Dean McKay
Eric A. Storch *Editors*

Handbook of Child and Adolescent Anxiety Disorders

Second Edition

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Part I

Classification of Child and Adolescent Anxiety Disorders

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Dean McKay and Eric A. Storch

Classification in psychopathology has moved through several important stages, based on the trajectory of the Diagnostic and Statistical Manual from its first edition to the current, fifth edition. The initial two editions were marked by a unifying theoretical basis whereby specific diagnoses were conceptualized in psychodynamic terms. This tradition is similar to the formulation of taxonomies in other branches of science. For example, in biology the reliance on a hierarchical arrangement from kingdom down to species is based on a specific theoretical framework whereby all newly discovered organisms may be readily classified. While not totally without controversy, such as the movement toward cladistics (whereby organisms are classified by ancestry rather than present biological structure; Scott-Ram, 2008; Williams & Ebach, 2020), these represent mere refinements rather than sea-change level alterations in classification. Another example is in chemistry, where elements are classified by a theory-driven framework regarding the organization of atoms, with specifications within the periodic table of elements (such as noble gases, metals, etc.) that also readily guides researchers in how to classify newly discovered entities. Again, controversies exist (e.g., cloud theory versus heliocentric theory of atomic structure; Cox, 1996), but these do not substantially alter the manner of utilizing the classification system.

Unlike other branches of science, however, psychiatry, psychology, and their associated professions are not unified by a single theory of mind, and most conditions likely have multiple determinants. Further, most users of the original DSMs noted the limited reliability of the taxonomy it laid out, and with the third edition came a radical change in how psychiatric classification was conceptualized: purely descriptive and atheoretical. This allowed users to arrive at diagnoses with much greater precision, and the aim was to establish a set of conditions that had ecological and syndromal validity. This has served the field well and has led to important advances in assessment, treatment, and etiological understanding. However, unlike classification systems in other branches of science, should a new condition arise, there is no inherent mechanism for classifying it. Instead, any new diagnosis must wait until the revisions are planned for the next edition of the DSM, whereupon the proposed diagnosis is determined by committee. The current edition (the DSM-5-TR; American Psychiatric Association, 2022) lays out diagnoses in a single-axial framework that remains committee-driven. The recent text revision aims to address racial and cultural disparities present in prior editions (Canady, 2022).

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This process of committee-driven descriptive diagnoses has led to a growth of diagnoses, but rarely have any been eliminated. In the anxiety disorders, two disorders stand out as illustrative of this point. On the one hand, agoraphobia without history of panic has been in the DSM since the arrival of the third edition. However, this particular diagnosis has long been recognized as either so rare as to not exist, or when actually diagnosed to likely have had a panic-related origin even if panic is completely and successfully avoided by the sufferer (McNally, 1994). On the other hand, of the very few diagnoses that have been eliminated is overanxious disorder of childhood. Interestingly, this diagnosis was only eliminated in that the criteria for a different disorder (generalized anxiety disorder) were extended to encompass diagnosis in children. While these are but two examples, they typify the approach to the DSM as contemporarily construed. Committees determine putative diagnoses for larger categories, based on the existing literature on etiology, incidence, and prevalence. At the same time, existing diagnoses are very rarely eliminated, even if infrequently encountered or its basis is seriously questioned by the broader community of researchers for that disorders' member class. The advent of the DSM-5 has included several new diagnoses and categories. For example, there is now the obsessive-compulsive related disorders, which includes the new diagnoses of hoarding disorder (a condition rarely present in children), and excoriation disorder. No anxiety disorders were eliminated in the most recent version.

When the first edition of this book was being prepared, the DSM-5 was in the later stages of development. At the time, many of the proposed changes for the fifth edition of the DSM included the potential role of fear circuitry modeling for conceptualizing candidate disorders (i.e., Britton & Rauch, 2009). This did not fully manifest in the final version of the manual. Additionally, the various proposed neural circuitry models did not readily account for learning processes that might influence changes in the connectivity among putative brain areas, despite repeated findings from neuroscientists to the contrary (Debiec & LeDoux, 2009; LeDoux & Schiller, 2009; Marek & Sah, 2018). This leaves us with the curious problem of a biologically based theoretical framework from which many disorders will be classified but that also fails to adequately explain a serious and debilitating condition that is considered a putative member. Moreover, although other etiological features are considered in this framework, there is the distinct possibility of an inaccurate bias towards a neurobiological explanation for disorders against a more holistic understanding that incorporates multiple determinants.

Current Standing of Childhood Anxiety Diagnosis

At the present time, most of the anxiety disorders in the DSM are age-downward extensions of adult diagnoses. The exceptions to this are separation anxiety, school refusal, and selective mutism. While there are exceptions, all anxiety disorders, when present in children, have unique manifestations that call for special clinical skill in assessment and intervention. One important distinction between childhood and adult manifestations of anxiety is that it is not required or even expected that children have clear insight into the nature of their fears. The only adult disorder where insight is not required is OCD (now part of a separate class of disorders, but still marked by extreme anxiety), and in this case, the modifier "with poor insight" or "with mixed insight" is available in the DSM-5-TR, and this manifestation has come under specific scrutiny as a poor prognostic indicator for treatment response (i.e., McKay et al., 2010).

A second major distinction involves the behavioral manifestation of different anxiety disorders. In children, it is not unusual for the presentation to have clear developmental consequences. For example, children with school refusal, when untreated, face significant developmental limitations resulting from reduced socialization and limited opportunities for establishing normative age-related behaviors. This is likewise true in social anxiety and the dimensionally less

severe problem of chronic shyness, whereby the inhibition associated with the disorder leads to developmental lags (Beidel & Turner, 2006; Ranta et al., 2015). Given the importance of socialization to cognitive and emotional growth (Konner, 2010), when treating children with anxiety disorders, it is often also necessary to attend to socialization problems resulting from the avoidance behaviors involved.

A third major distinction involves the role of caregivers in the etiology and maintenance of anxiety. While this is in part associated with socialization (i.e., Lawrence et al., 2019; Okagaki & Luster, 2005), it is unique in that each is mutually dependent. This unique association can lead to anxiety problems in children if one or both caregivers are themselves anxious, or if they engage in behaviors designed to accommodate anxious avoidance (see Chap. 20, this volume). This is distinct from mere genetic transmission, since there are specific behaviors parents may exhibit that propagate anxiety exclusive of heritability by virtue of reducing the child's anxiety. Indeed, genetic data has been inconclusive with respect to transmission of anxiety disorders, while behavioral theory has offered an empirically robust method of describing disorder onset and maintenance (see Chap. 20, this volume). Instead, it could be better stated that anxiety begets anxiety, but that there are no specific risks conferred on individual anxiety disorders.

Future Directions in Classifying Childhood Anxiety Disorders

The adequacy of a purely descriptive model of psychopathology, with specific reference to anxiety disorders in childhood, is limited. Formerly, theoretically driven models seem inadequate given the difficulties in operationalization and reliability (such as that noted in the early editions of the DSM). Modern medical conceptualizations (such as the fear circuitry) do not yet have adequate empirical support to use in developing a classification scheme. Further, purely biological models are often viewed as overly reductionistic, ignoring other important sources of influence such as behavioral and cognitive theory (Taylor et al., 2009).

This leaves the field in a difficult predicament. It appears that, in consolidating a research agenda that would advance our approach to classification, it will be necessary to identify the variables associated with the greatest amount of variance in the developmental trajectory of anxiety per se and all its manifestations. This would no doubt narrow the class of disorders, but would also allow for a comprehensive theory for which classification would readily flow without simply adhering to a diagnosis by committee approach to classification. It would also require that researchers remain open to a wide range of disparate theoretical influences (i.e., biological, psychological, developmental) to converge into a single meaningful theoretical framework.

Since the state of the field is not integrated into a meaningful theoretical framework, there are numerous perspectives on conceptualization, diagnosis, and treatment. It is our hope that the field will continue to advance whereby the multiple perspectives in the field may be meaningfully integrated to allow practitioners to seamlessly provide high quality services. In the meantime, this text is intended to provide a critical analysis of the state of the field in child and adolescent anxiety disorders across multiple perspectives. Since the publication of the first edition of this text, there has not, unfortunately, been much progress on developing an integrated theoretical framework.

Structure of the Present Text

We have arranged the book into four major sections. The first is a foundational section related to diagnostic issues and the directions anticipated in the coming years with respect to anxiety classification in children. The second section examines the full scope of alternative ways of classifying, the adequacy of these approaches, and limitations, as well as complicating factors in anxiety disorder. The third section is devoted to specific childhood anxiety disorders and their treatment, as well as integrative approaches to therapy (such

as cognitive-behavioral therapy and psychopharmacology). Finally, the fourth section covers novel and emergent areas within the anxiety disorders in children.

It is our hope that this book will serve the multiple goals of providing clinicians with a deeper understanding of the full breadth of childhood anxiety disorders, their assessment, treatment, and a critical understanding of classification. We also hope that this book will advance multiple research agendas such as those in specific anxiety disorders, as well as in areas that are debilitating but have as yet received limited research scrutiny. Finally, and perhaps most importantly, we hope that this book will vastly improve the lives of children affected by anxiety disorders.

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2 Issues in Differential Diagnosis: Phobias and Phobic Conditions

Mark B. Powers, Kiara Leonard, Maris Adams, Emma Turner, Jamie R. Pogue, Marjorie L. Crozier, Emily Carl, and Seth J. Gillihan

The purpose of this chapter is to summarize the current status of research with respect to the clinical features, course, and prognosis of specific phobias, social anxiety disorder (social phobia), panic disorder, agoraphobia, and separation anxiety disorder in children. In this context, we will consider the salient factors involved in the differential diagnosis of these five disorders. Finally, we will provide some directions to improve assessment of these disorders in children.

Specific Phobia

Description

Specific phobias are the most prevalent anxiety disorder according to nearly all epidemiological studies of the general population (e.g., Kessler et al., 2012). Defined in the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5; American Psychiatric Association, 2013) as intense fears of specific objects or situations, specific phobias (formerly "simple phobia" in DSM-III-R) can develop in response to nearly anything (Marks, 1987). Commonly occurring fears include animals, heights, flying, enclosed spaces, darkness, receiving an injection, and seeing blood. Because children naturally experience developmentally appropriate fears, it is important to distinguish phobias from those fears that are typical for the developmental stage of the child and to recognize their different forms of expression (e.g., tantrums, crying, freezing, clinging). A phobia diagnosis should be considered when the fear is excessive and causes marked interference in the child's life. In children, the fear must be present for at least 6 months. According to DSM-5, specific phobia should be diagnosed when all of the following criteria are met (Table 2.1).

These criteria for diagnosing specific phobias in children have been slightly modified from the criteria for the diagnosis in adults. The DSM-5 categorizes specific phobias into five subtypes: animal phobias (e.g., spiders, dogs, snakes), natural environment phobias (e.g., storms, heights, or water), blood-injection-injury phobias (e.g., seeing blood, receiving an injection/needles), situational phobias (e.g., enclosed spaces, elevators, flying), and other phobias for fears that do not fit into one specific category (e.g., choking, vomiting, loud sounds, costumed characters). The ICD-10 has similar diagnostic criteria but identifies fewer subtypes.

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Table 2.1 DSM-5 Diagnostic criteria for specific phobia

Pronounced fear or anxiety about a specific object or situation (e.g., blood, animals, getting a shot). *In children, the fear or anxiety may be expressed by crying, tantrums, freezing, or clinging* (criterion A)
The phobic object or situation almost always causes fear or anxiety immediately following exposure (criterion B)
The phobic object or situation is avoided or suffered through with intense fear or anxiety (criterion C)
The fear or anxiety is disproportionate to the actual danger presented by the specific object or situation and to the sociocultural context (criterion D)
The symptoms are not transient lasting 6 months or more (criterion E)
The fear, anxiety, or avoidance causes clinically significant distress or disability in important areas of functioning (e.g., social, education, development) (criterion F)
Difficulties are not better explained by symptoms of another mental disorder, including fear, anxiety, and avoidance of situations associated with panic like or other embarrassing or incapacitating symptoms (as in agoraphobia), obsession-related objects or situations (as in obsessive-compulsive disorder), traumatic event reminders (as in posttraumatic stress disorder), separation from home or attachment figures (as in separation anxiety disorder), or social situations (as in social anxiety disorder) (criterion G)

Note: Adapted from American Psychiatric Association (2013, pp. 197)

Avoidance behaviors in children often take the form of tantrums, crying, anger attacks, clinging, and hiding. When the feared stimuli are present, the severity of the fear response and avoidance behaviors indicate the extent of the child's distress. Often the child is brought in for treatment not because of the fear itself but rather due to severity of the disruption to the family's daily routine as a result of the avoidance and distress-related behaviors.

Epidemiology

Prevalence In international community samples, the prevalence rate for specific phobias in children is 2.6–9.1% with the average near 5% (Ollendick et al., 2002; APA, 2013). In 13- to 17-year-olds, however, the prevalence rate is approximately 16%, with 0.6% reporting severe impairment (APA, 2013). Some of the higher prevalence rates have been found in the United States, but it is likely that these differences are a result of variations in assessment methods or cultural differences (Wardenaar et al., 2017). Along with generalized anxiety disorder and separation anxiety disorder, specific phobias are one of the more commonly diagnosed anxiety disorders in children (Costello & Angold, 1995). Additionally, Costello and Angold (1995) found that specific phobias in a community sample occur more frequently without comorbid diagnoses than any other anxiety disorder in children. Community samples have also shown that adults with a specific phobia are significantly more likely to have had a specific phobia as an adolescent but no other previous anxiety diagnoses (Gregory et al., 2007).

Comorbidity Clinical samples have shown different rates of co-occurring anxiety and internalizing disorders in children. A sample of children referred to an outpatient anxiety center showed a prevalence rate of 15% with specific phobia as the primary diagnosis; 64% of children with a primary specific phobia met diagnostic criteria for a secondary diagnosis (Last et al., 1987b). A similar study found that 72% of children between the ages of 6 and 16 years, who were referred to a phobia treatment clinic, had at least one comorbid diagnosis (Silverman et al., 1999). Some of the more common comorbid conditions included an additional specific phobia (19%), separation anxiety (16%), and ADHD (6%) (Silverman et al., 1999). Additionally, there has been some evidence that phobias, specifically fears of the dark, in children and adolescents increase the likelihood of a co-occurring major depressive disorder (Pine et al., 2001). Literature has also demonstrated specific phobias in children can be a predictor of later internalizing disorders, particularly if there are multiple phobias present (de Vries et al., 2019). For example, a retrospective study showed that out of participants who reported childhood-specific phobias with one or more subtypes, lifetime prevalence of an internalizing disorder was 46.3%; comparatively,

those without childhood phobias had a prevalence of 18.2%, while those with four or more phobia subtypes had an increased prevalence of 75.6% (de Vries et al., 2019).

Cultural differences The prevalence for specific phobias has been reported to be higher in African-American children as compared to white children (Last & Perrin, 1993); however, rates may vary due to differences in specific phobia domains. Fears indicated by African-American young adults differ from their Caucasian American counterparts, with the former endorsing more specific phobias (Chapman et al., 2008). Mexican American adults born in the USA also report higher rates of specific phobia when compared to immigrant Mexican Americans as well as native non-Hispanic whites (Karno et al., 1989). There have also been higher rates of specific phobias reported in Brazil than in the USA (Da Motta et al., 2000). Lower risk for specific phobias has been reported among Asians and Hispanics (Stinson et al., 2007) as well as in Japan (Kawakami et al., 2005) compared to Western countries. In a study of children and adolescents in Seoul, Korea, the prevalence rate reported was 7.9% (Kim et al., 2010). In Uganda, the prevalence rate was much higher at 15.8%, with the highest rates in children under 5 years of age (Abbo et al., 2013). A number of factors include operational definitions, ages sampled, and the manner and content in which specific phobias present may contribute to differences in sampling and bias. Lastly, research including children in non-Western countries remains sparse, making it difficult to determine whether these results reflect methodological differences or a true cultural disparity. Diagnostic criteria in the DSM-5 address cultural differences by stipulating that the fear and anxiety caused by the specific phobia must be out of proportion to the sociocultural context (APA, 2013).

Age and gender differences The prevalence of specific phobias tends to be higher in children and adolescents than in adults (Emmelkamp & Wittchen, 2008). Most adults who meet diagnostic criteria for a specific phobia report an early age of onset (Stinson et al., 2007); however, there is a paucity of longitudinal research beginning in early childhood. A meta-analysis (Lijster et al., 2016) revealed specific phobia had a mean onset at 11 years of age. This, along with separation anxiety and social phobia, is significantly earlier than other anxiety disorders which begin, on average, between 21.1 and 34.9 years of age (Lijster et al., 2016). Other studies have reported even earlier age of onset around 7 and 8 years of age (Kessler et al., 2005; Wardenaar et al., 2017), often ranging across specific phobia domains. For instance, animal, environmental, and blood-injection-injury phobias typically begin in early childhood (Kessler et al., 2005; Wittchen et al., 1999), while situational phobias may start much later (Becker et al., 2007). Furthermore, several studies (Burstein et al., 2012; de Vries et al., 2019) demonstrate that individuals who present with multiple types of phobias at an early age experience increased severity and impairment and have higher rates of additional psychiatric disorders. Considering its early onset and high psychiatric comorbidity rates, specific phobia may be a useful indicator for subsequent psychopathology (Wittchen et al., 2003).

Research on gender effects in children with specific phobias has generally shown few significant differences under the age of 10 years (Strauss & Last, 1993). According to the DSM-5, females experience specific phobia twice as frequently as males (Bekker & van Mens-Verhulst, 2007), although this varies by phobia type. Literature on gender differences has remained mixed, though most support a higher prevalence in females than males (Beedso-baum et al., 2009; Fredrikson et al., 1996). For instance, a German study with a community adolescent sample found that more girls than boys were diagnosed with specific phobia (Essau et al., 2000). Researchers have posited that this gender distinction may follow differences in how boys and girls are socialized and how the expression of fear is often viewed as more acceptable from females than males (Kane et al., 2014). Strauss and Last (1993) have also suggested that this gender disparity may be either based on methodological variations or a reflection

of the different rates of referral for treatment in boys versus girls.

Despite the varied results of gender prevalence across studies, there have been some consistent findings related to gender differences across subtypes of phobias. The DSM-5 indicates higher rates of females than males experience animal, environment, and situational-specific phobias, while blood-injection-injury phobia affects both males and females equally. Environmental phobias tend to have an earlier age of onset in boys (Wittchen et al., 1999), but are overall more prevalent in females (Beesdo-baum et al., 2009). Animal phobias are also more common in girls with a 3:1 ratio clearly present by age 10 years (Wittchen et al., 1998a, b). Craske (2003) described adolescence as a period during which women develop fears and phobias more rapidly than men do. McLean and Anderson (2009) posit that this may be attributed to the effects of gender socialization during adolescence, where boys are encouraged to face their fears, whereas girls are permitted to avoid them. Whatever factors contribute, it is clear that gender differences in prevalence rates of specific phobia become apparent during adolescence (Craske, 2003).

Specific phobias and subtypes Some of the more commonly occurring phobias in children include fear of heights, darkness, injections, dogs, loud noises, small animals, and insects (Essau et al., 2000; King, 1993; Silverman & Rabian, 1993; Strauss & Last, 1993). However, there have been few studies specifically examining the prevalence of subtypes, and most studies have focused on adult populations. Most recently, the National Epidemiological Study on Alcohol and Related Conditions found that fear of animals and heights were the most commonly reported phobias among adults, comprising more than half of the diagnosed cases of specific phobia. This observation is consistent with Stinson et al.' (2007) finding that animals are among the more commonly feared stimuli in children, whereas blood-injury-injection phobias are among the least common. While much attention is placed on the subtype of specific phobia (LeBeau et al., 2010), many researchers assert the number of specific phobias present is more predictive of severity and impairment (Burstein et al., 2012; Stinson et al., 2007), regardless of the domain.

Structure of Fear

A study (Cox et al., 2003) using both exploratory and confirmatory factor analyses examined the factor structure of all specific phobia domains and found the following elements:

- Agoraphobia: Public places, crowds, being away from home, travel by car, train, or bus
- Speaking: Public speaking, speaking to a group, talking to others
- Heights/water: Flying, heights, crossing a bridge, water
- Being observed: Public eating, public toilet use, writing in front of others
- Threat: Blood/needles, storms/thunder, snakes/animals, being alone, enclosed spaces

Higher-order analyses showed two second-order factors: social fears and specific fears.

Another factor analytic study of specific phobia subtypes used data from a large sample of young adults from 11 countries. Results of this study supported blood-injection-injury phobia and animal phobia as two of the major classes of fears across cultures (Arrindell et al., 2003). Environmental (e.g., storms, heights) and situational (e.g., flying, elevators) phobias were grouped together on one factor in this sample. Additional studies have found similar results suggesting that there may be few differences between environmental and situational phobias (Fredrikson et al., 1996). While these studies have been primarily with adults, there has been some research specifically examining children. Muris et al. (1999) found similar results in a sample of children, indicating that environmental and situation types of phobias tend to cluster together in factor analyses. In a study examining mental disorders on a three-factor model consisting of "anxious-misery," "fear," and "externalizing,"

Wittchen et al. (2009) discovered that animal and natural environment subtypes were routinely attributed to the same factor, while blood-injury-injection subtype could not be precisely assigned to a single factor. These consistent results across samples indicate that phobia subtyping may need to be refined.

Genetic Patterns

There has been some evidence in family studies of a moderate degree of concordance for specific phobia diagnosis among family members. Another consistent finding has been the relationship between the fears of a mother and her child (Emmelkamp & Scholing, 1997). For example, mothers who fear insects may also have children who exhibit fear in the presence of insects. While there are a variety of factors such as temperament and modeling that may contribute to the familial relationship among anxiety disorders, genetic factors may also be responsible for some of the co-occurrence of this diagnosis.

