather in an interview includes information on negative thoughts and fears the child has expressed about speaking and observed behavioural responses to positive attention (e.g., smiles and others' nonverbal attempts to play) and positive evaluation (e.g., compliment from an adult). As well as gathering information about anticipatory processing and expectations of a social situation (i.e., conversations between the parent and child about speaking before entering the situation) and how the child processed the social situation after entering it, it is important to also get an idea of the parents' observations of where the child's attention is in social situations (e.g., self- vs. other-focused attention).

Finally, information should be sought about extended family history of mental health diagnosis, a history of the child's social behaviour from toddler years, as well as information on the ways in which they (the parent(s)) typically respond to the child's social behaviour, their fear of negative scrutiny from other's when their child is mute and their own and others attempts to have their child speak (e.g., rewards, consequences).

3. *Questionnaire Measures Administered Prior to or During Assessment*

A number of measures could be administered by the clinician prior to or during the assessment. These include use of a (semi)structured diagnostic interview primarily to assess anxiety and mood disorders. One example is the Anxiety Disorders Interview Schedule for DSM-IV, Child and Parent Versions (ADIS-IV-C/P; Silverman & Albano, 1996). Given the core symptom of SM is failure to speak, it is likely that the interview will be with the parent only.

There are several psychometrically sound measures that are designed to directly assess symptoms of SM. For example, the Selective Mutism Questionnaire (SMQ; Bergman, 2013) and the Frankfurt Scale of Selective Mutism (FSSM; Gensthaler et al., 2020) both cover the core symptoms and behaviours characteristic of SM from the parent's perspective. The FSSM is a useful screening tool as it contains a diagnostic scale. The SMQ is a quantitative measure of the severity, range and impairment related to the mutism that can be used as a baseline of SM severity, and if given intermittently, as a quantitative measure of progress in treatment (Oerbeck et al., 2020). The teacher's perspective can be captured by the School Speech Questionnaire (SSQ; Bergman, 2013). Finally, at least one measure of SM from the child's perspective has been developed, the Selective Mutism Questionnaire (SMQ-C; Milic & Rapee, 2015). This latter measure includes 20 items that assess frequency of speech across school, home/family, and in the community, and has shown adequate psychometric properties when used among 4- to 8-year-old children (Milic & Rapee, 2015).

Other Measures to Consider for Child-, Parent- and/or Teacher-Report

In addition to the specific assessment of SM symptoms, it is helpful to administer a measure of social anxiety and avoidance to the parent, to the teachers and, if possible, to the child to assess nonverbal aspects of social anxiety and avoidance. Moreover, additional measures assessing other anxiety disorders, general emotional health, social functioning and externalising behaviours are important for a comprehensive assessment. Screening instruments for autism spectrum symptomatology should also be considered (Muris & Ollendick, 2021; Steffenburg et al., 2018). Importantly, if a child receives an elevated score on the screening instruments for autism spectrum symptomology, a comprehensive, evidence-based ASD assessment is warranted to ensure ASD is not misdiagnosed (Cholemkery et al., 2013; Muris & Ollendick, 2021).

Treatment

Ultimately, the primary clinical goal of treatment is remission of the core symptom, mutism.

Oftentimes, the parent's goal is also for the child to be able to comfortably initiate and respond with speaking to adults and children at school, in extracurricular activities, community, and with extended family and friends. Additional goals of treatment may also include increasing the child's comfort and confidence engaging in social activities.

Evidence-Based Treatment

Empirically validated treatment for SM has been primarily based on cognitive behavioural principles incorporating a range of evidence-based strategies (e.g., Muris & Ollendick, 2021; Østergarrd, 2018). Treatment protocols from these studies have been published and include Integrated Behavior Therapy for Selective Mutism (IBTSM) (Bergman, 2013); Parent–Child Interactional Therapy for SM

(PCIT-SM)(Catchpole et al., 2019) and Social Communication Anxiety Treatment (S-CAT) (Klein et al., 2016). Controlled outcome studies of primary-school aged children have shown significantly stronger outcomes for CBT relative to waitlist at post-treatment on the frequency of speaking at school and in the community and parent-reported anxiety symptomatology (Bergman et al., 2013; Catchpole et al., 2019; Cornacchio et al., 2019; Klein et al., 2016; Oerbeck et al., 2014, 2018). These gains have generally maintained 3–12 months post-treatment. Treatment gains have been greater for children with less initial SM symptom severity (Klein et al., 2016; Oerbeck et al., 2014) and better family compliance with practice between therapy sessions (Klein et al., 2016). Moreover, evidence has shown no difference in responsiveness to treatment based on pretreatment comorbidity (Oerbeck et al., 2014), duration of SM (Klein et al., 2016) or language competence (Catchpole et al., 2019). Differences in treatment effect based on gender have not been investigated (Østergarrd, 2018).