Bolton et al. (2006) studied over 4500 6-year-old twins to determine genetic and environmental influences on the development of early-onset anxiety disorders. For specific phobias, the heritability was around 60% with the remaining 40% of variance attributed to differences in environment. As this study was conducted on young children and differs in results from other studies done on older children or adults, it is likely that early-onset phobias may be more genetically determined than those developing later in childhood or adulthood (Bolton et al., 2006). These findings provide support for a non-associative model of phobias which suggests an evolutionary basis to fears rather than a conditioned fear model (Menzies & Clarke, 1995). Another study examining heritability of specific phobias used a sample of 319 sets of twins between the ages of 8 and 18 (Stevenson et al., 1992). The results of this study suggested that differences in genes accounted for 29% of the variance in specific phobia diagnosis, with shared and non-shared environmental factors each accounting for a remaining third of the variance. Van Houtem et al. (2013) go on to suggest that unique environmental factors (i.e., individual events) account for most of the variance beyond genetic factors, whereas common environmental factors (i.e., events affecting multiple individuals) only contribute a small effect on variance.

While there has been a range of results found for the heritability of specific phobias, the heritability of anxiety more generally has been demonstrated consistently in the literature. Fyer et al. (1995) found moderate aggregation for specific phobias in families where one family member had an anxiety disorder. Hettema et al. (2001) found similar results in a meta-analysis of the heritability of anxiety disorders in both family and twin studies. Hettema et al. (2005) examined anxiety disorders in a community sample of twins and determined that for all the anxiety disorders there appears to be two genetic factors that contribute to the development of symptomology. One of these factors is specifically associated with situational and animal phobias but no other forms of anxiety. Because these two subtypes of phobias are loaded together but separate from other forms of anxiety, it suggests that there may be a unique genetic factor related to the development of these two specific types of phobia making them distinct from the etiology of other forms of anxiety. Additional evidence has shown that individuals with the blood-injection-injury subtype of specific phobia have more relatives with similar problems indicating that this subtype may be a separate category (Marks, 1987; Öst, 1992). A more recent meta-analysis examined five studies and largely found similar results to previous literature (Van Houtem et al. (2013). The heritability rate range was 28–63% for blood-injury-injection phobias, 22–44% for animal phobias, 0–41% for miscellaneous phobias, and 0–33% for situational phobias (Mean = 33%, 32%, 25%, and 25%, respectively). The presence of unique physiological attributes in blood-injection-injury phobia, including the risk for fainting which is rare in other phobia subtypes (Connolly et al., 1976), also supports differentiating this subtype from other specific phobia subtypes.

Contrary to the above results, the VATSPSUD study (Kendler & Prescott, 2006) found the

lowest rates of *specific* heritability for blood-injection-injury phobias (7%). That is, those with a relative with this specific type of phobia are not as likely to inherit that particular phobia. Kendler and Prescott (2006) also found similarly low rates for the specific heritability of situational phobias (15%). However, this study did find common genetic factors contributing to all phobias, with the largest contribution for animal (21%) and blood-injection-injury (22%).

Disgust Sensitivity

Disgust sensitivity refers to the propensity for experiencing disgust in a wide variety of settings. This sensitivity has been proposed to contribute to the development of a variety of disorders particularly blood-injection-injury phobias, animal phobias, and obsessive-compulsive disorder (OCD; Olatunji & Deacon, 2008). Individuals with phobias related to spiders frequently report feelings of disgust rather than fear (Davey, 1992). In fact, disgust responses to images of spiders have been shown to be present even when fear is not present (Olatunji, 2006). While little research has examined disgust responses to in vivo spider exposure, people with spider phobias report more disgust than non-phobic individuals (e.g., Olatunji & Deacon, 2008). There is also some evidence that disgust, more so than anxiety, is a better predictor of avoidance of spiders (Olatunji & Deacon, 2008; Woody et al., 2005). There are a few studies suggesting that disgust sensitivity may be related more to concerns about cleanliness and potential for disease rather than concern related to physical harm in the presence of spiders and other small animals and insects (Davey, 1992; Olatunji & Deacon, 2008). Disgust sensitivity has also shown to be significantly associated with certain psychopathological symptoms in children, including blood-injection-injury phobia, animal phobia, and agoraphobia (Muris et al., 2008). There is evidence that having both spider and blood-injection-injury phobias may have a compounding effect, such that people with both to exhibit greater disgust sensitivity compared to those having a single phobia (Bianchi & Carter, 2012).

Despite the general conception that disgust sensitivity is a genetically based vulnerability, there is little evidence of a genetic component. Correlations in twin studies have shown very small genetic contribution ($r = 0.29$ for monozygotic twins and $r = 0.24$ for dizygotic twins; Rozin et al., 2000). While a significant relationship exists between parent and child levels of disgust ($r = 0.52$; Rozin et al., 2000), there are environmental factors that could be contributing to this relationship other than genetics. Additionally, some researchers have suggested that gender differences in specific phobias may be related to gender differences in disgust sensitivity (Davey, 1994). While early studies have been inconclusive, a recent study (Connolly et al., 2008) found that disgust sensitivity mediated the association between gender and specific phobias.

Social Anxiety Disorder (Social Phobia)

Description

Social anxiety disorder (social phobia) is characterized by intense fear or discomfort in social situations. This fear can be limited to one specific situation (e.g., eating in front of others) or it can be generalized to all social settings. Individuals with this type of anxiety fear embarrassment in these situations which often includes fear of being ridiculed, laughed at, or disliked by peers. Individuals often have an overestimated perception of how anxious they appear physically. In children, symptoms must persist for at least 6 months and must result in significant interference in the child's social functioning. In addition to these criteria, the DSM-5 (pp. 202–208) requires the following:

- Marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others. Examples include social interactions (e.g.,

having a conversation, meeting unfamiliar people), being observed (e.g., eating or drinking), and performing in front of others (e.g., giving a speech). *Note: In children, the anxiety must occur in peer settings and not just during interactions with adults.
- The individual fears that he or she will act in a way or show anxiety symptoms that will be negatively evaluated (i.e., will be humiliating or embarrassing; will lead to rejection or offend others).
- The social situations almost always provoke fear or anxiety. *Note: In children, the fear or anxiety may be expressed by crying, tantrums, freezing, clinging, shrinking, or failing to speak in social situations.
- The social situations are avoided or endured with intense fear or anxiety.
- The fear or anxiety is out of proportion to the actual threat posed by the social situation and to the sociocultural context
- The symptoms are not transient lasting 6 months or more.

For children and adults alike, the fear or anxiety is considered excessive in relation to the actual threat posed by the social situation. In children, these symptoms must be present in social situations involving similarly aged peers and not only around adults. In addition, the child must demonstrate the capacity to engage in age-appropriate social interactions with individuals with whom the child is familiar. The distress and avoidance seen in social settings is often demonstrated in tantrums, crying, clinging to caretakers, and hiding. Moreover, the fear and avoidance situations or objects experienced by children tend to be narrower in range compared to those experienced by adults (APA, 2013).

Social phobia in children and adolescents is associated with a number of long-term negative outcomes. Children and adolescents with social phobia are at a high risk for developing substance use earlier than their peers and tend to have a shorter interval between first use of substances and problems associated with substance use (Marmorstein et al., 2010). There is some evidence that those who receive treatment for an anxiety disorder in childhood are less likely to have problems with substance use in later adolescence (Kendall et al., 2004). Children with a primary anxiety disorder (including social anxiety disorder) are also at a much higher risk for OCD and mood disorders, such as MDD or dysthymic disorder (now persistent depressive disorder; Waite & Creswell 2014) and educational problems, including decreased academic performance and early discontinuation (Kerns et al., 2013), particularly in later adolescence (Kessler et al., 1995). These heightened risks could be explained by consistent negative self-perceptions (Alfano et al., 2006).

Epidemiology

The lifetime prevalence of social phobia in an adolescent population has been reported as 1.6% (Essau et al., 1999b), although more recent literature has suggested the lifetime prevalence rates to be higher, between 4.20% for men and 5.67% for women (Clauss & Blackford, 2012). A meta-analysis reported social anxiety disorder prevalence in 28 countries to be 4.0% (Stein et al., 2017). The 12-month prevalence rate in US children is approximately 7% and is comparable to the rate among adults (APA, 2013). Prevalence rates of social phobia in children in the general population range from 1% to 6% (Verhulst et al., 1997), although, again, more recent reviews have suggested the rates to be higher, between 9.1% (Xu et al., 2012) and 12.1% (Ruscio, 2008). One possible reason for this large range in prevalence rates is the way certain forms of social anxiety are coded by researchers. For example, both school phobia and fear of public speaking could be classified under either social anxiety or specific phobia. Different studies have chosen to categorize these types of fears differently which may contribute to the inconsistent prevalence rates across studies. In a more recent study conducted with 8- to 13-year-olds in Norway, 2.3% of all children were reported to have significant symptoms of social anxiety (Van Roy et al., 2009). The rates of social phobia among a clinical population have been reported around 15%

(Last et al., 1987b). As with all anxiety disorders, there is a high level of comorbidity in social phobia with one sample reporting that 63% of children with social anxiety had a comorbid anxiety disorder (Last et al., 1987b).

Additionally, there is some evidence of sociodemographic differences in the prevalence of social phobia. Inconsistent findings have been reported for gender differences in social phobia. One study of a clinical sample found that boys were more likely to have social anxiety than were girls (Compton et al., 2000), while other studies have found that up to 70% of clinical samples of social phobia are females (Beidel & Turner, 1988). There has been little cross-cultural research or research related to racial background in social phobia. There is some evidence, however, that European American children are more likely to report more symptoms of social anxiety than are African American children in a community sample (Compton et al., 2000), but these findings have not yet been replicated. Social phobia is correlated with individuals who are single, never married or divorced, and without children (APA, 2013).

Panic Disorder

Description

The hallmark symptom of panic disorder is the presence of recurrent and unexpected panic attacks that cause the individual great anticipatory anxiety. Panic attacks themselves are brief periods of numerous physiological symptoms accompanied by intense fear. For a majority of individuals experiencing panic disorder, there is also agoraphobic avoidance—that is, avoidance of situations from which escape might be difficult in the event of a panic attack. Panic disorder was once thought to be a disorder found only in adults and very rarely in adolescents. This notion was based on the idea that there is a strong cognitive component to panic disorder that children were incapable of experiencing (Nelles & Barlow, 1988). However, there is now a large body of evidence showing that panic disorder does occur in children (e.g., Kearney et al., 1997). Despite the evidence showing that it does occur in children (Wittchen et al., 2008), the typical age of onset for panic disorder is late adolescence into adulthood (Kessler et al., 2005), and the prevalence rate among children younger than 14 years old is less than 0.4% (APA, 2013). For many individuals with panic disorder, the first panic attack occurred during a time of psychosocial stress (Craske, 1999).

Symptoms of Panic

According to DSM-5 (pp. 208), a panic attack is an "abrupt surge of intense fear or intense discomfort that reaches a peak within minutes, and during which time four (or more) of the following symptoms occur: palpitations, pounding heart, or accelerated heart rate; sweating; trembling or shaking; sensations of shortness of breath or smothering; feelings of choking; chest pain or discomfort; nausea or abdominal distress; feeling dizzy, unsteady, light-headed, or faint; chills or heat sensations; paresthesias (numbness or tingling sensations); derealization (feelings of unreality) or depersonalization (being detached from one-self); fear of losing control or 'going crazy'; and fear of dying" (Table 2.2).

In order for panic attacks to be considered part of panic disorder, at least one must be followed by a month or more of one or both of the follow-

Table 2.2 DSM-5 Symptoms of panic attacks

Palpitations, pounding heart, or accelerated heart rate
Sweating
Trembling or shaking
Sensations of shortness of breath or smothering
Feeling of choking
Chest pain or discomfort
Nausea or abdominal distress
Feeling dizzy, unsteady, lightheaded, or faint
Chills or heat sensations
Paresthesias (numbness or tingling sensations)
Derealization (feelings of unreality) or depersonalization (feeling detached from oneself)
Fear of losing control or going crazy
Fear of dying

Note: Adapted from American Psychiatric Association (2013, pp. 208)

ing: (1) persistent concern or worry about having another attack or their consequences (e.g., losing control, a heart attack, going crazy) and (2) a significant maladaptive behavior change related to having these attacks. In children, making a diagnosis of panic disorder can be challenging as some of the fears may present differently. For example, young children may report a fear of becoming ill without any clear physical symptoms reported. In older children, reports of anxiety about becoming sick are common, as are fears of uncontrollable vomiting. Only in adolescence do individuals tend to start reporting fears related to specific physiological symptoms.

Children and adolescents report many of the same physiological symptoms as adults, such as heart palpitations, nausea, shakiness, dizziness, sweating, headaches, and chills or heat sensations (Masi et al., 2000; Essau et al., 1999a; Kearney et al., 1997). Somatic symptoms are more common than cognitive complaints, which are reported more frequently among adolescents than children (Moreau & Follett, 1993). Nevertheless, there is evidence that some children and adolescent experience cognitive symptoms, such as the fear of dying, the fear of going crazy (e.g., "I feel I am losing control"), or depersonalization/derealization (e.g., "I don't know who I am" or "I don't know where I am"). Twin studies have demonstrated that panic disorder is moderately heritable with a concordance rate of 73% among monozygotic twins compared to 0% in dizygotic twins (Perna et al., 1997). The Virginia Adult Twin Study of Psychiatric and Substance Use Disorders (2005) found a panic disorder heritability of 28%, revealing that environmental factors also play a considerable role. However, two recent genome-wide association studies on panic disorders did not produce significant associations (Na et al., 2011).

Agoraphobia

Description

In the DSM-5, agoraphobia was designated as its own diagnostic category independent of panic disorder. The defining feature is "marked, or intense, fear or anxiety triggered by the real or anticipated exposure to a wide range of situations" (pp. 218). However, there remains some overlap in symptoms and diagnostic criteria (Asmundson et al., 2014). A diagnosis of agoraphobia requires marked fear or anxiety about at least two of five situations:

- Using public transportation (e.g., automobiles, buses, trains, ships, planes)
- Being in open spaces (e.g., parking lots, marketplaces, bridges)
- Being in enclosed spaces (e.g., shops, theaters, cinemas)
- Standing in line or being in a crowd
- Being outside of the home alone (DSM-5, pp. 217)

Generally, these "situations are actively avoided, require the presence of a companion, or are endured with intense fear/anxiety" (pp. 218). Phobic avoidance may be motivated by unrealistic fears of the *consequences* of having panic symptoms, particularly in situations where the person feels trapped or far from help. For children, commonly feared situations are being outside the home and becoming lost (DSM-5, pp. 220). There are some concerns for children failing to meet the new DSM-5 criteria and not receiving proper treatment, mainly due to criterion A (requiring symptoms elicited from two or more of the situations listed above; Cornacchio et al., 2015). However, the result and impact of this needs to be researched further.

Epidemiology

Agoraphobia is diagnosed in about 1.7% of adolescents and adults each year, with a "substantial incidence risk in late adolescence and early adulthood" (DSM-5, pp. 219). In a study of US adolescents, Roberts et al. (2007) found a 1-year prevalence rate of 4.5% (significantly higher than the rates found in adults). In fact, this study found that agoraphobia was the most frequent anxiety disorder in their sample, although the prevalence

dropped to 1.6% when impairment was required for a diagnosis. In a 2010 study of mental disorders in US adolescents (aged 13–18), the lifetime prevalence of agoraphobia was 2.4%, with higher rates for females than males (3.4% versus 1.4%) (Merikangas et al., 2010). Wittchen et al. (2008) examined the prevalence of agoraphobia in German adolescents. Adolescents with panic disorder or panic attacks were only moderately more likely to develop subsequent agoraphobia, while the majority of adolescents meeting criteria for agoraphobia had never experienced a panic attack. While cultural/racial groups do not seem to have different prevalence rates, cultural context is considered in the DSM-5 when determining if symptoms are "out of proportion to the actual danger posed" (pp. 219).

Separation Anxiety Disorder

Description

Separation anxiety disorder is a somewhat unique diagnosis in that, up until the DSM-5, it was the only anxiety disorder limited to children and adolescents. Separation anxiety disorder is defined in DSM-5 (pp. 190) as "developmentally inappropriate and excessive fear or anxiety concerning separation from those to whom the individual is attached, as evidenced by three or more of the following (Table 2.3):

- Recurrent excessive distress when anticipating or experiencing separation from home or from major attachment figures
- Persistent and excessive worry about losing major attachment figures or about possible harm to them, such as illness, injury, disasters, or death
- Persistent and excessive worry about experiencing an untoward event (e.g. getting lost, being kidnapped, having an accident, becoming ill) that causes separation from a major attachment figure
- Persistent reluctance or refusal to go to out, away from home, to school, to work, or elsewhere because of fear of separation
- Persistent and excessive fear of or reluctance about being alone or without major attachment figures at home or in other settings
- Persistent reluctance or refusal to sleep away from home or to go to sleep without being near a major attachment figure
- Repeated nightmares involving the theme of separation
- Repeated complaints of physical symptoms (such as headaches, stomachaches, nausea, or vomiting) when separation from major attachment figures occurs or is anticipated."

Table 2.3 DSM-5 Diagnostic criteria for separation anxiety disorder

Recurrent excessive distress when anticipating or experiencing separation from home or major attachment figures occurs or is anticipated
Persistent and excessive worry about losing major attachment figures or about possible harm to them, such as illness, injury, disasters, or death
Persistent and excessive worry about experiencing an untoward event (e.g., getting lost, being kidnapped, having an accident, becoming ill) that causes separation from a major attachment figure
Persistent reluctance or refusal to go to out, away from home, to school, to work, or elsewhere because of fear of separation
Persistent and excessive fear of or reluctance about being alone or without major attachment figures at home or in other settings
Persistent reluctance or refusal to sleep away from home or to go to sleep without being near a major attachment figure
Repeated nightmares involving the theme of separation
Repeated complaints of physical symptoms (such as headaches, stomachaches, nausea, or vomiting) when separation from major attachment figures occurs or is anticipated

Note: Adapted from American Psychiatric Association (2013, pp. 190–191)

To be considered clinically significant, these symptoms must be present in children and adolescents for at least 4 weeks. Comparatively, adults must present these symptoms for 6 or more months. Particular to children, the symptoms must be developmentally inappropriate for the child's biological age. Many of these symptoms would be considered developmentally appropriate in children ages 7 months to 6 years old

(Bernstein & Borchardt, 1991), and thus it is important to consider both age and developmental level when making a diagnostic determination. The underlying fear found in separation anxiety disorder is an exaggerated fear of losing or becoming separated from parents or other primary caregivers. In addition to these fears, many children experience nightmares related to becoming separated from caregivers (Bell-Dolan & Brazeal, 1993).

Symptom differences have been found between ages but not between genders (Francis et al., 1987; Paulus et al., 2015). Young children (ages 5–8 years) are most likely to report fears of harm to self or caregivers, nightmares, and school refusal. Children between the ages of 9 and 12 years present with more excessive distress at the time of separation, while adolescents are more likely to experience somatic symptoms and school refusal. Similarly, children tend to exhibit physical symptoms such as headaches and nausea, whereas adolescents and adults tend to experience cardiovascular symptoms (APA, 2013). Some children have also described perceptual experiences. Additionally, older children and adolescents are most likely to experience a smaller number of symptoms than are younger children.

Epidemiology

While separation anxiety disorder can present in children of all ages, it is most common in preadolescent age ranges. Typically, the onset is acute and follows a significant change in the child's life (e.g., start of school, moving, death of a parent or close relative) or developmental changes (Last, 1989). Several studies have shown that separation anxiety disorder follows an intermittent course over time. Children often experience remissions and relapses around times of school holidays, vacations, and life stressors (Cantwell & Baker, 1988; Hale et al., 2008). When followed over a period of 4 years, 96% of children initially diagnosed with separation anxiety disorder no longer met diagnostic criteria, the highest recovery rate of any anxiety disorder studied (Last et al., 1996).

Prevalence rates in community samples for separation anxiety disorder ranged from 2.0% to 12.9% (Anderson et al., 1987; Kashani & Orvaschel, 1988; McGee et al., 1990). Among children 12 years old and younger, separation anxiety disorder is the most prevalent disorder and has been found to decrease throughout the lifespan (APA, 2013), consistent with previous literature. The range in rates may be attributable to the age at which symptoms were assessed. The lower rates of prevalence were found in studies examining adolescents, while the higher rates were found in community samples of younger children. Rates among clinical populations are higher than the general population, with 33% of a sample of anxious children meeting diagnostic criteria for separation anxiety disorder (Last et al., 1987b). Results of this study also indicated that 41% of the children with a primary diagnosis of separation anxiety disorder had a comorbid anxiety diagnosis, the most common being GAD or specific phobia (APA, 2013).

A number of sociodemographic variables have been associated with separation anxiety disorder. Most samples examining separation anxiety disorder have been primarily with children of European descent, although this finding may reflect biased sampling rather than true cultural differences (Strauss & Last, 1993). However, one study in Uganda found a child/adolescent prevalence rate of 5.8% (Abbo et al., 2013). As with most other anxiety disorders, rates of separation anxiety disorder are higher in females than males (Compton et al., 2000); however, there is evidence of equal rates in a clinical sample (APA, 2013). Contrarily, a few published reports found no gender differences (Bird et al., 1989; Last et al., 1992; Paulus et al., 2015). Additionally, lower SES and parental education levels have been associated with higher rates of separation anxiety disorder in children (Bird et al., 1989; Last et al., 1987b). In a study examining separation anxiety disorder heritability, researchers estimated a heritability rate of 73% in a community sample of 6-year-old twins (Bolton et al., 2006).

Role of Avoidance

In addition to the many fears that children with separation anxiety disorder experience, the avoidance of situations is a key element of this disorder. Additionally, avoidance behaviors play an important sustaining role in anxiety disorders (Foa & Kozak, 1986). There is a large range of avoidance behaviors common to children with separation anxiety disorder, and types of avoidance may vary by age. Reluctance to be being alone or without an adult and reluctance to sleep away from caregivers or from home are the most frequently reported avoidance behaviors (Allen et al., 2010). Milder forms of avoidance include hesitation to leave home, requesting that the caregiver be accessible via phone during outings, and frequent questions about schedules. More moderate forms of avoidance in younger children can include clingy behaviors with parents or caregivers (e.g., following the adult around the house). Older children may be more likely to have difficulty leaving home without caregivers or refuse to participate in social activities with peers if the caregiver is not present. More serious forms of avoidance can include faking illnesses, school refusal, or refusal to sleep alone at night. According to the DSM-5 (2013), girls may exhibit more reluctance or avoidance to attend school than boys.

Avoidance behaviors may slowly increase over time. Albano et al. (2003) describe a pattern of increasing avoidance that starts with occasional nightmares and subsequent requests to sleep with parents. From this relatively mild behavior change, the child can become increasingly avoidant until he or she is sleeping with one or both parents every night. Similarly, Livingston et al. (1988) describe a pattern of increasingly serious physical complaints on the part of the child. This behavior often progresses from very vague complaints of not feeling well to frequent complaints of stomachaches or headaches. It is often these avoidance behaviors that will prompt the parent to bring the child in for treatment.

Differential Diagnosis

Developmentally Appropriate Fear Versus Anxiety Disorders

An important diagnostic issue to consider in children is whether the anxiety is developmentally appropriate or is part of a disorder. Anxiety and its various associated physiological symptoms are considered to be basic human emotions (Barlow, 2002). In young children, common developmental fears include fear of the dark, fear of new situations including the first day of school, fear of separation from parents or other caretakers, and fear of large animals. In adolescents, common developmental fears include anxiety related to job interviews, college applications, and dating.

An important distinction between developmentally appropriate fears and phobias is both the duration and severity of the anxiety. For the anxiety to become clinically significant, it must persist for a period of at least 6 months and include significant avoidance and interference in daily functioning (Albano et al., 2001). While this distinction often is based on clinical judgment, there has been research showing that a specific phobia diagnosis can be reliably achieved through the use of structured clinical interviews and standardized self-report measures (Schniering et al., 2000). One common assessment used for the diagnosis of anxiety disorders in children is the Multidimensional Anxiety Scale for Children Second Edition (MASC; March et al., 1997; March, 2012). This self-report scale is used to differentiate clinical from nonclinical samples as well as distinguish different forms of anxiety. It has been found to be sensitive to the differences in these groups (Dierker et al., 2001). The Anxiety Disorders Interview Schedule for Children (ADIS-C; Silverman & Albano, 1996) is another useful structured interview for diagnosis of anxiety disorders in children. The updated ADIS-5-C/P is under development. The structured Clinical Interview for DSM-5 (SCID-5) specifically tailored for children and adolescents is also currently under development.

Distinguishing Between Different Anxiety Disorders

Given the substantial overlap in symptoms across the disorders presented in this chapter, it may be difficult at times to identify which diagnosis a given child's symptom presentation warrants. The task can be all the more challenging in light of children's difficulty at times in reporting clearly what they are experiencing. Even if they are willing to discuss their experiences, there may be limitations in their vocabulary or concept formation to fully describe their fears. Accurate diagnosis is important for case conceptualization such that the most appropriate treatment can be administered. For example, a cognitive-behavioral clinician would expose an individual with panic disorder to interoceptive cues (e.g., pounding heart) but would follow a different treatment plan for an individual with separation anxiety disorder. The following section covers common distinctions that must be made in the differential diagnosis of specific phobia, social phobia, panic disorder, agoraphobia, and separation anxiety disorder. In most cases, the correct diagnosis can be derived by understanding what is at the core of the patient's fears.

Specific phobia vs. social phobia Of the disorders under consideration, the two that share the most symptom criteria may be the most straightforward to distinguish based simply on the content of the fears. Specific and social phobia overlap in nearly all of their diagnostic criteria except that social phobia involves a fear of social situations (e.g., talking to a group, answering questions in class), whereas specific phobia involves a fear of other stimuli. In cases where the distinction may be somewhat difficult—for example, fear of clowns—the differential diagnosis is based on whether the fear is primarily social (e.g., being publicly embarrassed by the clown) or involves fear of the stimulus itself (e.g., being attacked by the clown).

Specific phobia vs. panic disorder Children with specific phobias often will experience many physiological symptoms of panic, and may even develop a panic attack, when confronted with the feared stimuli. The presence of panic attacks is not sufficient to warrant the diagnosis of panic disorder, given that only a small minority of individuals who experience panic attacks go on to develop panic disorder; results from the National Comorbidity Survey Replication revealed a 22.7% lifetime prevalence estimate for panic attacks versus a 3.8% rate for panic disorder (Kessler et al., 2006, 2012). Specific phobia is indicated when the child's fear, including panic attacks, is provoked by the phobic stimulus itself—for example, a dog. The content of the fear in this case would have to do with the possibility of injury as a result of contact with the dog. At the core of panic disorder, on the other hand, is a fear of the panic attacks themselves (the so-called "fear of fear"; e.g., Chambless et al., 1984).

Differential diagnosis can be more difficult when the feared stimulus or situation is one that commonly is associated with panic disorder—for example, a fear of elevators. In these cases, it is imperative that the diagnosing clinician ascertain whether the patient is afraid of panicking in these situations or simply is afraid of the situations themselves (e.g., fears that the elevator will fall). Finding that the individual fears several situations that provoke panic attacks (e.g., car trips, elevators, crowds) makes a diagnosis of panic disorder more likely than diagnosis of a specific phobia to multiple situations.

Specific phobia vs. separation anxiety disorder Specific phobia and separation anxiety disorder both may include significant levels of avoidance. The primary distinction between these disorders is based on whether the avoidance is driven by fear of the avoided stimulus, as in specific phobia, or by fear of separation from attachment figures, which defines separation anxiety disorder. Although children with specific phobia may cling to their caregivers when confronted with the phobic stimulus, the clinging behavior represents the child's looking to the caregiver for safety and protection. In contrast, the core fear in separation anxiety disorder is

separation from the caregiver in and of itself. For this reason, the fear of separation is likely to be more pervasive than in specific phobia in which fear of separation is provoked by the presence of a relatively limited range of stimuli (e.g., dogs).

Specific phobia vs. agoraphobia Specific phobia and agoraphobia share similar criteria, particularly regarding feared situations. DSM-5 guidelines state that if the individual fears one situation, specific phobia should be considered, as agoraphobia requires two or more feared situations. Additionally, the motive for the feared situation is an important factor in distinguishing the two diagnoses. For example, an individual who displays crowd phobia tendencies due to fear of being harmed may be diagnosed with specific phobia, whereas an individual who fears crowds due to fear of displaying panic-like symptoms would be appropriate for an agoraphobia diagnosis.

Social anxiety disorder (social phobia) vs. panic disorder A child who presents with panic attacks and a fear of social situations could be living with either panic disorder or social anxiety disorder. Additionally, both conditions lead to avoidance of social situations, such as school refusal. Indeed, the Panic Appraisal Inventory (Telch, 1987), which is commonly used to measure panic-related concerns, comprises a subscale of panic consequences that include social concerns. Though frequently co-occurring (Schneier et al., 1992), social anxiety disorder and panic disorder can be distinguished by the primary fear driving the anxiety. While social anxiety disorder is characterized by fear of negative evaluation, panic disorder is characterized by fear of the panic attacks themselves (APA, 2013). For example, a child may fear that they will panic in school, faint, and have to be carried out of the classroom while the whole class watches. In this case, the child is unlikely to fear social situations per se, but rather the possibility of having a panic attack in a social setting. Similarly, children with social phobia may fear embarrassing themselves in public due to their anxiety response—for example, that they will shake, trip over their words, or blush. In this case, the child will fear the social situation itself, not their possible public panic response.

Social anxiety disorder (social phobia) vs. separation anxiety disorder As with panic disorder, separation anxiety disorder can also resemble social anxiety disorder in some respects. For example, school refusal may be driven by social anxiety or by the distress associated with separation from one's caregiver. Careful questioning of the child and, if necessary, the parents may reveal the underlying fear. Whereas social anxiety disorder is characterized by the fear of being judged negatively by others, separation anxiety is defined by the fear of being separated from attachment figures (APA, 2013). For example, if the child has no trouble socializing with peers when the parents are present but refuses to go to school, sleepovers, and other events where the parents are not present, a diagnosis of separation anxiety disorder is likely. On the other hand, if the child is still terribly afraid of social settings even in the presence of the parents, the accurate diagnosis is likely social anxiety disorder.

Social anxiety disorder (social phobia) vs. agoraphobia The main factor differentiating social anxiety disorder from agoraphobia is the stimulus triggering symptoms and the cognitive ideation (DSM-5). A diagnosis of agoraphobia will be defined by marked by fear, anxiety, and avoidance of certain places or situations. Conversely, fear of negative evaluation will be at the core of a social anxiety disorder diagnosis.

Panic disorder vs. separation anxiety disorder The final differential diagnosis, between panic disorder and separation anxiety disorder, can be one of the more difficult distinctions to make. In fact, there is strong evidence that separation anxiety disorder is a risk factor for panic disorder (Kossowsky et al., 2013). Both disorders may include clinging to "safe" persons, often the parents. Once again, making the right diagnosis depends on identifying the child's specific fear. In panic disorder, the strong desire to be close to a safe person is driven by fears related to panic—

for example, the person with agoraphobia who is concerned that she will have a panic attack when help is not available. In this case, the safe person provides a sense of comfort in the face of a potential panic attack, similar to the function of having a bottle of benzodiazepines always nearby. With separation anxiety disorder, the fear is related to separation from the caregiver in its own right. Unwanted separation from the caregiver may trigger a bout of anxiety that leads to a panic attack, but the root of the anxiety is the separation and not the panic symptoms.

Panic disorder vs. agoraphobia Agoraphobia should only be diagnosed when avoidance behaviors associated with panic attacks extend to two or more agoraphobic situations.

Agoraphobia vs. separation anxiety disorder Much like with panic disorder, the differentiation between agoraphobia and separation anxiety disorder lies in the specific cognitive ideation. In agoraphobia, the focus is on panic-like or other incapacitating or embarrassing symptoms in feared situations, whereas the cognitive ideation in separation anxiety disorder is more likely thoughts on detachment from parents or other attachment figures.

Diagnostic Reliability

In light of the often-challenging differential diagnosis of the disorders described in this chapter, arriving at a reliable diagnosis is imperative to provide treatment recommendations. The current diagnostic system was adopted in an attempt to increase the reliability of diagnoses across clinicians. Attempts to determine diagnostic reliability often rely on test-retest or interrater reliability approaches, including the audio/video-recording method. Knappe et al. (2013) demonstrated high test-retest reliability of the dimensional anxiety scales, including social anxiety disorder, agoraphobia, and panic disorder. In accordance with previous research (Lebeau et al., 2012), Knappe et al. (2013) reported low test-retest reliability for specific phobia. Interrater reliability for these disorders is also in the excellent range (Brown et al., 2001). The reliability of diagnosis specifically in children has also been found to be good when using structured diagnostic interviews (Schniering et al., 2000). This high level of reliability has improved the ease of communication between mental health professionals about a given patient's clinical status.

While there are positive aspects to the current diagnostic system, there also are significant limitations to the way disorders are defined. First, many diagnoses contain words like "persistent," "clinically significant," and "excessive" without defining the threshold for such criteria. This vagueness can lead to disagreement across clinicians. With respect to children specifically, the current DSM does not address developmental norms that can be expected across ages. It also does not address how specific disorders may present themselves differently in different age groups. Therefore, the clinician often must make a judgment call as to whether a particular behavior falls outside the realm of developmentally appropriate behavior in a child, creating a lack of reliability in diagnosis. By improving this definition, a clearer threshold would be established that would ideally incorporate developmental norms for diagnosis in children. A clearer definition of this threshold would dramatically improve diagnostic reliability as much of the lack of diagnostic agreement in this area is caused by differing definitions of what is "developmentally appropriate" (Albano et al., 2003).

Second, diagnoses could be improved by increasing the reliability of subtypes of specific phobias. There is significant co-occurrence of multiple subtypes in individuals diagnosed with specific phobias and a lack of empirical support for the current subtypes. Blood-injection-injury phobias seem to have both different physiological responses and psychometric properties and likely represent a clear subtype. However, the other subtypes do not seem to have the same psychometric differentiation. As with social phobia, it may make sense to refer to specific phobias in terms of simple type (one specific phobia) and generalized type (more than one specific phobia; Piqueras et al., 2008).

Third, symptoms of panic disorder should more clearly be differentiated by age range. There is evidence that children of different ages report different types and numbers of symptoms. This developmental variability needs to be reflected in the diagnostic criteria for children. There may also be a need for the addition of several symptoms currently missing from the diagnostic criteria for children.

Finally, there have been criticisms of the validity of the current diagnostic categories. There is high comorbidity of the current diagnostic criteria which often results in multiple diagnoses, although it is unclear whether the current disorders represent distinct entities. Not only does this present issues for diagnostic reliability, but this causes challenges for conducting research on the etiological and treatment differences among disorders (Asmundson et al., 2014). One proposed option is for a quantitative hierarchical model for diagnosis (Watson, 2005). Under this model, diagnoses are categorized by empirically supported phenotypic and genotypic similarities. This system would decrease the overlap of diagnosis and aim to increase the validity of the diagnostic system while maintaining reliability.

Summary

Anxiety disorders, including specific phobia, social anxiety disorder (social phobia), panic disorder, agoraphobia, and separation anxiety disorder, are common in children. Correct diagnostic assignment requires an understanding of the core fears in each of these disorders and the various ways that children may manifest these fears. In specific phobia and social anxiety disorder, anxiety is provoked by confronting the feared stimulus. Anxiety in those with agoraphobia is triggered by the fear of anticipated or real exposure to feared places or situations. Panic disorder is defined by fear of having panic attacks and of what their implications might be. Separation anxiety disorder is driven by fear of being separated from one's parents or other attachment figures. While the current diagnostic system represents an improvement over previous versions of the DSM, changes in several areas of the system could lead to more reliable diagnosis and clearer differentiation between anxiety disorders.

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3 Issues in Differential Diagnosis: Considering Generalized Anxiety Disorder, Obsessive-Compulsive Disorder, and Posttraumatic Stress Disorder

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Introduction

As a rule, an accurate diagnosis provides a foundation for case conceptualization and facilitates effective treatment practices, and accurate diagnoses are critical to the organization of participants for empirical research. Although not without its own problems, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), currently in its fifth iteration (American Psychiatric Association, 2013), is the most frequently used taxonomic system for organizing psychological disorders. Within this framework, disorders are presented as categories (discrete entities) characterized by specific criteria. Although specifying criteria is a decided improvement, one of the shortcomings of a categorical approach is the existence of considerable overlap in symptomatology among disorders. Indeed, comorbidity is common, and among youth with anxiety disorders, it is the norm (Kendall et al., 2001; Merikangas et al., 2010). For example, in a large sample of 7–17-year-olds, 55% of youth who met criteria for an anxiety disorder also met criteria for an additional disorder (Kendall et al., 2010). Differential diagnosis among disorders (i.e., anxiety and related disorders) poses challenges to both researchers and clinicians.

The diagnostic assessment of children and adolescents carries with it additional considerations not present when working with adults. For example, DSM-5 identifies some developmental differences in the diagnostic criteria for generalized anxiety disorder: only one physical symptom is required for children and adolescents, whereas three physical symptoms are required for adults. When diagnosing obsessive-compulsive disorder, the criterion requiring that compulsions be aimed at reducing distress is laxed for children. Additionally, separate criteria exist for diagnosing posttraumatic stress disorder in children 6 years and younger. Thus, features that may serve to differentiate disorders among adults may or may not apply to youth. Both children and parents typically provide information about the presenting youth. However, the agreement between parent and child reports of anxiety disorders is usually limited (Choudhury et al., 2003; De Los Reyes, 2011). Clinicians can resolve this discrepancy by assigning a diagnosis if the child meets criteria *by either* the child's report or the parents' report. Nevertheless, the reasons underlying parent–child discrepancies

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may be important for case conceptualization and treatment and should not be overlooked (De Los Reyes & Kazdin, 2005). For example, differences may be contingent upon the observability of the symptoms being reported (Comer & Kendall, 2004). Given the limited number of studies specific to issues of differential diagnosis among youth, the present discussion also draws upon findings from the adult literature. That said, it is clear that research is needed before conclusions can be drawn regarding differential diagnosis among youth.

This chapter addresses issues of differential diagnosis pertaining to generalized anxiety disorder (GAD), obsessive-compulsive disorder (OCD), and posttraumatic stress disorder (PTSD), with an emphasis on the potential diagnostic confusions among these three disorders. As is often the case among psychological disorders, GAD, OCD, and PTSD share similar symptom presentations. Perhaps most prominent, and potentially most troublesome, all three disorders are characterized by the presence of intrusive, repetitive cognition that causes distress. Among adults and youth, it can be difficult to delineate diagnostic boundaries. For example, a child may report that they frequently experience thoughts of their mother in a car crash. This presentation could suggest worry regarding the safety of family members, obsessional thinking, or flashbacks of an earlier trauma, corresponding to GAD, OCD, and PTSD, respectively. How best to make sense of such a youth report?

This chapter will first provide a description of the essential diagnostic features of GAD, OCD, and PTSD in youth along with a brief overview of epidemiological findings. We then examine specific areas of diagnostic overlap and confusion. These domains are organized into five categories of symptoms: (1) fear/anxiety, (2) recurrent thoughts, (3) intrusive images, (4) physical symptoms, and (5) avoidance. These symptom domains are present in nearly every anxiety disorder, help distinguish anxiety disorders from other disorders, and may facilitate differential diagnosis. Given the high rate of comorbidity, symptom overlap, and heterogeneity within diagnostic categories, a nuanced examination of youths' symptomatology within each domain will help our understanding. Next, the reliability and validity of the diagnoses will be considered. Last, this chapter will discuss current research findings in terms of their diagnostic implications.

Essential Features of GAD, OCD, and PTSD

Generalized Anxiety Disorder

The hallmark of GAD is the presence of excessive, uncontrollable, and persistent worry about a number of events or activities, more days than not for at least 6 months (APA, 2013). Worry has been defined as "a chain of thoughts and images, negatively affect-laden and relatively uncontrollable" (Borkovec et al., 1983, p. 10). For youth, these worries frequently concern health, school, and personal harm (Silverman et al., 1995; Muris et al., 2000) and must be associated with at least one physiological symptom (i.e., feeling keyed up or on edge; being easily fatigued; difficulty concentrating or mind going blank; irritability; muscle tension; or sleep disturbance). In addition, the worry or physical symptoms must cause distress or impairment in important areas of functioning, which for youth often include school/academics, peer relationships (i.e., Verduin & Kendall, 2008), and family/home life.

Critical to differential diagnosis, the focus of the anxiety and worry present in GAD cannot be better accounted for by features of another disorder. For example, if the excessive and interfering worry is entirely focused on peer evaluation, social anxiety disorder may be more apt than GAD, or if the worry is solely about gaining weight, a diagnosis of anorexia nervosa may be appropriate. In addition, the symptoms of GAD must not be attributable to the effects of a substance or a medical condition.

Onset of GAD in childhood does exist (e.g., Kendall et al., 2010), but it is the case that the main incidence period for GAD is adolescence and adulthood (Beesdo et al., 2010), with prevalence estimates in adolescence at about 3%

(Burstein et al., 2014). Onset of GAD is often earlier in females than in males, with prevalence estimates increasing with age in children and adolescents (Beesdo et al., 2009). Additional research is needed to examine the gender ratio in youth.

Obsessive-Compulsive Disorder

OCD is characterized by the presence of obsessions or compulsions. Most individuals with OCD experience both obsessions and compulsions, and the presence of pure obsessions is uncommon (APA, 2013; Foa et al., 1995). Obsessions are defined as recurrent and persistent thoughts, impulses, or images that are intrusive, inappropriate, and experienced as distressing (APA, 2013). The most common obsessions among clinically affected youth involve themes of contamination, harm or death, and symmetry (Hanna, 1995), though recent research demonstrates that children and adolescents may differ in presentations of obsessions, including an increased presentation of sexual obsessions in adolescents (Selles et al., 2014). Youth with OCD often perform compulsions to ignore, hold back, or neutralize obsessive thoughts and related feelings. Compulsions are repetitive, intentional behaviors performed to reduce anxiety or distress and are often performed stereotypically or according to rigid rules. Unlike adults, youth do not have to recognize that the obsessions or compulsions are excessive or unreasonable. While children and adolescents do not necessarily differ in severity of symptoms, adolescents may experience more control over compulsions (Selles et al., 2014). Given that intrusive thoughts and images regularly occur in the general population, symptoms must be distressing, time consuming (lasting more than 1 h per day), or interfering with academic functioning, social activities, or relationships to warrant a diagnosis of OCD.

The DSM-5 separates anxiety and obsessive-compulsive disorders, creating a separate category of obsessive-compulsive disorders that include OCD, body dysmorphic disorder (BDD), hoarding disorder, trichotillomania, and excoriation disorder. Regarding differential diagnosis, DSM-5 specifies that obsessions are not simply excessive worries about real-life problems, but instead center around irrational, magical worries (APA, 2013). The obsessions and compulsions cannot fall within the circumscribed content domains of other anxiety or obsessive-compulsive disorders. For example, obsessions related to one's own appearance may better fall under the diagnosis of BDD, and hair-pulling (not cosmetic) may be better accounted for by a diagnosis of trichotillomania.

Similar to GAD, OCD likely develops between childhood and mid-adolescence, with the average age of onset falling between 7.5 and 12.5 years (Geller et al., 1998). Several epidemiologic studies conducted with adolescents in the United States and elsewhere report prevalence rates ranging from approximately 2% to 4% of the pediatric (Geller, 2006). Among clinic-referred youth, the lifetime prevalence rate is approximately 15% (Last et al., 1992). The gender ratio is not clear in children: some data suggest that OCD is more common in boys (Geller et al., 1998; Zohar et al., 1997), whereas other data indicate no difference in sex distribution (Anholt et al., 2014; Chabane et al., 2005).

Posttraumatic Stress Disorder

PTSD is characterized by a constellation of symptoms that develop in response to a trauma. Specifically, it can occur when an individual experiences, witnesses, learns about a close family member or friend experiencing, or is repeatedly exposed to as part of one's job (school), an event involving actual or threatened death, serious injury, or sexual violence (APA, 2013).

In DSM-5, PTSD was relocated to a new category, "Trauma and Stressor-related Disorders." Further, the DSM-5 includes separate diagnostic criteria for PTSD for children and for adults older than six and children younger than six. For those older than six, there must be at least one intrusion symptom (e.g., recurrent distressing dreams), at least one avoidance symptom (e.g., avoidance of memories), at least two negative alterations in

cognitions and mood (e.g., distorted blame about the traumatic event, persistent negative emotional state), and at least two alterations in arousal and reactivity (e.g., irritable behavior, hypervigilance). The disturbance must last for longer than 1 month and cause meaningful distress or impairment in important areas of functioning. For those younger than six, a lower threshold of symptoms must be met, and there is a focus on observable symptoms rather than reports on internal experiences.