Based on this evidence, there are a number of essential ingredients necessary for treatment of SM. It is first necessary to ensure that treatment is collaborative involving the child, their primary carers with whom they comfortably and confidently speak, and their school. The school is an imperative part of the treatment, as practice should occur in this environment. Moreover, it is important that all adults interacting with the child (e.g., parents, clinician, teacher) understand the continuum of communication and adapt the ways in which they interact with the child according to the stage the child is at on the continuum. How and how much the child interacts and communicates with the person will vary across contexts (e.g., setting, audience, activity). For example, if the child is speaking to the teacher only when their parent is present during the planned graded exposure task, then the teacher/parent would expect the child to respond nonverbally to the teacher in all other interactions between the child and teacher during the school day and to praise them accordingly. It is also important to remember that practice across settings, activities and people is imperative for each stage along the continuum to increase the frequency, clarity, range (number of spoken words) and immediacy (responding, initiating) of communication.

Components of Treatment

The above treatment goals are achieved by incorporating a number of different, but important, components into the treatment plan. These include a number of behavioural strategies often linked with graded exposure tasks aimed at increasing social interaction and speech and improving performance of specific social skills (e.g., making choices/decisions, asking questions, sharing ideas and being socially assertive). Graded exposure steps are best implemented using age-appropriate games that correspond to the stage of communication being practiced (e.g., Snap, bingo and UNO for the first stages of nonverbal interaction and communication, moving to Go Fish, Guess Who and Hedbanz for predictable verbal responses and questions). The graded exposure program should incorporate (i) reinforcement (rewarding target behaviours with tangible and immediate rewards such as ticks on a chart or stickers), (ii) video/audio recordings that either the child (e.g., an edited recording that models the child having a conversation with someone they do not use voice with (Cline, 2015)) or the child and a person they do not speak with can listen to together, (iii) modelling verbal responses in questioning, (iv) shaping and gradually building up the speech by breaking down the target situations into smaller more manageable steps (e.g. single word then short phrases), (v) “sliding in” where an adult the child does not speak with gradually slides into an activity (e.g., play, reading) the child is comfortably playing speaking in with their parent (Bergman, 2013) and finally, (vi) fading or having the parent gradually step back from the interaction once the child is speaking to others. As treatment progresses, planning and control of the graded exposure is gradually transferred from the therapist to the parent. In addition to the planned clinician-, parent- and teacher-led graded exposure practice, incidental opportunities for daily parent-led graded exposure practice coupled with regular teacher-led practice during the school week will maximise treatment gains (e.g., Bergman, 2013; Klein et al. 2016; Cornacchio et al., 2019).

In addition to a graded exposure program, it is necessary to teach and include emotional coaching skills for parents and cognitive behavioural (CBT) strategies to target the anxiety and to reduce safety behaviours and avoidance associated with SM. Emotional coaching helps parents be aware, empathise, validate and build a shared language for speaking about the feelings and fear cognitions the child experiences in situations where they show decreased nonverbal social and speaking behaviours (e.g., Siegel & Bryson, 2018). Parents help their children learn to regulate their feelings and fear cognitions by together learning CBT strategies including (i) psychoeducation about anxiety, (ii) using subjective units of distress scale (e.g., visual feelings thermometer) for the child to communicate anxiety levels and/or effort in practicing a step on the graded hierarchy, (iii) physiological training (e.g., breathing) to reduce the physical symptoms of anxiety and increase attentional focus (McEvoy et al., 2018), (iv) developmentally appropriate cognitive restructuring skills (Bergman, 2013) that assist the child in identifying and challenging the fear-related cognitions they associate with speaking in a particular social situation and (v) opportunities for structured practice and role plays of specific social skills (e.g., making a choice/decision, asking for help) and social assertiveness behaviours once they begin speaking (Rapee et al., 2009).

It is also essential to address parent-child interaction variables, particularly, parental expectations about interaction and communication to ensure that these expectations are consistent with where the child is at on the communication continuum for a given social situation. Establishing realistic expectations ahead of time together in therapy helps lower the child's anxiety and empowers the child and parent to give realistic goals a try and then experience success in some social interactions. The parent can aid the child's success in social interactions by packing a bag of toys and activities that will allow the child to focus on a pleasurable activity (i.e., one they enjoy) and encourage joint play (between the child and their peer) thus shifting their focus from the self- to other (i.e., their peer). Throughout this process, it is important to go at the child's pace and move slowly while constantly monitoring the child's fear response in order to gauge their level of anxiety. Positive praise and encouragement are important, although this may initially be nonverbal so as not to draw attention to the child (e.g., frequent smiles and physical affection), as it will aid the child in challenging their fear of negative evaluation from the parent and support their engagement as well as provide opportunities to build communication with the parent and others in the social situation.