A history of adverse or traumatic events can be present in individuals with diagnoses other than PTSD. The stress associated with traumatic events may serve as a catalyst for the manifestation of an underlying vulnerability, as described in the diathesis-stress model. Thus, the presence of a traumatic event is necessary but not sufficient for a diagnosis of PTSD. Moreover, differential diagnosis was informed by the timing of symptom onset. As noted in DSM-5, symptoms of intrusion, avoidance, negative alterations of cognitions and mood, and alterations of arousal and reactivity must begin or worsen after the trauma. Based on this framework, symptoms of PTSD were distinguished from psychotic hallucination, agoraphobia, specific phobia, and depression. Of course, the presence of PTSD does not exclude the presence of other disorders, as evidenced by the high comorbidity rates of both adults and children diagnosed with PTSD (Salloum et al., 2018).

Notably, not all youth who experience trauma develop PTSD, and there is evidence to suggest that age, gender, and environmental factors all play a role in differential outcomes (e.g., Furr et al., 2010; Bokszczanin, 2007, 2008; McNally, 1993). Approximately 16% of children who are exposed to a traumatic event develop PTSD (Alisic et al., 2014). A survey of adolescents in a population-based sample found a 4.7% prevalence rate for PTSD, which was significantly higher among females (7.3%) compared to males (2.2%; McLaughlin et al., 2013). While boys are more likely to be victims of physical violence, girls are more likely to experience sexual violence (McLaughlin et al., 2013). A large-scale survey of PTSD in children aged 2–5 revealed a much lower prevalence rate of 0.1% (Lavigne et al., 1996).

Domains of Symptom Overlap

Fear/Anxiety

All anxiety disorders are characterized by the presence of fear or apprehension in some form, and the presence of fear/anxiety can help differentiate anxiety disorders from other psychopathology, such as mood disorders. This domain can include fear of specific stimuli, situations, or feelings. Fear of specific stimuli is characteristic of OCD and among the possible symptoms of the disorder. It may also be present in GAD and PTSD, but it is not explicitly included as a symptom of the disorders. Likewise, fear of a specific situation (e.g., riding the bus) may be present in GAD, OCD, and PTSD, requiring a more specific understanding of the fear. For example, a child with GAD may fear that the bus will get lost or will cause him to be late, whereas a child with OCD may fear that every time the bus hits a bump it is running over a person; a child with PTSD may have previously been in a bus accident.

An interesting notion is the "fear of fear" (e.g., fear of experiencing fear; Goldstein & Chambless, 1978), sometimes referred to as anxiety sensitivity, that is often thought of as the signature feature of panic disorder, but it may also be present in GAD (Knapp et al., 2016) and PTSD (Hensley & Varela, 2008; Viana et al., 2018). Individuals with heightened anxiety sensitivity evidence a fear of physiological symptoms of anxiety due to the belief that those sensations are deleterious to their physical, psychological, and/or social well-being (Schmidt et al., 2010; Reiss & McNally, 1985). In GAD, anxiety sensitivity has been associated with worry regarding uncertainty (Floyd et al., 2005). Regarding PTSD, anxiety sensitivity has been thought to be a vulnerability and maintenance factor (Elwood et al., 2009) and has been implicated as such in children and adolescents (e.g., Kiliç et al., 2008).

Intolerance of uncertainty (IU) has been defined as "an individual's dispositional incapac-

ity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty" (Carleton, 2016, p. 31). Research has demonstrated a strong relationship between IU and GAD in youth (Read et al., 2013; Donovan et al., 2016), and some evidence exists for the association between IU and OCD (Wright et al., 2016). Although IU does not appear to differentiate between OCD and GAD, it may be useful in distinguishing the two disorders from others. Further research is needed to examine the utility of IU in youth for differentiating among the anxiety disorders (Kendall et al., 2020).

Recurrent Thoughts

The fact that there is a similar presentation of recurrent, intrusive thoughts among GAD, OCD, and PTSD (and other psychopathology) is perhaps one of the most challenging aspects of differential diagnosis. Research and theoretical discussions have emphasized the similarities of intrusive cognition for youth with GAD and OCD (Comer et al., 2004) and youth with OCD and PTSD (Huppert et al., 2005).

Turner et al. (1992) suggest that worries and obsessions present similarly regarding presence, form, and content within both clinical and nonclinical adults. Furthermore, worries and obsessions are often experienced as frequent, uncontrollable, and facilitate negative mood and attention biases in these groups. However, worries and obsessions have a vulnerability factor distinguishing between clinical and nonclinical adults. Given the overlap, some have suggested that obsession and worry may coexist on a single continuum (Langlois et al., 2000b). Huppert et al. (2005) demonstrated that items on rating scales, such as "unpleasant thoughts come into my mind against my will and I cannot get rid of them" and "I find it difficult to control my own thoughts," are characteristic of both OCD and PTSD. It is not surprising, and it is understandable that clinicians and researchers find it difficult to capture the exact nature of an adult's or child's cognitive intrusions. This effort may be further complicated by the social context of threat that emerges during times of terrorism (Comer & Kendall, 2007).

Obsessions and worry are also frequently confused/conflated with rumination. Rumination, with reference to its role in depression, has been defined as "repetitively focusing on the fact that one is depressed; on one's symptoms of depression; and on the causes, meanings and consequences of depressive symptoms" (Nolen-Hoeksema, 1991). Worry and rumination are two forms of the transdiagnostic construct of repetitive negative thinking differentiated in temporal orientation, such that worry is more future-oriented, whereas rumination is past-oriented (McEvoy et al., 2013). These distinctions between worry and rumination have been replicated in adolescent samples (e.g., Hong, 2007; Muris et al., 2004). Complicating matters, features of rumination may play etiological and maintenance roles in versions of anxiety. For example, the compulsion to ruminate and repeatedly ask questions such as "why" and "what if" has been associated with the onset and maintenance of PTSD (Michael et al., 2007) and can be a part of GAD (reassurance seeking) in youth.

Although there is a meaningful overlap among the various forms of recurrent thoughts, some cognitive features may help to differentiate between them. One distinction is the content of recurrent thought. As described by DSM-5, worries characteristic of GAD consist of everyday life events or activities, such as health, relationships, school, and finances. In contrast, obsessions tend to be more irrational and bizarre (less logically connected), although children may lack this insight (Krebs & Heyman, 2015). The content of obsessions tend to fall into more circumscribed areas, including dirt/contamination, sex, aggression, self-doubt, and order. Children's worries seem to be more logical, whereas obsessions have an illogical (disconnected) quality (Comer et al., 2004). The content of recurrent thoughts present in PTSD is typically associated with re-experiencing the trauma. However, such cognition is not limited to the recollection of the trauma per se and may also include themes of danger, negative self-schema, and evaluation of

the meaning of the trauma (De Silva & Marks, 1999).

Distinctions have also been made regarding the evaluation of the thought content. In particular, content of obsessions tends to be experienced as contradictory to one's own beliefs and values, whereas worries tend to be experienced as consistent (Langlois et al., 2000a, b; Turner et al., 1992; Brakoulias & Starcevic, 2011). Given the contradictory nature of some obsessions, they may be accompanied by feelings of responsibility for having the thoughts (Langlois et al., 2000a; Salkovskis, 1985). However, this distinction may vary by the content area of the obsessions (Wells & Papageorgiou, 1998).

The presence or absence of identifiable triggers may help to distinguish between different forms of recurrent thought, although as with other phenomena should not be considered in isolation. Studies have found that adults with intrusive worries are more aware of specific external or internal precipitants of the recurrent thoughts as compared to adults with intrusive obsessions (Langlois et al., 2000a; Turner et al., 1992), although research in youth is needed. A key feature of PTSD is the psychological and physiological distress in response to triggers associated with the trauma, which are often avoided. However, individuals with PTSD are frequently unaware of the triggers that give rise to intrusive memories (Ehlers et al., 2004). These triggers may only be loosely associated with the trauma and may not be directly meaningful to the individual.

Thought-action fusion is a meta-cognitive construct that may help differentiate between OCD and other disorders. This construct consists of (1) believing that the presence of a thought increases the probability of an event actually occurring and (2) that the presence of a thought that is inconsistent with one's beliefs is equivalent to actually carrying out the thought (Shafran et al., 1996). Higher thought-action fusion was found in adults with obsessive thinking than in adults with pathological worry (Coles et al., 2001). It has also been suggested that thought-action fusion may play an etiological and maintaining role in additional disorders, such as GAD, depression, and certain psychotic disorders (Starcevic & Berle, 2006). Studies support the presence of thought-action fusion in youth with OCD (Farrell & Barrett, 2006; Libby et al. 2004); however, one study did not find a significant distinction in thought-action fusion between youth with OCD and youth with anxiety disorders (Barrett & Healy, 2003). According to one study, thought-action fusion plays a minor role in anxiety disorders but may have a particular association with OCD, as evidenced by significantly higher thought-action fusion scores in youth with OCD than youth with anxiety disorders who in turn has higher scores than non-clinical youth (Libby et al., 2004). Attention should be paid to the interaction between thought content and meta-cognitive processes. The presence and quality of recurrent thoughts should be considered within the full constellation of symptoms.

Intrusive Images

The symptom presentation of both OCD and PTSD may include intrusive images. Intrusive images associated with PTSD are typically related to the initial trauma and are frequently fragmented sensory memories (Ehlers et al., 2004; Lafleur et al., 2011). Youth with PTSD do not engage in compulsions in response to intrusive images (Lafleur et al., 2011). However, recent research has demonstrated that previous history of traumatic experiences may increase the presence of intrusive obsessions that may overlap with OCD symptoms (Barzilay et al., 2019). While images in OCD are typically characterized as bizarre or irrational, individuals with OCD can also experience intrusive images associated with a prior adverse event (De Silva & Marks, 2001; Lipinski & Pope, 1994; Speckens et al., 2007).

In OCD, sexual or violent intrusive images may be the most distressing or stigmatizing, despite their frequent occurrence in nonclinical populations (Cole & Warman, 2019). Regarding the distinction between OCD and GAD, studies suggest that obsessions more frequently occur in the form of intrusive visual images than do worries (Gillet et al., 2018). Pathological worry typi-

cally takes the form of verbal cognition rather than visual images and has been described as a "chain of thoughts" (Borkovec et al., 1983). In contrast, intrusive images are characterized as brief mental flashes that are shorter in duration (Langlois et al., 2000a).

Physical Symptoms

Somatic symptoms are commonly experienced by youth with anxiety disorders and have been associated with anxiety severity and impairment (Ginsburg et al., 2006; Storch et al., 2008a, b). In a sample of anxiety-disordered youth, over 95% endorsed at least one somatic symptom (Crawley et al., 2014). Children with anxiety frequently report headaches, stomachaches, muscle tension, sweating, drowsiness, and jittery feelings (e.g., Crawley et al., 2014; Eisen & Engler, 1995; Last, 1991).

The substantial overlap among the physical symptoms associated with the various anxiety disorders in youth makes it difficult to determine a diagnosis based on this factor alone. Studies examining the relationship between anxiety disorder diagnosis type and somatic symptoms have found mixed results. Crawley et al. (2014) found that youth with GAD and SAD reported more frequent and severe somatic symptoms than youth with social anxiety disorder, which may be due to diagnostic criteria of somatic symptoms DSM IV for GAD and SAD rather than social anxiety. Hofflich et al. (2006) found that children with GAD, social anxiety, and separation anxiety disorder did not differ in the frequency with which they reported somatic symptoms or with regards to the presence of any specific somatic symptom. Interestingly, children with a principal diagnosis of GAD reported a wider variety of physical symptoms than those listed in DSM-5, (i.e., shaky and jittery, having chest pain, feeling strange, weird or unreal, heart racing or skipping beats, and feeling sick to their stomach). Given the lack of significant group differences across anxiety disorders, these somatic complaints may not be specific to GAD. The number of somatic complaints reported by children with GAD increases with age, suggesting that children may be better able to identify their physiological symptoms associated with anxiety as they mature (Crawley et al., 2014; Ginsburg et al., 2006; Choudhury et al., 2003).

Among youth with anxiety disorders, those endorsing somatic symptoms have been found to have more severe psychopathology compared to those with anxiety disorders who do not endorse somatic symptoms. This finding includes more severe anxiety, poorer global functioning, poorer academic performance, and higher rates of school refusal (Ginsburg et al., 2006; Storch et al., 2008a, b; Last, 1991; Hughes et al., 2008).

Although evidence of somatic complaints is not required for a diagnosis of OCD, physical symptoms are common among youth with this disorder. The most frequently experienced physical symptoms include tension and restlessness (Storch et al., 2008a). Storch et al. (2008b) found that sleep-related difficulties were associated with anxiety severity in children with OCD and may be relatively common among these youth. Children with OCD and hoarding symptoms have been found to exhibit higher levels of somatic complaints relative to non-hoarders with OCD, suggesting that physical symptoms may vary within OCD (Storch et al., 2007). The role of physical symptoms in OCD is particularly nuanced as somatic concerns also characterize the nature of some children's obsessions and/or compulsions (Ivarsson & Valderhaug, 2006). Thus, it may be difficult to differentiate between a child's actual experience of somatic complaints and preoccupation with such concerns. Gathering detailed information regarding children's true physical symptoms, beliefs about bodily sensations, and mental/behavioral responses may aid clinicians in distinguishing OCD from other anxiety disorders.

Somatic symptoms appear to be a common reaction to trauma in children (Bailey et al., 2005; Escobar et al., 1992; Gobble et al., 2004) and warrant specific attention as they are associated with negative social, emotional, and academic outcomes (Campo et al., 1999). In particular, symptoms can include physical reactivity and symptoms that are similar to those experienced

during the traumatic event. (APA, 2013). A study of PTSD symptoms among children in the New Orleans area following Hurricane Katrina found headaches, nausea, and upset stomach to be the most commonly reported somatic symptoms (Hensley & Varela, 2008). Consistent with the earlier discussion of anxiety sensitivity in PTSD, children in the study with high anxiety sensitivity and high trait anxiety may have had a higher risk of developing PTSD and somatic symptoms following exposure to the traumatic event. Knowing whether children possess these characteristics may help identify youth who are most likely to develop trauma reactions, which can in turn aid with diagnosis and intervention.

Garnering contextual information surrounding the onset of physical symptoms is likely to be more useful in determining a diagnosis than solely assessing the presence of a particular somatic complaint. If physical symptoms are the primary presenting problem, it is necessary to examine the context in which these symptoms occur. When a child reports a physical symptom, it can merit parental attention – more attention than would be assigned if the child only felt emotionally unsettled. Indeed, the functional impact of a child's reporting physical complaints (stay home from school, receive care) may unwittingly buttress such reports.

Avoidance

Avoidance is central but not unique to GAD, OCD, and PTSD. Avoidance is characteristic of the anxiety disorders generally and may be present in other forms of psychopathology. Avoidance refers to making a response that the individual thinks/believes is necessary to prevent a negative condition, despite the response being unnecessary. Individuals with an anxiety disorder tend to avoid an event, outcome, or thought which is greatly feared and may engage in avoidance when the outcome of the feared situation or event is unknown or ambivalent (Palitz et al., 2019). Individuals use avoidance to minimize or obviate the potential for a negative outcome. Clinicians should determine the details of the avoidance, what is being avoided (e.g., an object, a situation, an image), and the function of the avoidance, when the avoidance takes place and what, if any, circumstances facilitate coping. Answers to these questions inform an accurate diagnosis and effective treatment and can help differentiate between OCD, PTSD, and GAD.

Research suggests that worry may act as the avoidance mechanism in GAD. Worry has been defined as an attempt at problem-solving to prevent the occurrence of negative outcomes (Borkovec et al., 1983). Children and adolescents with GAD may specifically engage in cognitive avoidance techniques by means of thought suppression, distraction, and thought substitution to decrease the intensity of worries (Hearn et al., 2017), and parents may facilitate and maintain this avoidance through over-controlling their child's environment and decreasing response to exposure situations (Aktar et al., 2017). Overall, the evidence supports the "avoidance theory of worry" (Borkovec et al., 2004), suggesting that a primary function of worry in GAD is to enable individuals to avoid negative outcomes, negative bodily feelings, as well as other even more distressing thoughts. Of interest, this notion has applicability to the parents of anxious youth (Tiwari et al., 2008).

Individuals with OCD engage in a wide range of compulsions that are believed to deactivate and avoid threatening images, thoughts, or outcomes. According to Salkovskis (1985, 1989), this behavior stems from a person's inaccurate belief that they have control over whether such outcomes will occur (recall thought-action fusion). The implied responsibility that comes with this way of thinking translates into a pattern of behavioral neutralizing responses which reflect attempts to escape or avoid the feared outcome (Salkovskis, 1996). These avoidance-focused efforts include compulsions that are consistent with the associated fear (i.e., repetitive hand washing to avoid catching germs) as well as those that lack a rational connection (i.e., touching objects in a symmetrical fashion to prevent harm from befalling a loved one). Additionally, internal avoidance may be present in the form of mental rituals such as repetitively thinking about a

word or phrase until the interfering discomfort has been alleviated. Parents may facilitate youth's maintenance of compulsions, aiding youth in ritualistic behaviors to avoid feared outcomes (e.g., reducing demands to allow time for compulsions; Stewart et al., 2017) and through accommodations of the avoidance (Kagan et al., 2018). Cognitive processes present in adults with OCD that have been linked to compulsions, such as appraisals of responsibility, have been found to exist in children with OCD as well. However, many of these processes were not found to distinguish between youth with OCD and youth with other anxiety disorders (Barrett & Healy, 2003). Such findings provide further evidence of the considerable diagnostic overlap among anxiety-related disorders. Although there are several overlapping features of anxiety disorders, research does indicate that compulsions are typically unique to OCD and flashback-related avoidance is typically unique to PTSD (Goodwin, 2015).

Youth with PTSD may engage in avoidance with the express purpose of distancing themselves from stimuli associated with the trauma. During a traumatic event, a strong association is formed with corresponding contextual cues which then come to signal the presence of danger (APA, 2013; Runyon et al., 2013). This association leads youth to avoiding places, people, and activities that trigger painful memories. In addition to being directed at external triggers, avoidance in PTSD can also be directed at internal experiences. Youth with PTSD will often make a concerted effort to avoid thoughts and feelings that might remind them of the immense distress they previously experienced, including hyperarousal symptoms (e.g., increased heart rate, etc.; Runyon et al., 2013). Research demonstrates that avoidance in individuals with PTSD may further generalize to aversive situations not related to their trauma experience (Sheynin et al., 2018). Compulsive urges can strictly occur within the context of PTSD (i.e., compulsion of thinking "good thoughts to cancel out images of a dying friend"; De Silva & Marks, 2001, p. 173) and are not necessarily indicative of a comorbid diagnosis of OCD. However, the presence of such symptoms warrants comprehensive assessment to rule out the presence of OCD.

Reliability and Validity of Diagnosis

GAD typically presents first in school-aged children and is characterized by excessive worries that a child finds difficult to control. The course of anxiety symptoms can follow many different patterns through development, with GAD and social anxiety disorder being the most persistent (Voltas et al., 2017), and some anxiety symptoms having links to later mood disorders (Cummings et al., 2014). In a follow-up study of youth patients treated for an anxiety disorder through either cognitive-behavioral therapy, a selective serotonin reuptake inhibitor, their combination, or placebo, 30% were chronically ill, and 48% had relapsed (Ginsburg et al., 2018). Additionally, youth with GAD are frequently diagnosed with a second anxiety disorder, as well as other disorders such as attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), and depression (Kendall et al., 2001; Walkup et al., 2008).

When assessing for GAD in youth, clinicians typically obtain information from adults such as parents and teachers and should pay attention to behavior changes and physical complaints (e.g., upset stomach, sleeping patterns, school avoidance). When assessing among adolescents, clinicians can rely more on the patient's report (Panganiban et al., 2019). Measures that are considered validated screening tools for GAD (see also Creswell et al., 2020; Fleischer et al., 2020) in youth include the Screen for Childhood Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1999), the Multidimensional Anxiety Scale for Children (MASC; March et al., 1997; Villabø et al., 2012), and the Spence Children's Anxiety Scale (SCAS; Spence, 1998).

Approximately half of all OCD cases have their onset in childhood and adolescence (Janowitz et al., 2009). OCD that begins in childhood, and goes untreated, frequently persists into adulthood, with one meta-analysis finding that of children and adolescents diagnosed with OCD,

60% had either full, or subthreshold OCD symptoms persist (Stewart et al., 2004). Without adequate treatment, the majority of patients experience symptoms with a chronic and fluctuating course.

Comorbid diagnoses are especially common in OCD in youth and include but are not limited to depression, social anxiety, and substance use (Douglass et al., 1995). High rates of comorbidities can make differential diagnoses particularly challenging. To assess for OCD in youth, scales that are considered to have acceptable psychometrics include the Children's Yale-Brown-Obsessive-Compulsive Scale (CY-BOCS; Goodman et al., 1991) and the Obsessive-Compulsive Inventory – Child Version (OCI-CV; Foa et al., 2010).

Epidemiologic studies have found high rates of childhood and adolescent exposure to traumatic events, but only about 16% of youth exposed to a traumatic event develop PTSD (Alisic et al., 2014). Approximately one-third of youth with PTSD experience a chronic course that lasts several years (McLaughlin et al., 2013).

When assessing for PTSD in youth, one must determine whether the symptoms follow and are due to exposure to a traumatic event, rather than a different psychological disorder. Childhood trauma exposure and PTSD often present with frequent comorbidity, particularly anxiety disorders, depression, externalizing problems, self-harm, and substance use disorders (McLaughlin et al., 2013). New to the DSM-5, among children under the age of 6, a lower threshold of symptoms is needed to diagnose PTSD. Measures with acceptable psychometrics for assessing PTSD in children and adolescents include the UCLA PTSD Reaction Index for Children and Adolescents (PTSD-RI; Steinberg et al., 2013) and the Clinician-Administered PTSD Scale for Children and Adolescents (CAPS-CA; Nader et al., 1996).

Implications

The essential features of GAD, OCD, and PTSD, as currently defined by DSM-5, have substantial degree of commonality that makes differential diagnosis a challenge. Consideration of this issue begs the question of whether the disorders under examination truly reflect distinct entities, each with their own unique etiology and underpinnings, or whether these disorders are better conceptualized using a unified construct with varying manifestations. Speaking to this question, symptoms of GAD, PTSD, and OCD are typically not specific to one particular disorder. Treatment strategies that emerge from a cognitive-behavioral framework (Kendall, Suveg, & Kingery, 2006), though applied with some variations for the specific disorders, are similar and consistent and have been found to be effective for several of the emotional disorders in youth (see Ollendick & King, 1998).

Additionally, although genetics are not the focus of this review, there are data suggesting that the genes for anxiety disorders may be shared, as opposed to distinct (Hudson & Rapee, 2004; Levey et al., 2020), and that similar changes in the brain occur in several anxiety disorders (see Sinha, Mohlman, & Gorman, 2004). As advances in the field (e.g., genetics, neuropsychology, cognition, behavior, emotion) provide findings, a reconceptualization of anxiety, or several types of anxiety, may be reconsidered as one disorder. This potential reconceptualization has important implications for how anxiety disorders are studied and treated.

Overall, anxiety, OCD, and PTSD may be better viewed as dimensional, rather than categorical. Individuals with the highest levels of symptoms often move in and out of meeting criteria for an anxiety disorders overtime (Caspi & Moffitt, 2018). Further, it may be difficult to distinguish between developmentally appropriate anxiety and pathological anxiety (Costello & Angold, 1995; Pine, 1997), or anxiety that is justified by current environmental circumstances (covid19). Although one or two symptoms may distinguish between persons with or without a diagnosis according to DSM-5 classification, in actuality these individuals may nevertheless look quite similar to their nondiagnosed counterparts. In a study of European adolescents, subthreshold anxiety was associated with increased suicidality

and functional impairment (Balazs et al., 2013). Since the inception of DSM, the number of childhood diagnoses has expanded quite rapidly and additional diagnoses have been suggested (Silk et al., 2000). However, before the field incorporates new diagnostic categorizations, bigger and overarching issues surrounding classification – categorical or dimensional approaches (Drabick, 2009; Maser et al., 2009) – merit consideration and research evaluation (see also Jensen et al., 2006). A refinement of our classification scheme, reflecting the empirical research, will likely facilitate better understanding and care for youth with anxiety and its disorders.

As the current classification system stands, diagnostic categorization can serve both to facilitate and hinder accurate assessment and effective treatment. That is, categorical distinctions help organize constellations of symptoms and participants into cohesive groups, and these distinctions can provide a framework for identifying commonalities among individuals with similar problems. On the other hand, given the symptom overlap among diagnostic categories and the heterogeneity within diagnostic categories, disorder level distinctions may obscure fundamental characteristics of the psychopathology present at the symptom level. The present discussion of such issues as they relate to GAD, OCD, and PTSD emphasizes the importance of exploring the form, function, quality, and associated features of symptoms within their context.

Summary

This chapter discussed the considerations for differential diagnoses between GAD, OCD, and PTSD. With the new edition of the DSM-5 (APA, 2013), these three diagnoses are no longer subsumed under the anxiety disorder umbrella. Practitioners should consider the overlap in symptoms and presentations when considering the diagnosis of GAD, OCD, or PTSD in youth presenting with anxiety symptoms. This chapter also discussed the differentiation between these three disorders within the specific domains of fear and anxiety presentation, recurrent thoughts, intrusive images, physical symptoms, and avoidance. Further, mention was made of recommended screeners. Differentiating between GAD, OCD, and PTSD requires an informed, skillful, and nuanced approach.

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4 Cognitive Behavioral Models of Phobias and Pervasive Anxiety

Dean McKay

Over the last several decades, the expansion of cognitive behavioral models of anxiety disorders has led to improvements in therapeutic interventions and treatment outcomes. Behavioral models are dependent on learning processes and conditioning potentials (such as the non-associative account; Menzies & Clarke, 1995). Further, contemporary learning theories suggest that anxiety serves as a conditioned response, as well as an unconditioned response, leading to future conditioning for anxiolytic stimuli (Bouton et al., 2001; Zinbarg et al., 2022).

There are two major perspectives that inform a purely cognitive perspective on anxiety disorders. On the one hand, cognitive therapy-based models have emerged that posit two central dimensions of anxiety include an overestimation of danger, threat, and fear, as well as an underestimation of one's abilities to cope with such threats (Beck et al., 1985). On the other hand, an extensive literature describes cognitive biases based on automatic processing of environmental stimuli (Williams et al., 1997). The former perspective is predicated on the ability of individuals to articulate cognitive errors that occur in response to specific events, while the latter is not reliant on client report, but instead on reaction time and biases evident for subtle cues related to anxiety (Matthews & MacIntosh, 1998). Recent literature supports the findings related to reaction time differences for subtle cues and has shown that cognitive biases have clear neurological correlates (McKay et al., 2009) and draw on attention resources, particularly in youth (i.e., Smith et al., 2021). These findings have collectively shown the robust nature of specific cognitive biases in understanding the etiology and maintenance of anxiety in general. At the same time, cognitive errors that are articulated by anxious individuals have been effective at determining methods of intervention (see, e.g., McKay & Storch, 2009)

The aforementioned research describes complementary perspectives on anxiety disorders that have, for the most part, been integrated into a comprehensive framework constituting cognitive-behavioral theory for anxiety. This line of work has been highly influential in the development of treatment for anxiety for all ages. Indeed, the majority of empirically supported treatments for anxiety disorders are cognitive-behavioral in origin (Chambless & Ollendick, 2001).

Common to models of specific anxiety disorders is threat appraisal in conjunction with learning as per the above description. Specific components are introduced intended to isolate the ways a specific disorder differs from others, and the arrangement and constellation of components that result in anxiety are also deemed unique. The aim of this chapter is to critically

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Table 4.1 Common features of anxiety disorders: two experimental perspectives

Cognitive errors	Info. processing biases
Overestimation of danger/threat	Encoding process selectively biased towards threat
Overestimation of fear	Interpreting ambiguous information as threatening
Underestimation of coping abilities	Memory biases favoring recall of threatening info
Overactive threat/ danger schemas	

consider the degree those components of anxiety disorders models are unique to the disorders they purport to describe (see Table 4.1).

Cognitive Models of Anxiety: General Considerations

Broadly, cognitive models for anxiety have an implicit basic assumption – that anxiety reactions are "fast" responses to environmental stimuli and may stand impervious to "slow" (i.e., more deliberative) thinking (see Kahneman, 2011). Several models have attempted to describe the cognitive processes occurring in childhood anxiety disorders. One early model emphasized the role of schemas and cognitive deficit and distortion. From this point of view, schemas related to danger and threat are believed to be overactive in children with anxiety (Kendall & Ronan, 1990). Additionally, such children also lack or are unable to use adaptive coping skills and suffer from cognitive processes that are biased or erroneous. Conversely, another model emphasized a stage-process approach whereby childhood anxiety could be understood in the context of information flowing through the information processing system (Crick & Dodge, 1994). Six stages were identified as part of normal cognitive processing. During *encoding*, information can be attended to for further processing, or ignored. If attended to, information then undergoes *interpretation*, whereby meaning is attached by the individual. Next, the *goal clarification* or *construction* stage involves the activation or construction of a new goal to meet situational demands. *Response access* or *construction* involves the cognitive process of decision-making whereby one or more responses are recalled from memory or created for the situation. Finally, the individual undergoes *response selection* whereby responses are evaluated in terms of a variety of factors, and the individual finally produces the selected response through *enactment*. According to Dodge's information processing system model, anxiety disorders are the result of dysfunctions occurring during one or more of these stages.

A third model works to integrate Kendall's theory of childhood anxiety (Kendall & Ronan, 1990) with Dodge's model of information processing to highlight distortions and deficits that occur throughout the stages of processing (Daleiden & Vasey, 1997). Specifically, the encoding process of children with anxiety disorders may be influenced by a narrowing focus and selective attention to threatening information. There is evidence for such an attention bias in both normal (Field, 2006) and anxious children (Watts & Weems, 2006; Murrary et al., 2009). Such children may also interpret ambiguous information as threatening, make negative attributions about new information, expect negative outcomes, and have low self-efficacy in coping with threatening situations. Such biases in the encoding and interpretation stage may also lead to an increased reliance on avoiding and escaping threatening situations, as opposed to engaging in problem-focused coping. While these models have been helpful in understanding general processes that occur in childhood anxiety disorders, there is still much to be done in order to better understand cognitive dysfunctions that are specific to each of the anxiety disorders. Similar to this model, Weems and Watts (2005) posit that childhood anxiety may be related to three cognitive processes: selective attention, memory biases, and negative cognitive errors. In other words, children with anxiety tend to pay more attention to threatening stimuli, remember threatening information, and have more biased interpretations of events and situations as fearful or threatening. Evidence for this latter model has shown that selective attention, memory bias, and cognitive errors are correlated with childhood

anxiety problems, but is unable to show specific relationships between these three cognitive processes and specific anxiety symptoms or disorders (Watts & Weems, 2006).

In summary, contemporary cognitive models encompass elements from the original notion of cognitive errors that were articulated by Beck et al. (1985) and emphasize the way information is processed (i.e., directed attention, encoded, and recalled) in the etiology of childhood anxiety disorders. Modern conceptualizations emphasize automatic processing in addition to errors in thinking that perpetuate anxiety responses. Behavioral models associated with learning are involved insofar as learning leads to selective encoding of material. Nevertheless, treatment for childhood anxiety, regardless of specific disorder, emphasizes both cognitive approaches and behavioral interventions.

Content-Specificity Hypothesis

The idea that various disorders have specific and unique cognitive processes is not new and goes back to early cognitive models positing that anxiety and depression are caused by specific types of cognitive dysfunctions unique to each disorder and has been termed the *cognitive content-specific hypothesis* (Beck, 1976; Beck et al., 1985). For example, the content of cognitions that gives rise to social anxiety disorder would be distinctive from the content of cognitions that gives rise to panic disorder. Therefore, treatment for mental disorders would involve identifying and modifying the specific cognitive distortions or biases that are presumed to give rise to each disorder. In adults, some evidence for the content-specific hypothesis has provided support for the specificity of cognitions in identifying and treating various anxiety disorders (Clark, 1999; Clark & Fairburn, 1997; Foa et al., 1996; Stopa & Clark, 2000). However, a larger meta-analysis failed to find support for the content-specificity hypothesis (Beck & Perkins, 2001). Less research has examined the content-specificity hypothesis with anxiety disorders in children and suggests a need for further investigation into the ability of cognitive models of anxiety to inform treatment and predict outcome. However, as will be seen below, the research that has examined the content-specificity hypothesis with anxiety disorders in children is mixed and suggests only partial support for the specificity of cognitions among disorders. One major difficulty in linking specific cognitions with specific anxiety disorders is the high degree of comorbidity found among anxiety disorders (Last et al., 1987, 1992; Micco & Ehrenreich, 2010; O'Neil et al., 2010; see also Chaps. 2, 3 and 13 this volume). Because of this overlap among diagnostic categories, it is difficult to demonstrate specificity among cognitive content without also experiencing similar degrees of overlap.

One early study investigating the content of cognitions compared the measurements of cognitions in a group of depressed, anxious, and mixed depressed-anxious fourth, fifth, sixth, and seventh graders and found few differences between groups (Laurent & Stark, 1993). While no differences in anxious cognitions were found between depressed, anxious, and mixed depressed-anxious groups, the depressed group did endorse more depressive cognitions than the other two groups. While this study did not find support for specificity of cognitions among anxiety disorders, it did lend backing to the theory that positive and negative affect are two-dimensional variables important in understanding anxiety and depression.

One small study compared the interpretations of ambiguous events of four anxious children with obsessive-compulsive disorder, separation anxiety disorder, social phobia, and panic disorder, to interpretations provided by a group of eight non-anxious controls and found evidence that anxious children have a tendency to interpret ambiguous material as threatening (Chorpita et al., 1996). Furthermore, when asked about how they would react to the ambiguous situations, anxious children tended to express plans involving avoidance and assign a higher probability that threatening events will occur. A similar study investigated the cognitions of various groups of children by providing them with an ambiguous situation involving either physical or social threat and then asking them to interpret the event and

say what they would do about it. When comparing the cognitions of anxious children with separation anxiety disorder, overanxious anxiety disorder, simple phobia, and social phobia, to a nonclinical control group, evidence for a threat interpretation bias was found within the anxious group (Barrett et al., 1996). However, when compared to a group of oppositional defiant children, the anxious group actually showed less threat interpretation bias. Therefore, this particular cognitive bias was useful in distinguishing anxious from non-anxious children, but lacked specificity in distinguishing between children with oppositional defiant disorder and anxiety disorders. It is unknown to what extent this shortcoming can be attributed to methodological factors in the way these studies were conducted. That is, because each study grouped all anxiety disorders under one category, it is not possible to know if children with different disorders provided distinctive types of responses when interpreting ambiguous information. Furthermore, for the latter study, the ambiguous situation involved only physical or social threat and may not have included enough of a variety of situations necessary to capture the divergence of cognitions amongst anxiety disorders.

Yet still another study investigating the interpretations of ambiguous situations compared a group of children with anxiety disorders including separation anxiety disorder, generalized anxiety disorder, panic disorder, obsessive-compulsive disorder, social phobia, and simple phobia, to both a nonclinical control group and a group of children with externalizing disorders including oppositional disorder, attentional deficit and hyperactivity disorder, and conduct disorder (Bogels & Zigterman, 2000). Here, it was found that anxious children had more negative cognitions than the externalizing group and nonclinical group; the former difference was significant, while the latter difference only approached significance. Contrary to the findings by Barrett et al. (1996), it was found that the group of anxious children also interpreted the situation as more threatening than the other two groups. Other research has also confirmed this threat bias in children with anxiety disorders (Hadwin et al., 1997; Muris et al., 2000). While these findings offer support for differences in cognitions between anxiety and externalizing disorders, they still lack specificity in association with each of the anxiety disorders and instead point to support for a general threat bias among children with any anxiety disorder.

The first study to directly investigate the content-specificity hypothesis in children failed to find support for distinctive cognitions based upon anxiety disorder. Reactions were recorded from a group of children without anxiety disorders who were exposed to stories characterized by social anxiety, separation anxiety, or generalized anxiety (Muris et al., 2000). While high levels of anxiety were associated with greater threat perception, high ratings of threat, high levels of negative feelings and cognitions, and an early detection of threat, no differences in cognitions were found between the anxiety-specific content of the stories. However, one potential reason for this failure may be due to the sample's high degree of comorbidity between social anxiety, separation anxiety, or generalized anxiety as measured by the Screen for Child Anxiety-Related Emotional Disorders (SCARED), an anxiety assessment. Additionally, it was noted that though each of the three stories were separated by theme, separate sentences within stories may have included themes from other stories. Therefore, it is difficult to parse out the unique effects of each anxiety disorder on the types of responses provided by participants in this study.

Another study also attempted to identify specific cognitive interpretations in children with social anxiety, separation anxiety, and generalized anxiety by exposing children to ambiguous situations and analyzing their interpretations and action plans (Bogels et al., 2003). Again, only limited support was found for the content-specificity hypothesis. Children with separation anxiety did report more overestimations of the danger of being abandoned and more underestimations of their independent functioning compared to children with generalized anxiety disorder or social anxiety. However, socially anx-

ious children reported more overestimation of criticism and rejection and underestimation of their social competence compared to children with separation anxiety disorder, but not compared to children with generalized anxiety disorder. Additionally, cognitive interpretations associated with generalized anxiety did not differ among the three groups. This latter finding may be due, again, to the high degree of comorbidity between anxiety disorders. Similarly, children with separation anxiety disorder and social phobia showed a negative interpretation bias relevant to their fear, though these groups could not be distinguished from each other. Also, children with generalized anxiety disorder did not show any distinguishable differences in their negative interpretation bias.

As mentioned above, one study has shown that selective attention, memory bias, and cognitive errors are associated with anxiety symptoms in children (Watts & Weems, 2006). Of interest to the content-specificity hypothesis is the degree to which cognitive errors alone can account for differences in the expression of anxiety symptoms. In the aforementioned study, cognitive errors were measured by the Children's Negative Cognitive Error Questionnaire (CNCEQ), an assessment targeting four major forms of cognitive errors (catastrophizing, overgeneralization, personalizing, and selective abstraction). However, measures that were used to assess anxiety, the Revised Child Anxiety and Depression scales (RCADS) and its parent version (RCADS-P; Chorpita et al., 2000), assessed for a range of anxious and depressive symptoms to produce an overall score and were not able to provide information about specific diagnosis. While scores on these anxiety measures were significantly and positively correlated with the CNCEW total and subscale scores, it was not possible to investigate whether particular anxiety disorders were associated with unique types of cognitive errors as assessed by the CNCEQ. An earlier study also investigated the relationship between specific cognitive errors as measured by the CNCEQ and measures of anxiety as measured by the Childhood Anxiety Sensitivity Index (CASI; Silverman et al., 1991), the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978), and the State Trait Anxiety Inventory for Children-Trait Version (STAIC-T; Spielberger, 1973) (Weems et al., 2001). A measure of depression, the Children's Depression Inventory (CDI), was also included. Again, results found support for a positive relationship between cognitive errors and child anxiety. Additionally, partial correlations controlling for depression indicated that catastrophizing and overgeneralizing were related to all measures of anxiety and that personalization was related to most measures of anxiety. While these findings lend credence to the notion that different types of cognitive errors contribute to anxiety, it remains unknown whether or not each of the measured categories of cognitive errors are specific to the various anxiety disorders present in children.

Review data show that, overall, the content-specificity hypothesis provides a useful conceptual framework for youth anxiety disorders (Nicol et al., 2020). However, while there have been an abundance of investigations, the majority employ community or unselected samples, and thus the generalizability to clinical samples remains unclear.

Specific Disorders: Posttraumatic Stress, Obsessive-Compulsive, and Generalized Anxiety Disorders

Posttraumatic stress disorder (PTSD) has been found in both adults and children, although until recently most research on cognitive models of PTSD has been focused on adults. More recently, cognitive models of adult PTSD have been applied to working with children with this disorder (Vickers, 2009). An adult model proposed by Ehlers and Clark (2000) was applied to understanding the presentation and treatment of two children with PTSD. This model views PTSD as a paradoxical disorder characterized by intense fear of a future threat propagated by a severely terrifying event that happened in the past. Because this event has been processed in a way

that the threat of danger remains current, individuals with PTSD are observed to engage in a variety of avoidance behaviors that are ineffective at reducing threat. This model of PTSD views cognitions and the personal meaning of the terrifying event as a core process, rather than simply emphasizing conditioning as earlier models of PTSD have done. The two cases presented by Vickers (2009), along with several other studies applying the Ehlers and Clark model, have offered some promising though limited support for using an adult model of cognitive processes in explaining a childhood anxiety disorder (Stallard, 2003; Ehlers et al., 2003).

Obsessive-compulsive disorder (OCD) is another disorder that presents in both adults in children. While there has been evidence to support the specificity of cognitions associated with OCD in adults (e.g., Salkovskis et al., 2000; Frost & Skeketee, 1997), less research has been conducted to determine whether or not similar cognitions occur in childhood OCD. One study that did focus on children investigated whether cognitions found in adult OCD were also found in childhood OCD, including inflated responsibility, overimportance of thoughts, and perfectionism (Libby et al., 2004). Results showed that children with OCD displayed higher levels of inflated responsibility as compared to a group of children with other anxiety disorders and a nonclinical control group. Results also showed a higher level of thought-action fusion, the belief that one's thoughts can have direct effects on the environment, in children with OCD as compared to children with other anxiety disorders and a nonclinical control group. Moreover, while perfectionism was not found to be uniquely associated with childhood OCD, a subscale of the perfectionism measure, concern over mistakes, was significantly related to children with OCD as compared to children in the other two groups.

Finally, generalized anxiety disorder (GAD) is a disorder present across age ranges. Most models of GAD emphasize the role of worry control and catastrophizing in the etiology and maintenance of the disorder (Borkovec et al., 2004). Some research supports the role of catastrophizing in worry process (Davey & Levy, 1998) and its interfering role in information processing (McKay, 2005). However, this does not suggest specificity of catastrophizing or worry to GAD. Indeed, it may not necessarily be the case that these cognitive processes are specific. Recent treatment trials targeting worry, and associated cognitive processes, have shown positive outcome in children with GAD as well as those with separation anxiety and social anxiety (Kendall et al., 2008; Suveg et al., 2009).

Selective Mutism

Current conceptualizations of selective mutism (SM) suggest two major types: anxious and/or oppositional. For the present purposes, we will restrict our focus to the anxious type, which has been considered similar to social anxiety (Beidel & Turner, 2007; Freeman et al., 2004). One factor that has been considered a significant contributor to selective mutism in relation to children is behavioral inhibition (Beidel & Turner, 2007), a temperament that is present from a very early age. However, the research has generally suggested that behavioral inhibition is a risk factor for a wide range of anxiety disorders and is not specific to SM (summarized in Lonigan & Phillips, 2001). There have not been any investigations evaluating cognitive factors contributing to SM.

Separation Anxiety Disorder

As noted above regarding GAD, treatment of several common factors associated with anxiety generally appears to confer a benefit on children suffering from separation anxiety (i.e., Kendall et al., 2008). With respect to separation anxiety disorder (SAD) specifically, several factors have been implicated in the etiology and maintenance of the disorder. Among these are anxious attachment style, parental anxiety, and comorbid psychiatric conditions (summarized in van Dyke et al., 2009). However, these do not represent a

comprehensive model of the disorder's unique characteristics. Nevertheless, treatment relying on general cognitive behavioral principles such as coping skills, anxiety management, and exposure has collectively led to significant improvement (Kendall et al., 2008; Suveg et al., 2009; Walkup et al., 2008).

Specificity of Treatment for Unique Cognitive Features of Anxiety Disorders

From the available literature, it appears that treatment for childhood anxiety disorders using cognitive-behavior therapy is highly efficacious. Indeed, meta-analytic reviews have shown large effect sizes associated with treatment (Abramowitz et al., 2005; Bear et al., 2020; Silverman et al., 2008). Bear et al. (2020) showed that treatment employing specialty treatment shows large effect sizes when compared to treatment-as-usual (TAU), although it is noted that TAU is highly variable. This is encouraging since anxiety disorders are associated with significant disability and can impair academic and social functioning in lasting ways.