It may be useful for the parents of children with SM to have planned statements they can say when others attempt to interact with the child in a way that is further along the communication continuum and thus likely to trigger a fear response from the child. The parent may look towards their child and repeat the question as a closed response allowing the child to respond to the parent in a way that aligns with their current ability in front of the person who asked the question. Alternatively, if the child is not yet at this step on the continuum, the parent may instead respond to the person who asked the question with an acknowledgement and closed statement (e.g., "Thank you for asking. We are still working on brave voice talking in front of one or two people at a time."). This openness acknowledges the presence of the selective mutism and at the same time models possible ways to currently communicate and include the child in the interaction.

Finally, concurrent pharmacological treatment or speech therapy may also be considered alongside treatment outlined above. Systematic reviews of pharmacological treatment in SM (Manassis et al., 2016; Østergarrd, 2018) show that selective serotonin reuptake inhibitors (SSRIs) are the main group of medications with empirical support, but research is limited with small sample sizes and a lack of comparison groups. Nevertheless, preliminary findings indicate that SSRIs (e.g., Fluoxetine, Sertraline) result in improvement in SM symptomatology and global functioning (Black & Udhe, 1995; Carlson et al., 2008). As such, pharmacological treatment may be useful as a supplement to cognitive behavioural therapy when cognitive behavioural therapy alone has produced little improvement (Muris & Ollendick, 2021). However, due to the limited existing research, there are no guidelines as to when during CBT, medication should be considered nor what the optimal dose of medication would be if it was considered. Additionally, when a child has concurrent receptive and expressive language delays and/or articulation difficulties, alongside the SM, concurrent speech therapy should be considered. If speech therapy is sought, treatment goals, particularly in the short term, would be aligned with the steps the speech therapist sets for building language and articulation skills in order to ensure there is a match between the expectations of speaking and the child's language ability.

Duration of Treatment

A final point to be made is that treatments for SM have traditionally been considerably longer than treatments for many other disorders, especially other anxiety disorders (e.g., Rapee et al., 2009). The beneficial outcome of up to two thirds of children no longer meeting criteria for SM and decreased parent-reported social anxiety is achieved when families participate in more than 16 hours of treatment (Bergman et al., 2013; Cornacchio et al., 2019; Oerbeck et al., 2014) in combination with frequent graded exposure practice across multiple settings (i.e., home, school, community). Nevertheless, in most instances, children with SM and their families will require continued clinical support following structured treatment. Improvements in speech are sustained at follow-up, but the frequency of speech remains on average lower than for children with no prior history of SM (Oerbeck et al., 2020) and teacher-reported levels of social anxiety often remain high (Bergman et al., 2013). Moreover, one-third (Bergman et al., 2013) to approximately one-half (Cornacchio et al., 2019) of treated children continue to meet criteria for SM. What continued clinical support should involve is unclear but is likely to include ongoing but perhaps less frequent treatment appointments to (i) support continued graded exposure practice for the core goal of speaking coupled with contact with the school to plan exposure and (ii) CBT for social and other anxieties. Furthermore, treatment studies have not included older children, young people, or adults with SM. Clinically, practitioners are implementing the same CBT principles with adolescents and young adults with SM using age-appropriate structured activities (e.g., board games) with the addition of CBT for social anxiety.

Ultimately, early intervention is imperative (Oerbeck et al., 2014, 2018), ideally before schooling, as the child has fewer performance expectations and academic evaluations (Muris & Ollendick, 2015) and more opportunities for play interactions which can help facilitate graded exposure in social situations with few expectations for speaking.

Conclusions

Our understanding of SM has come a long way from the days when this disorder was seen as a wilful attempt by the child to maintain control and express aggression and was sometimes treated with punitive and negative interventions. The current view of SM is clearly one that sits it within the family of anxiety disorders with the lack of speech most likely motivated by specific fears of negative evaluation. Nonetheless, children with SM show sufficiently unique characteristics from children with more general social anxiety disorder to warrant a slightly different approach to understanding, assessment and treatment. The current chapter has summarised much of the empirical literature into these aspects of SM. Clearly, we still have a long way to go. Far less is known about SM than about other forms of anxiety disorder and empirically validated treatments are supported by a much smaller evidence base than for other forms of anxiety. Despite this relative lack of knowledge, current conceptualisations seem to be supporting some promising treatment outcomes. Future developments should begin to see a far more positive prognosis for these young people than might have been expected only a few decades ago.

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