While the news is encouraging, it has become increasingly important that specific mechanisms associated with the development of disorders be clearly articulated in order to advance our understanding of how to prevent specific psychological problems, as well as to improve the efficiency of current interventions. What this review has shown is that whereas treatment as currently conceived is effective, there are few unique cognitive or behavioral factors tied to individual anxiety disorders (see Tables 4.2 and 4.3). Cognitive variables such as coping or proneness to catastrophizing are instead more likely to be components evident across anxiety disorders, and the alleviation of these features produces a general therapeutic benefit. Insofar as there are specific behavioral manifestations, it appears that directly targeting these using behavioral interventions alone is also efficacious.

This leads to an important distinction that has been drawn in recent years regarding the role of behavioral interventions in cognitive therapy (i.e., behavioral experiments) versus exposure per se. Some have argued the behavioral experiments allow therapists to access cognitions that are either unique to the individual or to the disorder in question (i.e., Bennett-Levy et al., 2004). Alternatively, it has been argued that behavioral experiments provide a mechanism, through exposure, to provide corrective feedback that alters cognitive processes indirectly (McMillan & Lee, in press). This would suggest that a typology of environmental cues could be developed that would serve a similar diagnostic value to the current Diagnostic and Statistical Manual. The prospect of a behavioral typology that would lead directly to specific interventions has been entertained in the past (Kanfer & Saslow, 1969). These have not lead to systematic diagnostic schemes, but point to the possibility that models should be developed with specificity in mind.

Conclusion

In conclusion, the evidence supporting a content-specificity hypothesis for anxiety disorders remains mixed and in need of further review. While there is strong evidence that cognitive errors are associated with anxiety and depression in general, the degree to which particular disorders map onto specific cognitive errors is still unknown. Such a mapping is important in bolstering a cognitive model of anxiety disorders in children, as well as adults, because it clearly identifies the mechanism involved in the development of an anxiety disorder in an individual. Without such knowledge, current cognitive models remain muddled and vague, limiting themselves to only pointing at general patterns rather than the more detailed cognitive processing involved in etiology and maintenance of anxiety that one would desire in treatment.

Table 4.2 Content specificity in anxiety disorders

Disorder	Unique components	References
Separation anxiety disorder	Overestimation of the danger of being abandonded	Bogels et al. (2003)
	Underestimation of independence Anxious attachment style Parental anxiety Comorbid psychiatric conditions	van Dyke et al. (2009)
Social anxiety disorder	Overestimation of criticism and rejection Underestimation of social competence	Bogels et al. (2003)
Selective mutism	Behavioral inhibition	Beidel and Turner (2007)
Posttraumatic stress disorder	Intense fear of a future threat due to manner of processing of prior threatening event	Ehlers and Clark (2000)
Obsessive-compulsive disorder	Inflated responsibility Overimportance of thoughts Perfectionism	Libby et al. (2004)

Table 4.3 Mixed or limited support for specificity of hypothesized cognitive content

Generalized anxiety disorder
Anxiety disorders in general
Anxiety disorders vs. depressive disorders
Anxiety disorders vs. oppositional defiant disorder/ conduct disorder
Phobia
Panic disorder

Note: This list is derived from research examining content specificity either among disorders or between disorders in children

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Neurochemistry of Childhood Anxiety Disorders

5

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Overview of Neurochemistry and Neurotransmission

Neurochemistry describes the molecular basis of both the function and dysfunction of nervous system tissues. In studying the neurochemical basis for psychiatric disorders, a significant focus is on neurotransmission, the transfer of impulses between neurons or between neurons and effector cells. Neurotransmission occurs through chemical substances known as neurotransmitters at the synapse. There are several different types of neurotransmitters, including amino acids, peptides, monoamines, and more. Molecules such as neurotrophic factors, steroid hormones, and small organic molecules also play important roles in neuronal signaling. In neurotransmission, when the receptor of a neuron receives a signal, the signal is transferred as an electrical impulse through its dendrite and down the axon until it reaches the nerve terminal. Subsequently, the plasma membrane depolarizes which increases the entrance of calcium ions through voltage-sensitive calcium channels. As a result, a series of proteins are activated, allowing vesicles to fuse with the preterminal membrane and release its transmitter content into the synaptic cleft. Afterward, the transmitter can bind with its receptor on the postsynaptic neuron (Theibert, 2020). Neurotransmitters may be excitatory or inhibitory based on the characteristics of their receptor, and many neurotransmitters can interact with multiple receptor types or subtypes. Transmitter amino acids and amines are often transported from the synaptic cleft into nerve terminals and glial cells via plasma membrane transporters such as the serotonin transporter. This type of transport is dependent on the sodium-potassium ATP pump, which maintains an ion gradient essential for the transmission of electrical signals in the neuron (Siegel & Sapru, 2011).

This chapter will explore the neurochemical underpinnings of anxiety disorders and obsessive-compulsive disorder. First, a general overview of neuroanatomy and neurotransmitters implicated in anxiety disorders will be presented. Then, the anxiety disorders will be reviewed in detail, focusing on alterations in neurotransmission that may influence the onset, presentation, treatment, and life course of these disorders. In this chapter, generalized anxiety disorder (GAD), social pho-

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bia (SP), separation anxiety disorder (SepAD), specific phobia, panic disorder (PD), and obsessive-compulsive disorder (OCD) will be discussed.

Neurochemistry of Anxiety

Overview

Anxiety disorders are a group of psychiatric diagnoses that share features of excessive fear and anxiety, along with related behavioral disturbances. Anxiety can be thought of as the anticipation of a potential threat, while fear is the reaction to an imminent threat. Anxiety is a normal emotional state; in order to be diagnosed with an anxiety disorder, the severity or frequency of fear and anxiety must prove to be distressing and maladaptive (American Psychiatric Association, 2013). The fear response begins with perception. Most sensory perceptions are relayed through the thalamus into the sensory cortices, which are responsible for the cognitive appraisal of a stimulus as a threat. There are two exceptions to this pathway: olfactory input (which may reach the amygdala and entorhinal cortex directly) and visceral organ input (which may proceed from the brainstem nuclei to the locus coeruleus (LC)). This latter pathway is crucial in disorders with a significant somatic component, such as panic disorder (PD). From the sensory cortices, impulses are relayed to relevant structures for emotional processing, such as frontal cortices, striatum, and limbic and paralimbic structures (including the amygdala), which in turn project to cortical and subcortical "output" areas to coordinate a response to the stimulus. Alterations in neurochemistry and neurotransmission at any of these junctures may contribute to anxiety disorders (Strawn et al., 2014).

Neurotransmitters and Anxiety

Anxiety disorders as a whole are characterized by neuroendocrine, neurotransmitter, and neuroanatomical disruptions (Stein & Steckler, 2010). These disruptions can stem from decreased inhibitory signaling or increased excitatory transmission. Understanding the interconnectivity between neurotransmitters across brain regions is vital towards understanding the functional differences between various anxiety-related disorders. This section reviews several neurotransmitters associated with anxiety (Martin et al., 2010).

Norepinephrine Norepinephrine (NE) is synthesized centrally in the locus coeruleus (LC). There are three main groups of adrenergic receptors (a1, a2, b), among which a2 post-synaptic receptors are most commonly associated with depression and anxiety. a2 adrenergic receptors are present on the cell bodies and terminals of NE neurons where they regulate the firing rate and release of NE; stimulation of a2 receptors can decrease the firing rate of LC NE neurons. NE and related metabolites in urine, blood, and CSF have been found to be elevated in anxiety disorders including PD, specific phobia, social anxiety disorder, and GAD; such findings suggest that both central and peripheral NE is dysregulated in anxiety disorders (Mathew & Parambi, 2020).

Dopamine Dopamine is another catecholamine neurotransmitter and a step in the pathway to the synthesis of norepinephrine. It is released primarily by the substantia nigra (SN) and acts on five subtypes of dopamine receptors, which are excitatory G-protein coupled receptors. Dopamine is implicated in numerous functions including motor control, social behavior, and reward salience. Dopamine has not been studied extensively in most anxiety disorders, but given its important role in complex human behavior, it is increasingly becoming a target of investigation (Mathew & Parambi, 2020).

Serotonin Mechanistically, serotonin (5-HT) is synthesized from tryptophan in the raphe nuclei. First, tryptophan is converted into 5-hydroxytryptophan (5-HTP) by tryptophan hydroxylase, an enzyme present in serotonergic neurons. Then, aromatic I-amino acid decarbox-

ylase (AADC) converts 5-HTP into 5-HT through a calcium-dependent process. Serotonin release is controlled by the serotonergic soma firing rate in raphe nuclei and mediated by calcium, which promotes fusion of synaptic vesicles with the plasma membrane. As we will discuss below, serotonin has been widely implicated in the pathophysiology of anxiety disorders, in part due to early clinical findings of response to serotonergic medications. Polymorphisms of the 5-HT transporter (5-HTT) gene are associated with an increased anxiety disorder risk, particularly when coupled with stressful life events (Schiele et al., 2016). Decreased expression of 5-HTT has been associated with heightened acute anxiety responses (Santangelo et al., 2016). The raphe nuclei, medial raphe, amygdala, and hypothalamus each interact with serotonergic aspects of fear and anxiety through potential negative feedback mechanisms.

Gamma-Aminobutyric Acid (GABA) GABA is an inhibitory neurotransmitter synthesized from glutamate through the Krebs cycle. Glutamic acid decarboxylase, the enzyme responsible for the conversion of glutamate into GABA, is encoded by the GAD65 gene. GAD65 knockout animal models are vulnerable to symptoms mimicking anxiety (Müller et al., 2015). Given that tonic inhibition in the amygdala is dependent on GABA, GABA and its receptors are prime neurochemical targets for understanding and treating anxiety. There are two main types of GABA receptors, one of which (GABA-A) is linked with anxiety; GABA-A is composed of five protein subunits surrounding a chloride channel. Several anxiolytic compounds interact with the GABA-A receptor as either allosteric modulators or agonists, including alcohol, benzodiazepines, and barbiturates. GABA-A receptors are also capable of bidirectional agonism, a property which suggests that endogenous inverse agonists or endogenous agonists may play a role in the regulation of anxiety (Mathew & Parambi, 2020).

Neuropeptide Y (NPY) NPY and its receptors are involved in both anxiety and stress. NPY is synthesized in the arcuate nucleus, a brain region which receives stress-related adrenergic input from the LC. Several rodent studies have suggested that NPY administration has anxiolytic and sedative effects. Likewise, NPY can antagonize CRH-induced stress responses and suppress LC firing when injected into the brainstem. As scientific understanding of the role played by NPY receptors (located across arcuate nucleus, central amygdala, nucleus accumbens, septum, periaqueductal gray (PAG), and hippocampus) improves, NPY receptor agonists may become a goal of anxiolytic development (Mathew & Parambi, 2020).

Cholecystokinin Cholecystokinin (CCK) is a neuropeptide with potentially anxiogenic effects. Key areas of the fear network are interconnected by CCK-ergic pathways (Zwanzger et al., 2012). CCK-B receptor agonists have been reported to have (1) anxiogenic effects in animals and (2) anxiogenic and panicogenic effects in both healthy and PD subjects. Suppression of CCK-B receptor expression and pharmacological antagonism can block the acquisition of a conditioned fear response. Despite the lack of abundant success in clinical trials, CCK remains an attractive target for drug development, especially with PD (Mathew & Parambi, 2020).

Substance P Substance P (Sub P) is a neuropeptide that binds to the neurokinin-1 receptor (NK-1 or tachykinin-1 receptor). Sub P has anxiolytic effects when it is injected into the cholinergic nucleus basalis magnocellularis. Additionally, NK-1 activation in the hypothalamus can inhibit the secretion of corticotropin-releasing hormone (CRH). Antagonists of NK-1 receptors can exert anxiolytic and antidepressant effects. Several NK-1 antagonists have appeared anxiolytic in animal studies, and in a preliminary clinical trial, the MK-869 antagonist was considered as effective as paroxetine in treating anxiety and depression (Mathew & Parambi, 2020).

Generalized Anxiety Disorder

Generalized anxiety disorder (GAD) is a condition characterized by persistent worry and anxiety about routine life circumstances such as personal health, work, and social interactions and is associated with signs of physiologic hyperarousal such as fidgetiness, muscle tension, insomnia, and appetite change (American Psychiatric Association, 2013). Patients with GAD have been found to have dysregulation in multiple neurotransmitter systems (Jetty et al., 2001).

Given the efficacy of SSRI medication in GAD treatment, the 5-HT system is of significant interest (Maslowsky et al., 2010). Early investigations of neurochemistry in all anxiety disorders, GAD included, focused on peripheral and whole-brain (via CSF sampling) neurotransmitter levels and metabolism. In the serotonin system, 5-hydroxyindoleacetic acid (5-HIAA) is a marker of 5-HT turnover. Increases in urinary 5-HIAA in GAD patients were reported, correlating with symptom severity (Garvey et al., 1995). However, studies of peripheral plasma concentrations of 5-HT and 5-HIAA in GAD patients did not show differences from controls (Hernández et al., 2002). Iny and colleagues have reported finding decreases in platelet 5-HT reuptake binding in GAD (Iny et al., 1994). Centrally, PET and SPECT studies have found no significant difference in 5-HT transporter binding density between GAD patients and healthy controls (Maron et al., 2004b). However, there are studies indicating associations between 5-HTT polymorphisms, GAD diagnosis, and response to treatment, which suggest dysregulation in serotonin reuptake (Craske et al., 2017). In terms of treatment response, effective SSRI treatment of GAD leads to improved functional connectivity between the VMPFC and basolateral amygdala (Lu et al., 2021), suggesting improved serotonergic modulation of amygdala-driven anxiety circuits (Strawn et al., 2012).

The hypothalamic-pituitary-adrenal (HPA) axis and its outflow hormone cortisol have been extensively studied in GAD, given the chronic nature of the condition. However, results remain inconsistent, with some studies demonstrating increased baseline cortisol and others decreased or unchanged, as well as varying cortisol responses to stressful stimuli and the dexamethasone suppression test (Juruena et al., 2020). One theory advanced to explain these differences is that chronic anxiety over time blunts the HPA axis response; those early in their disease course may have increased reactivity or baseline levels, but over the course of the illness, HPA reactivity and cortisol will decrease. Studies of hair cortisol showing decreased long-term concentrations of cortisol in adult GAD patients (but not adolescents) may support this hypothesis (Kische et al., 2021; Staufenbiel et al., 2013).

GABA is a potent anxiolytic neurotransmitter at the GABA-A receptor. GAD subjects have been found to express fewer GABA receptors in their frontocortical region compared to healthy subjects (Nikolaus et al., 2010). Additionally, female patients with GAD were found to have fewer GABA-A receptors in the L temporal pole compared to healthy controls (Tiihonen et al., 1997). Peripheral studies have found decreased expression of GABA receptor mRNA in the lymphocytes of GAD patients, as well (Rocca et al., 1998).

Dopamine transporter activity in the striatum was found by Lee and colleagues to be reduced in GAD compared to controls (Lee et al., 2015). This same study found no differences in the serotonin transporter in the striatum, but did not investigate other areas. With regard to researched neurotrophic factors for GAD, one study found that serotonin-norepinephrine reuptake inhibitor (SNRI) antidepressant treatments have increased plasma brain-derived neurotrophic factor (BDNF) concentrations in GAD participants (Ball et al., 2013). However, there is still limited research on the association between BDNF baseline plasma concentration and GAD severity.

Social Phobia

Social phobia (SP) is characterized by the persistent, irrational fear of being negatively evaluated by others during social interactions and related

avoidance and physiologic changes (American Psychiatric Association, 2013). With regard to serotonergic systems, SP has been associated with increased rates of serotonin synthesis in the amygdala, raphe nuclei region, caudate nucleus, putamen, hippocampus, and anterior cingulate cortex as well as increased serotonin transporter availability in the raphe nuclei region, caudate nucleus, putamen, thalamus, and insula cortex (Frick et al., 2015). SP is also associated with a decrease in autoreceptor and inhibitory 5-HT1A receptor binding sites in the amygdala and mesiofrontal brain regions (Lanzenberger et al., 2007). Serotonin transporter binding potential – an indicator of increased reuptake activity relative to serotonin availability – is normalized with effective SSRI anti-anxiety treatment in SP (Kent et al., 2002).

Serotonin and the HPA axis have important interactions in SP. Cortisol has been found to increase vulnerability to and severity of SP by potentially altering the function of 5-HT1A receptors in the limbic system (Lanzenberger et al., 2010). Several studies have also shown that serotonin-releasing compounds such as fenfluramine can elevate cortisol levels in SP subjects, indicating supersensitivity of the postsynaptic serotonin receptors (Tancer et al., 1994). Other lines of research have focused more on the peripheral autonomic nervous system and demonstrated ANS hyperactivity but not HPA hyperactivity in socially stressful tasks in SP patients relative to controls (Tamura et al., 2013).

Dopamine can also play an important role in anxiety modulation, particularly in social contexts, which may activate the reward system. Although early studies suggested that SP subjects do not experience dopaminergic dysfunction, more recent work has suggested otherwise. When administered dopamine agents – sulpiride and pramipexole – Hood and colleagues (Hood et al., 2010) reported that SP subjects experienced increased anxiety levels to both drugs and suggested the likelihood of dopamine receptor desensitization post-SSRI treatment. Dopamine transporter co-expression with the serotonin transporter in the striatum has been found to be increased in SP patients compared to controls, and dopamine transporter availability correlated with symptom severity (Hjorth et al., 2021). Dopamine D2 receptor density both within the striatum and non-striatal areas has been found to be dysregulated, although these results have not been consistent (Cervenka et al., 2012; Plavén-Sigray et al., 2017).

Other neurotransmitter systems including oxytocin and glutamate receptors are also involved with SP. In humans, oxytocin has been suggested to modulate anxiety by reducing amygdala response in potentially threatening social contexts (Heinrichs et al., 2009). In SP patients, intranasal administration of oxytocin has been found to attenuate hyperactive amygdala reactivity to fearful stimuli (Labuschagne et al., 2010). Despite limited data on treatment outcomes, oxytocin can also improve personal evaluations of appearance and speech performance in SP subjects (Guastella et al., 2009). Regarding glutamatergic systems, SP is suggested to increase the ratio of glutamate to creatine in the anterior cingulate cortex (Phan et al., 2005). Finally, there is some evidence of inflammatory dysregulation in SP: females with SP commonly underexpress C-reactive protein and IL-6 (Vogelzangs et al., 2013).

Separation Anxiety Disorder

Separation anxiety disorder (SepAD) is characterized by the experience of excessive distress when separated from home or attachment figures. Individuals with separation anxiety often worry about the well-being or potential death of attachment figures when separated from them. There are two main subtypes of the disorder: childhood (C-SepAD) and adult separation disorder (A-SepAD) (American Psychiatric Association, 2013). The research into the neurochemical basis of separation anxiety disorder remains limited, but reveals promising directions for additional inquiry (Schiele et al., 2020).

Studies of pharmacological treatment of SepAD with serotonergic medications (Schneier et al., 2017) and SepAD animal models (Spinelli et al., 2007) implicate the serotonin system. To

date, no systematic investigation of serotonin neurotransmission has been undertaken in SepAD. However, the endogenous opioid system, often modulated by serotonin, is thought to be dysregulated in SepAD (Boparai et al., 2018). Additionally, children with SepAD may show increased reactivity of the HPA axis during separation events (Brand et al., 2011).

Attachment research suggests that oxytocin is crucial in establishing and maintaining close caregiver attachments and is likely an important contributor to pathological SepAD (Gottschalk & Domschke, 2020). Youth with SepAD have been found to have decreased concentrations of salivary oxytocin, with direct negative associations between severity and oxytocin concentration (Lebowitz et al., 2016). Additionally, youth with SepAD had greater oxytocin responses to maternal attachment behavior compared to other anxious youth (Lebowitz et al., 2017). Childhood SepAD has also been associated with variations in the oxytocin receptor genotype, further supporting its role in the pathophysiology of SepAD (Costa et al., 2017).

Adult SepAD is often studied in the context of other psychiatric diagnoses. The findings are consistent with known alterations of neurochemistry in other anxiety disorders and further emphasize the importance of oxytocin in SepAD. Adult women's ratings of separation anxiety were negatively correlated with levels of oxytocin 3-months postpartum (Eapen et al., 2014). A-SepAD has been found to be prevalent in nonresponders to other anxiety disorder treatments. When those patients were treated in an attachment-based paradigm, Milrod and colleagues found non-significant but still drastic reductions in oxytocin levels, which were associated with reduced heart rate variability (Milrod et al., 2016). In patients with PD, major depression, and bipolar disorder, reduced peripheral platelet expression of the peripheral benzodiazepine receptor – commonly known as mitochondrial translocator protein (TSPO) – has been associated with the presence of SepAD (Abelli et al., 2010). Crucially, this receptor mediates the rate-limiting step in the synthesis of anxiolytic neurosteroids.

Specific Phobia

Specific phobia is a disorder of acute fear that is triggered by a stimulus in the environment. Broadly speaking, there are two functional categories of phobias. Non-experiential phobias are those that occur without prior negative experience, such as fear of snakes in a patient without a history of snakebite. These phobias rely on evolutionarily innate, learning-independent fear circuits, with defects in sensitization and habituation (Ipser et al., 2013). Experiential phobias rely on prior negative experiences, such as fear of dogs in a person who experienced a dog attack as a child. These phobias are driven by classical conditioning mechanisms but are maintained long after the negative experience due to deficits in extinction (Garcia, 2017).

Innate fear is an important component of specific phobia. This type of fear is highly dependent on the amygdala (Mobbs et al., 2010); we will review, in simplified terms, the neurochemical basis of fear regulation in the amygdala. For a more detailed outline, see Keifer and colleagues' review (Keifer et al., 2015). The amygdala, particularly the central nucleus and its extended network, processes fear cues from a variety of inputs (Fox & Shackman, 2019). At rest, the fear centers of the amygdala are tonically inhibited by gamma-aminobutyric acid (GABA), which is released locally by interneurons. Dopamine modulates this inhibition and is released during both excited and stressed states (Marowsky et al., 2005). Norepinephrine also increases fear by reducing tonic inhibition (Onur et al., 2009). Serotonergic projections from the raphe nucleus, on the other hand, inhibit amygdala reactivity (Lee et al., 2013). The amygdala, in turn, projects to the bed nucleus of the stria terminalis (BNST) (Fox & Shackman, 2019) which coordinates the behavioral and emotional responses to fear and to the HPA axis which allows the body to respond to stress.

During both anticipatory and acute fear states, phobia patients show increased activation and connectivity in fear circuits (Münsterkötter et al., 2015). It is assumed that patients with specific phobia suffer from reduced GABA-mediated

tonic inhibition of the central amygdala circuits. This process is hypothesized to be mediated by reduced "top-down" inhibition of the amygdala, as noted by reduced ventromedial prefrontal cortex (vmPFC) activity in phobia patients (Hermann et al., 2009). As described above, dopamine and norepinephrine are both implicated in the modulation of this inhibition. Beta-blockers, which decrease sympathetic outflow, reduce amygdala reactivity (Hurlemann et al., 2010) and are useful in treatment of specific phobias and other situational phobias. Serotonin is important in maintaining tonic inhibition in the amygdala. The short polymorphism of the serotonin transporter gene predicts increased amygdala activation in response to phobic exposures (Bertolino et al., 2005). Most studies also suggest that patients have an exaggerated cortisol response during phobic exposures (Fredrikson et al., 1985), and treatment with cortisol blunts phobic responses and enhances exposure therapy in treatment models, suggesting a negative feedback loop (Soravia et al., 2018).

Returning to the categories of experiential vs. non-experiential phobia, there are likely additional neurochemical factors at play. Those with non-experiential phobia are hypothesized to be more vulnerable to fear sensitization and less likely to habituate to phobic stimuli. Sensitization is thought to occur via a "top-down" noradrenergic mechanism; repeated exposure to innately fearful stimuli in rats leads to upregulation of NE receptors on the GABA-ergic amygdala interneurons important for tonic inhibition (Rajbhandari et al., 2016). Habituation, on the other hand, requires a reduction of "bottom-up" fear and is associated with increased functional connectivity of the amygdala with the insula and a reduction of insular firing, likely mediated by GABA. This connectivity and coordination is inhibited in phobia patients (Denny et al., 2014).

In experiential phobia, the model includes enhanced conditionability and impaired extinction (Stein & Matsunaga, 2006), although some studies have found no general increase in conditionability in phobia patients compared to controls (Schweckendiek et al., 2011). Extinction in particular has been studied from a neurochemical standpoint, as it is a valuable target for pharmacologic intervention in the treatment of specific phobia and other anxiety disorders. Extinction is thought to be dependent on long-term potentiation (LTP), which is mediated by glutamatergic transmission via the NMDA receptor. Extinction is modulated by serotonin (Amano et al., 2010) and CCK (Rovira-Esteban et al., 2019). Blockade of neurotransmitters upregulated by serotonin, such as GABA and the endocannabinoids, has been found to impair extinction (Marsicano et al., 2002). In terms of treatments, D-cycloserine is a partial agonist at the NMDA-R and has been found to augment extinction learning (Hofmann et al., 2015). Additionally, given serotonin's contribution to extinction, we can understand the value of SSRIs in treating phobia and anxiety disorders.

Panic Disorder

Panic disorder (PD) is a paroxysmal, often dramatic, disorder of acute physiologic and psychologic fear responses. Various features of PD, in addition to its cardinal symptoms, strongly suggest a neurobiological and neurochemical basis. These include high heritability, nocturnal occurrence, baseline autonomic hyperarousal, sensitivity to pharmacologic challenge, and robust response to pharmacotherapy (Goddard, 2017). Several neurotransmitter systems have been implicated in panic, which taken together suggest a functional neuroanatomical and neurochemical system that drives PD.

PD's features consist of chronic anticipatory anxiety in the fear of having another attack or agoraphobia, as well as acute paroxysmal fear in the form of panic attacks. Gorman et al. (Gorman, 2000) have proposed a model of diffuse hyperactivity in which both of these symptoms are accounted for. Brainstem structures such as the LC, periaqueductal gray (PAG), and parabrachial nucleus mediate the acute fear response in concert with the hypothalamus, while chronic anticipatory anxiety is mediated via limbic and paralimbic structures such as the thalamus, amygdala, anterior cingulate cortex (ACC), and

insula. The behavioral phenomena of avoidance are processed and mediated by cortical areas such as the PFC with strong ties to the limbic system (Sobanski & Wagner, 2017).

Reflecting on this neuroanatomical model, the connections to the various neurotransmitter symptoms and their putative roles in PD are clear. One theory of PD is rooted in hyperactivity of the noradrenergic system as it originates in the LC. Direct stimulation of the LC produces increases in subjective anxiety, somatic symptoms, blood pressure, and tachycardia as seen in panic attacks (Heninger & Charney, 1988). Furthermore, noradrenergic agonists such as yohimbine have been demonstrated to induce panic attacks (Charney et al., 1992). The treatment of acute panic also relies to some degree on a decrease in noradrenergic activity. Reductions in plasma levels of the norepinephrine metabolite 3-Methoxy-4-hydroxyphenylglycol (MHPG) are seen in parallel with response to treatment with clonidine (Charney et al., 1983).

The LC/NE system is intimately tied to the HPA axis, one of the most important systems for stress signaling (McCall et al., 2015). Although many studies have investigated the role of stress hormones, the results are mixed regarding baseline cortisol, ACTH and CRH, and their response to induced panic attacks (Bandelow et al., 2017). However, spontaneous panic attacks have consistently been shown to increase salivary cortisol levels (Bandelow, 2000), and genetic markers of increased HPA activity have been linked to both apprehension and post-threat stress responses in PD patients (Richter et al., 2012). Atrial natriuretic peptide (ANP) is a peptide hormone secreted by cardiac tissue that inhibits the release of ACTH and cortisol as stimulated by CRH, thus leading to anxiolysis (Ströhle et al., 2001). ANP is released during both exercise and panic attacks and may play a role in modulating HPA activity, likely by decreasing reactivity to calm acute panic attacks (Kellner et al., 2001).

Acute fear does not fully encompass PD, however. Other systems modulate those known to be hyperactive in panic. One such system is the 5-HT system, the importance of which can be inferred from the response to SSRIs seen in PDs (Charney et al., 1990). Study findings pertaining to serotonin in PD appear to be mixed, but this likely reflects the complex nature of anxiety modulation by serotonin. Early studies of plasma neurotransmitter levels revealed decreased 5-HT levels (Schneider et al., 1987). In the CNS, 5-HIAA is used as a marker of serotonin turnover. In untreated PD patients, there is evidence for increased serotonin turnover, and studies have demonstrated that effective treatment leads to decreased CSF 5-HIAA in responding patients (Esler et al., 2007). Anti-serotonin and anti-receptor antibodies have also been found to be elevated in PD patients (Coplan et al., 1999).

Functionally, 5-HT is known to play a restraint or inhibitory role in the hypothalamus and PAG – structures that mediate acute fear or panic (Canteras & Graeff, 2014) – by interacting with other neurotransmitters such as the endogenous opioid system (Graeff, 2017). Furthermore, corticolimbic areas important for anticipatory anxiety are also sensitive to serotonin transmission via 5-HT1a and 5-HT2c receptors. Serotonin binding studies have demonstrated abnormal reductions in 5-HT1a binding in the midbrain and cortex of patients with PD (Maron et al., 2004a). Studies of gender differences in PD have shown abnormally elevated 5-HTT binding in the ACC and midbrain in males with PD (Cannon et al., 2013). Additionally, homozygosity for the short allele at the serotonin transporter gene may be associated with PD severity (Lonsdorf et al., 2009). Taken together, there is evidence of decreased inhibitory serotonergic activity in brainstem structures important for acute fear and increased activation of serotonin systems in corticolimbic areas that mediate chronic anticipatory anxiety.

Dopamine (DA) is known to be important both in the top-down regulation of the amygdala and intrinsic amygdala activity (Grace & Rosenkranz, 2002). Several studies have studied the relationship between DA and PD. Early research demonstrated increased neuroendocrine reactivity to a DA agonist in PD patients compared to depressed patients (Pitchot et al., 1992). A small neuroimaging study of females with PD found an increased binding potential of the dopamine transporter (DAT) in the striatum in remitted

patients compared to both controls and acutely symptomatic patients; likewise, symptom severity was correlated with reduced DAT binding (Eduard Maron et al., 2010). Most neurobiological studies of the dopamine system in PD have focused on the catechol-O-methyltransferase (COMT) gene, in particular, the val158met polymorphism, which confers a marked increase in the rate of DA breakdown in the CNS. This polymorphism has been associated with an increased risk for PD (Domschke et al., 2007). Domschke et al. (2008) conducted a neuroimaging study linking the COMT genotype with functional alterations in PD. Increased amygdala reactivity and altered frontal lobe activity were seen in response to fearful stimuli in patients carrying at least one val158met allele. In sum, DA appears to reduce acute fear via top-down modulation, which is reduced or altered in PD patients.

GABA is the most widely distributed inhibitory neurotransmitter in the human brain and is particularly important in structures such as the amygdala that are crucial for fear processing. Using magnetic resonance spectroscopy, decreased GABA levels have been found in the ACC, PFC (Long et al., 2013), and the occipital cortex (Goddard et al., 2001) in PD. Binding studies have demonstrated decreased GABA binding in the insula cortex, which potentially indicates decreased inhibitory tone (Cameron et al., 2007)**.** Hasler and colleagues (2008) found reduced GABA binding potential in the frontal cortex and increased GABA binding potential in the hippocampus and parahippocampal gyrus, which they suggest is consistent with diminished fronto-limbic regulation in PD. Several studies have demonstrated decreased GABA binding in the same regions and have indicated a general loss of inhibitory GABA tone in these fear circuits (Bremner et al., 2000). Chronic stress – the anticipatory anxiety of panic – is known to impair tonic inhibitory GABA circuitry, leading to disinhibition (Liu et al., 2014) and increased excitatory glutamatergic transmission in the amygdala (Masneuf et al., 2014). There is some evidence that this leads to neuroplasticity changes in the extended fear network, further contributing to chronic anxiety (Goddard, 2017). One potential mechanism for chronic reductions in GABA inhibition could be by stress-induced alterations in GABA-A receptor modulatory steroid hormones (Rupprecht, 2003) – including metabolites of sex steroids such as progesterone which have been found to be reduced during panic attacks (Ströhle et al., 2003).

CCK is an important neuropeptide in the fear network (Zwanzger et al., 2012). CCK agonists can reliably produce and induce panic-like attacks in known PD patients; PD patients appear to be more sensitive to these agonists (Bradwejn et al., 1992). Some studies have demonstrated reduced concentrations of CCK in the CSF of PD patients compared to healthy controls (Lydiard et al., 1992). Genetic studies of the CCK gene, along with CCK receptors and promoters, in PD patients have demonstrated polymorphisms and mutations associated with the diagnosis (Koefoed et al., 2010). Given the lack of treatments targeting the CCK system, this is an area ripe for further clinical investigation.

Finally, one basic molecule in human metabolism has been extensively studied in PD, carbon dioxide (CO_2). Panic attacks often include physical symptoms suggestive of respiratory dysregulation. Thus, one theory of PD has been the false suffocation alarm theory (Klein, 1993), which postulates that evolutionarily important "suffocation alarm" systems are dysregulated or hyperactive, inappropriately cueing the behavioral and psychological responses to suffocation such as hyperventilation, fight-or-flight, tachycardia, and others. Panic attacks are reliably induced by exposure to increased CO_2 concentrations, and lower relative concentrations are required to induce attacks for PD patients (Bailey et al., 2005). In terms of mechanism, many of the previously discussed systems are likely involved in the sensitivity to CO_2 seen in PD. Rodent studies indicate that the amygdala has chemoreceptors which detect CO_2 concentrations. However, further human studies found that panic attacks can be induced even in patients with bilateral amygdala lesions, suggesting an additional, important role for brainstem structures (Davis & Whalen, 2001). CO_2 may initiate a neurotransmitter cascade initiated at the LC; this area has

chemoreceptors for CO_2 and releases norepinephrine to both cardiovascular and emotional control centers, as well as to the HPA axis (Martin et al., 2010). This response is further modulated by serotonergic systems; studies have demonstrated that 5-HT can inhibit CO_2-induced panic (Schruers et al., 2002), and there is also evidence of modulation of the CO_2 challenge response by serotonin transporter genotype (Schruers et al., 2011).

Obsessive-Compulsive Disorder

Obsessive-compulsive disorder (OCD) is no longer formally classified with the anxiety disorders in the 5th edition of the Diagnostic and Statistical Manual (DSM 5) (American Psychiatric Association, 2013); it has been grouped with other disorders bearing features of compulsive behaviors and obsessive cognitive patterns. This change, and the debate surrounding it, reflects the duality of OCD, both clinically and neurobiologically (Hollander et al., 2008; Storch et al., 2008). On one hand, OCD retains commonality with many anxiety disorders. These similarities include symptomatology: a high level of baseline worry and arousal, increased attention to potentially fear-inducing cues in the environment, and peaks of anxiety and fear when obsessions occur or compulsions cannot be performed. They also include responses to treatment, which in some ways guided early neurochemical theorizing about OCD. However, as reflected by the ultimate removal of OCD from the anxiety disorders section in DSM 5, there are many ways in which OCD is distinct from the other anxiety disorders. These unique features have driven extensive research into the neurobiology of OCD and have shed light on the neuroanatomical and neurochemical underpinnings of the disorder.

The earliest neurochemical hypothesis of OCD focused on serotonin (Stein, 2000). This hypothesis was based on clinicians' observation that antidepressants with serotonergic activity were effective in OCD (clomipramine, a tertiary tricyclic antidepressant), while others in the same class without serotonergic activity (secondary tricyclics such as desipramine) were not (Benkelfat et al., 1989). This hypothesis was studied further using peripheral markers of 5-HT and its metabolism. OCD patients with a family history of OCD had higher baseline 5-HT blood levels than either OCD patients without a family history or non-OCD controls (Hanna et al., 1991). Blood levels of 5-HT in OCD decreased with medication treatment (Humble et al., 2001), guiding the hypothesis of increased serotonin turnover in OCD. Studies found increased levels of the marker for serotonin turnover, 5-HIAA, in CSF at baseline and, similar to 5-HT, a decrease when treated with clomipramine (Thorén et al., 1980). However, a broader view of the evidence, both clinical and neurochemical, did not bear out serotonergic dysfunction as necessary or sufficient to explain OCD (Barr et al., 1992). For instance, in one study, the administration of serotonin receptor agonists (mCPP) and 5-HT precursors (tryptophan) did not produce expected behavioral changes or neurochemical responses in either controls or OCD patients (Charney et al., 1988). Indeed, even in positive studies, there are a substantial minority of patients, perhaps up to half, that do not respond to serotonin-based treatments (Goodman et al., 1989; Jenike, 2004).

Findings from neuroanatomical research protocols have broadened the neurochemical understanding of OCD. The current leading model for OCD is rooted in cortico-striatal-thalamo-cortical (CSTC) circuits. This model is supported by findings in a myriad of research modalities including lesion reports (Grados, 2003), psychoimmunologic syndromes (Chain et al., 2020), volumetric analyses (Rotge et al., 2009), functional neuroimaging studies (Brennan & Rauch, 2017), and, more recently, outcomes of neuromodulatory treatments targeting such brain regions (Goodman et al., 2021). These CSTC circuits are driven largely by glutamate, the most common excitatory neurotransmitter in the adult brain (Saxena & Rauch, 2000). Glutamate is specifically implicated in the regulation of motor and cognitive sequences (Karthik et al., 2020). Dysfunction in the CSTC circuits is highly suggestive of a pathogenic role for glutamatergic dysregulation in OCD.

Grossly, CSF sampling studies have demonstrated higher levels of glutamate in the CSF of OCD patients compared to controls (Chakrabarty et al., 2005). However, given the complex nature of glutamatergic signaling, more in-depth investigations have attempted to localize this imbalance. These studies, primarily using magnetic resonance spectroscopy (MRS), have been less conclusive. Early studies of pediatric patients found reduced concentrations of glutamate in the ACC, which was suggestive of downstream glutamatergic hyperactivity in the striatum and OCD symptomatology (Rosenberg et al., 2004). Further studies did not replicate these findings regarding the ACC or striatum (Lázaro et al., 2012). Our ability to fully characterize the nature of glutamatergic dysfunction in OCD is limited at this time, due both to methodological barriers (Stanley & Raz, 2018) and confounding factors such as medication status and comorbidity (Bédard & Chantal, 2011; Benedetti et al., 2013).

Although local dysregulations in glutamate transmission that contribute to CSTC dysfunction have not been demonstrated, the glutamate hypothesis is further supported by the benefit of certain pharmacotherapies. Interventions that act to regulate glutamate have shown potential benefit in OCD (Pittenger et al., 2011). More recently, ketamine, an NMDA-R antagonist, has been shown to be effective in the acute treatment of OCD (Rodriguez et al., 2013). Furthermore, SSRI treatment has been found to interact with the glutamate system. One study found higher levels of total glutamate plus glutamine, choline (an indicator of neuronal breakdown, perhaps due to excitotoxicity) in the medial thalamus of OCD patients compared to controls. These levels both declined significantly with effective treatment with an SSRI (Parmar et al., 2019). This interplay is consistent with known actions of serotonin in promoting top-down inhibitory control from the frontal cortex as well as modulation of dopamine and glutamate in the basal ganglia and thalamus (Dougherty et al., 2018).

The role of dopamine in OCD has also been investigated. Antipsychotics, including typical antipsychotics with relatively pure and potent D2 antagonism, have commonly been used as adjunctive treatments in OCD (Bloch et al., 2006) and provide benefits for related conditions such as Tourette's syndrome (Pringsheim et al., 2019). Furthermore, dopaminergic medications for conditions such as Parkinson's disorder and attention-deficit-hyperactivity disorder (ADHD) can unmask repetitive behaviors and cognitions (Borcherding et al., 1990). Medication-naive OCD patients show decreased D2 binding potential in the ventral striatum (Perani et al., 2008). These findings suggest that dopamine hyperactivity may be involved in OCD, leading to the downregulation of dopamine receptors. However, theoretically, these observations could also be attributed to low levels of endogenous dopamine. Successful deep brain stimulation (DBS) for OCD targeted to the nucleus accumbens (NAc) is associated with both acute and chronic decreases in binding potential at D2/D3 in the putamen and increased plasma homovanillic acid (HVA), a metabolite of dopamine. These results suggest that effective DBS induces striatal dopamine release (Figee et al., 2014). Dopamine's precise role in OCD remains unclear, perhaps due to its complex transmission within striatal structures (Prager & Plotkin, 2019).

GABA also plays an important role in CSTC circuits, providing top-down inhibition from both the prefrontal cortex and striato-thalamic pathways (Dougherty et al., 2018). MRS studies in OCD have demonstrated decreased GABA in the medial PFC (Simpson et al., 2012) and OFC (Zhang et al., 2016). GABA levels increased with ketamine infusion and were associated with rapid improvement in OCD symptoms (Rodriguez et al., 2015). In contrast to other anxiety disorders, repeated investigations into the role of the HPA axis have not demonstrated any consistent patterns of dysfunction in OCD (Kellner et al., 2012). In summary, OCD can be seen as a disorder of dopaminergic and glutamatergic dysregulation in the circuitry that underlies repetitive, habitual behaviors and the inhibition of those behaviors. Dopamine and glutamate are likely the primary drivers of hyperactivity in this circuit, which is modulated by serotonin and, in turn, GABA.

Conclusion

While the research into the neurochemistry of anxiety disorders is somewhat fragmented, there are clear themes we can extract to guide both treatment and further research. The first and most important theme is that current methodologies of studying the neurochemical basis of psychiatric disorders are limited – by clinical heterogeneity, sample sizes, technology, and more. For instance, neurotransmitters have different effects at different receptors in various brain regions, or even at different types of neurons in the same region, making any results difficult to interpret. Observation-driven, clinically relevant, and synthetic investigations seem to yield the greatest clarity, as seen in OCD. Bearing this in mind, a common thread in the neurochemistry of anxiety disorders seems to be dysregulation of underlying anxiety circuits (GABA and NE-based; or in the case of OCD, glutamate-driven) that are insufficiently modulated by systems such as the serotonergic system. Treatment, therefore, may focus on a range of targets; we have reviewed evidence that effective treatments, both psychopharmacologic and psychotherapeutic, influence these systems and their modulation. We are rapidly expanding our understanding of the diversity of neurochemicals that are involved in anxiety. As technology improves, we anticipate that further research will focus on understanding the function of these neurotransmitters on a more precise level of detail, linking genetic and anatomical studies to neurotransmitter function, and identifying new targets for pharmacologic intervention.

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6 Genetics of Childhood and Adolescent Anxiety and Obsessive-Compulsive Disorders

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Anxiety is a part of our lives that allows us to identify, prepare, and respond to our environment. Anxiety can motivate us to deal with challenges and provide us with the feelings of worry and heightened alertness necessary for survival. However, heightened states of anxiety characterized by unpleasant feelings of worry and tension can be maladaptive and result in anxiety disorders. The fifth and most recent edition of the Diagnostics and Statistical Manual of Mental Disorders (DSM-5) describes anxiety disorders as fear or anxiety responses disproportionate to both the situation experienced and the individual's age, causing significant impairment or distress (American Psychiatric Association, 2013). Anxiety is also a prominent feature of obsessive-compulsive disorder (OCD), which according to the DSM-5 is characterized by intrusive, recurrent thoughts and repeated, ritualized behaviors (American Psychiatric Association, 2013). As noted elsewhere in this volume, both anxiety disorders and OCD are common and associated with significant impacts on psychosocial functioning and quality of life.

In the first section of this chapter, genetic epidemiological approaches including family, high risk, and twin studies are briefly reviewed. In this section, we also discuss environmental risk factors, which may interact with genetic risk in the development of anxiety disorders or OCD. Genetic epidemiological studies have clearly established the importance of genetic determinants in anxiety disorders and OCD and provide an essential backdrop to the second and largest section on molecular genetic approaches. In this section, current gene-finding approaches (linkage and association) are briefly outlined followed by a comprehensive review of molecular genetic findings for anxiety disorders and OCD. The final section describes novel approaches in psychiatric genetics, including the study of putative endophenotypes, gene-environment interaction, and genetics of treatment response. The chapter concludes with a brief discussion of anticipated future trends in the genetics of anxiety and OCD.

The focus throughout the chapter is on studies of anxiety and OCD in children or adolescents whenever possible. However, relevant adult studies are also summarized from topic areas where little is known regarding children, or if the findings are clearly of high general relevance to anxiety in all age groups. Given the burgeoning literature on genetics of anxiety and OCD in recent years, this review is by necessity selective,

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highlighting recent and exciting trends in the literature.

Evidence from Epidemiological Studies

Family Studies Anxiety disorders tend to aggregate in families, suggesting the importance of genetic risk factors. The risk of developing an anxiety disorder or OCD in first-degree relatives of patients with these same conditions is approximately five times higher than healthy subjects (Hettema et al., 2001; Mataix-Cols et al., 2013; Browne et al., 2015). A large population-based, multi-generational study (over 24,000 probands) from Scandinavia (Mataix-Cols et al., 2013) found strong evidence for genetic influences on the liability of OCD: the odds ratio (OR) for first-degree relatives was higher than ORs for second- and third-degree relatives (ORs 2 and 1.5 for second- and third-degree relatives, respectively). Although OCD has been reported to be significantly more common in relatives of child compared with adult onset probands (Nestadt et al., 2000; Pauls et al., 1995; do Rosario-Campos et al., 2005; Hanna et al., 2005), more recently a large population-based study (Mataix-Cols et al., 2013) found only a slightly increased risk in family members of children with OCD compared with adults, suggesting a possible ascertainment bias for earlier studies of children seen in subspecialty clinics.

Environmental Risk Factors Psychological and environmental factors known to influence anxiety symptoms are themselves somewhat heritable (Zavos et al., 2010). Therefore, it is important to consider how the combination of environmental influences, genetic variation, and the interplay of these factors drives the development of anxiety disorders and OCD. Environmental stressors may increase one's risk for developing an anxiety disorder (Hudson et al., 2019; McLaughin & Hatzenbuehler, 2009) or OCD (Brander et al., 2016). Such environmental factors span social determinants of health, including low socioeconomic status (Beesdo et al., 2009), discrimination, childhood neglect, and parental conflict (Sederer, 2016). Brook and Schmidt (2008) reviewed environmental risk factors for developing social anxiety disorder (SAD), a disorder characterized by persistent fear of social performance and situations. Many environmental risk factors, including negative pre- and perinatal experiences and gender roles, were found to contribute to the development of SAD, emphasizing the need for greater consideration of cultural and societal factors as environmental risk factors. A recent systematic review of environmental risk factors for OCD found evidence supporting a role for perinatal complications, reproductive cycle events, and stressful life events in conferring risk for OCD (Brander et al., 2016). Another important putative environmental risk factor is streptococcal infections, which may trigger unusually sudden onset of symptoms in a subset of childhood onset cases (Swedo et al., 1998). This condition was initially termed Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections (PANDAS), but more recently was broadened to include other infections, and potentially other non-infectious causes, leading to the designation Pediatric Acute-onset Neuropsychiatric Syndrome (PANS) (Swedo et al., 2012).

High-Risk Studies A complementary design to the family study is a prospective study of "high-risk" individuals, typically the offspring of individuals with a disorder. Prospective studies have indicated that children of anxious parents are at increased risk of developing anxiety disorders (Black et al., 2003; Black & Gaffney, 2008; Merikangas et al., 2003). In a high-risk study of children of OCD probands (Black et al., 2003), 23% of the high-risk offspring met criteria for OCD at 2-year follow-up, a proportion significantly higher than that for controls. High-risk offspring were more likely to meet criteria for an anxiety disorder generally and scored higher on dimensional measures of anxiety/depression and somatic complaints.

Twin Studies In twin studies, monozygotic (MZ) and dizygotic (DZ) twin pairs are compared. MZ twins share 100% of their segregating

genes, and DZ twins share 50%. In both cases, twin pairs are assumed to share the same rearing environment. Twin studies provide an estimate of heritability, a measure of the extent to which genetic factors can explain differences in traits, ranging from characteristics such as eye color and height to psychiatric disorders. Heritability estimates range from zero to one, with a heritability closer to zero indicating a trait primarily influenced by environmental factors, while a heritability estimate closer to one indicates a trait is primarily influenced by genetic factors. Using heritability estimates derived from twin studies, it is possible to better understand the extent of variation in anxiety disorders and OCD due to genetics, shared environment, and non-shared environment.

Anxiety Disorders Current heritability estimates converge on approximate rates of 35% for generalized anxiety disorder and approximately 50% for social anxiety disorder, panic disorder, and agoraphobia (Meier & Deckert, 2019). The genetic basis overlaps not only within the different anxiety disorders but also with anxiety dimensional traits measured in non-clinical samples, suggesting at least a partial continuum from normal to pathological anxiety (Polderman et al., 2015). Importantly, heritability estimates of childhood and adult anxiety measures differ (Polderman et al., 2015). Longitudinal twin studies suggest that heritability is high in childhood but decreases over adolescence into adulthood (Nivard et al., 2015; Waszczuk et al., 2016; Hannigan et al., 2017). Genetic effects change significantly over the course of child and adolescent development (Waszczuk et al., 2016; Hannigan et al., 2017), but become more stable over time as individuals reach adulthood (McGrath et al., 2012).

On the phenotypic level, anxiety disorder subtypes typically fit a two-factor model characterized by distress (generalized anxiety disorders and MDD) and fear (panic disorder and specific phobias) (Watson, 2005). Multivariate twin studies have found limited evidence to support this model on the genetic level. Studies are consistent in that generalized anxiety disorders and panic disorder (i.e., distress and fear disorders) share a genetic basis, whereas at least some subtypes of phobias are influenced by other genetic factors (Hettema et al., 2005; Tambs et al., 2009). Importantly, the genetic structure of anxiety disorders also changes across development. One study supported the distress and fear model in adults, but different structures in younger age ranges (Waszczuk et al., 2014).

OCD The best evidence for the heritability of OCD symptoms comes from large twin studies measuring obsessive-compulsive symptoms as quantitative traits distributed continuously throughout the population, which indicate that the heritability of obsessive-compulsive symptoms is elevated in children (45–74%) compared with adults (27–47%) (van Grootheest et al., 2005; Zai et al., 2019; Burton et al., 2018). A longitudinal population-based study on 14,743 twins demonstrated that genetic factors exerted 60–80% stability over time, with environmental factors less consistent over time (Krebs et al., 2015). The same group further found that the correlation between broader anxiety and OC symptoms is $r \sim 0.68$ and that anxiety sensitivity is a risk factor for OC traits and vice versa (Krebs et al., 2020).

In summary, genetic epidemiological approaches (including family, twin, and high-risk studies) support a substantial genetic contribution to anxiety disorders and OCD. A variety of environmental risk factors clearly also play a substantial role. These studies provide an essential foundation for the molecular genetic studies discussed in the next sections.

Gene Discovery in Anxiety Disorders and OCD

Strategies for discovering risk genes have evolved over time, based on available technology and advances in analytic methods. Initially, most investigators performed linkage studies, genotyp-

ing evenly spaced DNA markers to determine chromosomal segments shared by affected individuals within families, thereby indicating the approximate chromosomal location of the susceptibility gene(s). Linkage studies, which were very helpful for identifying disorders caused by single genetic variants of large effect (e.g., Huntington's disease, cystic fibrosis), are known to have limited power to detect genetic variants of small or modest effect (i.e., a relative risk of less than two) which are more typical of psychiatric disorders and other common complex conditions (Risch & Merikangas, 1996).

Genome-wide linkage scans for panic disorder produced mixed findings with the most promising peaks found within 13q, 14q, 4q, 22q, and 9q (Maron et al., 2010; Smoller, 2008). Genome-wide linkage (GWL) scans of childhood-onset OCD (Hanna et al., 2002, 2007; Shugart et al., 2006) did not yield significant, replicable findings although identification of a linkage peak in chromosome 9p24 (Hanna et al., 2002) subsequently led to multiple findings of associations with a biologically plausible candidate gene, the glutamate transporter gene *SLC1A1* (as described below).

Candidate Genes

The most well-researched source of genetic variation known to influence the risk of psychiatric disorders is single nucleotide polymorphisms (SNPs). Candidate gene association studies are selected according to limited *a priori* hypotheses, focusing on the position of the gene under a peak identified in linkage studies, genomic regions contributing to anxiety traits in animal models, or the gene's biological function (Meier & Deckert, 2019). The classic design for an association study is based on comparison of allele frequencies in cases and controls. When testing a small number of genetic variants, a known limitation of the case-control strategy is the risk of spurious results in which genetic effects are identified that are unrelated to the disease (population stratification). When candidate gene approaches were the prevailing paradigm, various approaches were employed to address this issue, for example, testing within families (Ewens & Spielman, 2001). Due to the genetic complexity of anxiety disorders and other psychiatric disorders, as well as the aforementioned methodological issues, candidate gene studies have had limited success and low reproducibility (Smoller, 2016; Border et al., 2019).

Anxiety Disorders Studied candidate genes for anxiety disorders are typically found in the monoaminergic neurotransmitter systems and the hypothalamic-pituitary-adrenal (HPA) axis. Some of the most commonly studied candidate genes are (1) *SLC6A4*, particularly the insertion-deletion polymorphism known as *5HTTLPR* (serotonin-transporter-linked promoter region); (2) the Val158Met polymorphism (rs4680) of catechol-O-methyltransferase (*COMT*), a promoter length polymorphism of Monoamine Oxidase A (*MAOA)*; and (3) a regulator of G protein signaling 2 (*RGS2*) variant (rs4606) (Ask et al., 2021). Studies examining *SLC6A4* (1161 cases vs. 1051 controls) found no consistent association with the *5-HTTLPR* promoter variant (Meier & Deckert, 2019); however, treatment prediction based on *5-HTTLPR* showed promising results (Wray et al., 2009).

OCD Similar to anxiety disorders, the most studied candidate genetic variant in OCD is *5-HTTLPR* (Sinopoli et al., 2019; Murphy et al., 2008; Lesch et al., 1996). Meta-analyses of *5-HTTLPR* in OCD have reported either mixed findings (Dickel et al., 2007; Lin, 2007; Taylor, 2013; Walitza et al., 2014) or no association between *5-HTTLPR* and OCD (Bloch et al., 2008; Mak et al., 2015). A possible explanation for the inconclusive findings is the failure of earlier studies to consider the rs25531 A/G SNP that lies within *5-HTTLPR* and is known to influence the impact of *5-HTTLPR* on expression of the gene (Hu et al., 2006). Two groups have published meta-analyses accounting for the rs25531 variant, and both reported that the L_A (high expressing) variant was significantly associated with OCD (Taylor, 2013, 2016; Walitza et al.,

2014). In a meta-analysis, OCD was significantly associated with SNPs within another serotonergic gene – serotonin receptor 2A (*HTR2A)* (Taylor, 2013, 2016). Like other candidate genes, findings seem to indicate that *HTR2A* variants are associated with specific OCD subgroups reflecting sex, age of onset, and presence of comorbidity with tic disorders.

The Val158Met polymorphism within *COMT* has been the subject of multiple studies in OCD. In a recent meta-analysis of 14 case-control studies (1435 OCD cases, 2753 healthy controls), this variant was significantly associated with OCD (Kumar & Rai, 2020). Sex-stratified analyses indicated that this association was only found in males (Kumar & Rai, 2020), an observation that has been made in previous meta-analyses (Taylor, 2013, 2016).

Glutamate candidate genes have been studied based on evidence from neuroimaging studies and animal models for a role for glutamatergic neurotransmission in pathogenesis of OCD (Wu et al., 2012, Pauls et al., 2014, Rajendram et al., 2017). One of the most reported glutamatergic genes associated with OCD is *SLC1A1* (solute carrier, family 1, member 1) (Arnold et al., 2006; Wu et al., 2012, 2013; Stewart et al., 2013). As noted above, *SLC1A1* is located within the 9p24 region, one of the strongest linkage peaks in OCD, and therefore represents an excellent positional as well as functional candidate for OCD. A meta-analysis of nine *SLC1A1* SNPs in 815 trios, 306 cases, and 634 ethnicity- and sex-matched controls (Stewart et al., 2013) yielded largely negative findings with the exception of a single SNP that was modestly associated with OCD only in males ($P = 0.012$). The lack of clear association with common variants could be due to small effect size and phenotypic and/or genetic heterogeneity. Other glutamate candidate genes including *GRIK2* (Sampaio et al., 2011), *GRIN2B* (Arnold et al., 2004; Alonso et al., 2012; Kohlrausch et al., 2016), and *DLGAP3* (Zuchner et al., 2009) have also been studied with mixed results.

In addition to candidate variants within serotonergic genes (e.g., *SLC6A4*, *HTR2A*), *COMT*, and glutamatergic genes (e.g., *SLC1A1*), other genes that have been studied with non-significant or mixed findings involve dopamine neurotransmission, GABAergic signaling, and brain-derived neurotrophic factor (*BDNF*) (Zai et al., 2019).

Genome-Wide Association Studies

This limited success of hypothesis-driven candidate gene studies resulted in the rise of genome-wide association studies (GWAS) that enable the search for risk variants across the genome. GWAS require many samples to test thousands to millions of genetic variants. In comparison to candidate gene studies, they allow for a more detailed search of the genome for genetic variation.

GWAS performed in common complex disorders have revealed that most common variants have small effect sizes (Sullivan & Geschwind, 2019). According to the common-disease common-variant hypothesis (Iyengar & Elston, 2007), complex genetic diseases are largely attributable to common variants of low effect that would be amenable to such an approach.

As a result of these small effect sizes, and to overcome the multiple testing burden of examining so many variants, GWAS requires large sample sizes (thousands of subjects), typically involving multiple collaborative sites.

Anxiety Disorders The first GWAS attempt on a specific anxiety disorder was conducted for greater insight into panic disorder. Participants included 200 patients and 200 control subjects from a Japanese population, and several susceptibility loci were reported (Otowa et al., 2009). However, a replication study involving more participants failed to replicate the findings from the previous study (Otowa et al., 2010). A GWAS of 909 patients with panic disorder and 915 controls reported a significant variant in the location of transmembrane protein 132D (*TMEM132D*) on 12q24 (Erhardt et al., 2011). Additionally, risk genotypes were associated with higher *TMEM132D* mRNA expression in the postmortem frontal cortex. Independent SNPs in

TMEM132D were also associated with the severity of anxiety symptoms in both patients with panic disorder and in patients with depression who were also affected by panic attacks.

However, GWAS on specific anxiety disorders and anxiety-relevant traits were for a long time severely underpowered and characterized by mostly negative or inconsistent results (Meier & Deckert, 2019). To overcome sample size limitations, researchers started analyzing disorder subtypes together. By meta-analyzing the results of seven GWAS on five clinically ascertained anxiety disorder subtypes, the ANGST consortium study (Otowa et al., 2016) identified two genome-wide significant loci. The first resulted from a case-control approach (n = 17,310) and mapped to a non-coding RNA on chromosome 3q12. The second region located in the calmodulin-lysine N-methyltransferase (*CMKMT*) gene was associated with an anxiety quantitative factor score (n = 18,186). A GWAS making use of the Danish national registers (iPSYCH) study including patients with anxiety and related disorders (n = 31,880) identified multiple genome-wide significant SNPs mapping to the phosphodiesterase 4B (*PDE4B*) gene (Meier et al., 2019), which has been shown to impact anxiety-like behavior in mice (Zhang et al., 2008). A GWAS on composite anxiety phenotypes used self-reported symptoms and diagnoses to create a binary measure of lifetime anxiety disorder (n = 83,566) and a dimensional measure of current GAD symptoms (n = 77,125) in the UK biobank (Purves et al., 2020). For lifetime anxiety disorders, five variants reached genome-wide significance with three implicated in regions coding for the proteins neurotrophic receptor tyrosine kinase 2 (*NTRK2*), transmembrane protein 106B (*TMEM106B*), and myosin heavy chain 15 (*MYH15*) and two within intergenic regions on chromosome 5q15 and 9p23. The largest anxiety GWAS to date was performed in 175,163 European and 24,448 African US military veterans from the Million Veteran Program (MVP) using a 2-item dimensional measure of GAD (Levey et al., 2020). This GWAS used a binary measure of self-reported anxiety disorder diagnosis comprising 192,256 European and 23,074 African American participants. The study resulted in six genome-wide loci mapping to the SATB Homeobox 1 (*SATB1*), estrogen receptor 1(*ESR1*), leucine-rich-repeats and IQ motif containing 3 (*LPRIQ3*), mitotic arrest deficient 1 like 1 (*MAD1L1*), and transcription elongation factor A2 (*TCEA2*) genes in the European and the transient receptor potential cation channel subfamily V member 6 (*TRPV6*) gene in the African American subgroup.

Leveraging genetic correlations has proved successful in increasing the power of GWAS. A GWAS on latent factors of depressive symptoms and anxiety symptoms identified multiple loci (depression: 89 independent variants, 61 genomic loci; anxiety: 102 variants, 73 loci) in the UK Biobank. Of these associated variants, 72% and 78%, respectively, replicated in an independent cohort of approximately 1.9 million individuals with self-reported diagnosis of depression and anxiety (Thorp et al., 2021).

Importantly, GWAS of anxiety phenotypes in children and adolescents have thus far been unsuccessful in identifying genome-wide significant SNPs (Benke et al., 2014; Jami et al., 2022; Trzaskowski et al., 2013). However, a meta-analysis of childhood and adolescent internalizing symptoms (n = 64,641) by the CAPICE consortium identified three significantly associated genes: WNT family member 3 (*WNT3*), C-C motif chemokine ligand 26 (*CCL26*), and centromere protein O (*CENPO*) (Jami et al., 2022).

OCD: The first GWAS of OCD included 1465 cases and 5557 controls of mixed ages. No genome-wide significant variants were detected (Stewart et al., 2013). There were also no significant variants identified from the second GWAS based on pediatric onset participants from the OCD Collaborative Genetics Association Study (OCGAS) consortium, which included 1065 families with 1406 affected probands. In this study, a variant near the gene protein tyrosine phosphatase receptor type D (*PTPRD*) was the strongest finding but did not reach genome-wide significance ($p = 4.13 \times 10^{-7}$) (Mattheisen et al., 2014). Subsequently, a meta-analysis of these two initial studies, including 2688 cases and

7037 matched healthy controls, did not yield genome-wide significant loci despite the larger sample size (International Obsessive Compulsive Disorder Foundation Genetics Collaborative (IOCDF-GC) and OCD Collaborative Genetics Association Studies (OCGAS), 2018). The first sex-stratified OCD GWAS, based on the same two cohorts, identified two significant associations in gene-based analyses that were significant only in females, *GRID2* (p-value = 2.8×10^{-6}) and *GRP135* (p-value = 8.7×10^{-7}) (Khramtsova et al., 2019). It is important to note that the sample size of these early studies is much smaller than the large samples for anxiety disorders noted above and is also much smaller than typical sample sizes for other psychiatric disorders in which GWAS have identified significant loci (Sullivan & Geschwind, 2019). Therefore, analyses on larger samples are needed. Currently, the OCD/Tourette's Syndrome Working Group of the Psychiatric Genomics Consortium (PGC) is conducting an analysis of a much larger collaborative sample.

Similar to other psychiatric disorders, GWAS are revealing extensive shared genetic risk between OCD and other disorders. The shared genetic etiology between OCD, attention-deficit hyperactivity disorder (ADHD), Tourette syndrome (TS), anxiety disorders, and autism spectrum disorders (ASD) has been reported in multiple studies (Davis et al., 2013; Yang et al., 2021; Yu et al., 2015; Pinto et al., 2016). The cross-disorder group of the PGC performed a large-scale GWAS with 232,964 cases and 494,162 controls on ADHD, ASD, anorexia nervosa, bipolar disorder, depression, OCD, TS, and schizophrenia. They identified 109 risk loci shared between at least 2 psychiatric disorders and 23 loci shared between 4 or more disorders (Cross-disorder PGC, 2019). A recent study analyzed cross-disorder genetic associations for TS, ADHD, and ASD (Yang et al., 2021). Using an approach guided by genetic correlations, the group identified multiple genetic loci that confer risks to multiple disorders within this group (a phenomenon known as pleiotropy), including two pleiotropic regions identified in a meta-analysis of OCD and TS.

Similar to anxiety disorders, one approach that has been fruitfully applied in OCD genomics is the analysis of quantitative traits based on self- or parent-report measures of OCD symptoms. The first such study of 6931 samples from the Netherlands Twin Registry (NTR) tested genetic associations with scores on the Padua Inventory-Revised and identified a significant association ($p = 2.56 \times 10^{-8}$) with a variant (rs8100480) located within *MEF2BNB*, a gene involved in regulation of expression of muscle specific genes. They also found that a polygenic risk score derived from the first GWAS of OCD (Stewart et al., 2013) predicted OCS in their population-based twin-family sample. SNP-based heritability was estimated at 14% (Den Braber et al., 2016). This group later performed a GWAS on the obsession (rumination and impulsions) and compulsion (checking, washing, and ordering/precision) subscales of the Padua Inventory in the NTR ($N = 8267$). The compulsion subscale showed a substantial and significant positive genetic correlation with the OCD case-control GWAS ($r_G = 0.61$, $p = 0.017$) performed by the Psychiatric Genomics Consortium (PGC-OCD). They did not identify any genome-wide significant SNPs in their meta-analysis of the PGC and NTR data (combined $N = 17{,}992$), but aggregate gene-level analyses showed increased enrichment for brain-expressed genes related to psychiatric disorders and increased association with gene expression in the amygdala, hippocampus, and caudate nucleus (brain regions with known roles in emotion, reward processing, memory, and fear) compared to the original PGC-OCD GWAS (Smit et al., 2020).

In the "Spit for Science" study, another quantitative trait GWAS was conducted in 5018 unrelated children and adolescents ascertained in a community setting (at a science museum) and assessed using the Toronto Obsessive-Compulsive Scale (TOCS), a novel self- or parent-report measure (Park et al., 2016; Lambe et al., 2021). The Rs7856850 SNP in *PTPRD* was identified as significantly associated ($p = 2.48 \times 10^{-8}$) with OC symptom severity in the Spit for Science sample, and this SNP was also found to be significantly associated (p-value = 0.0069, same

direction of effect) in a meta-analysis of case-control datasets (Burton et al., 2021). Polygenic risk scores from OC traits were significantly associated with OCD in case/control datasets and vice versa (p's < 0.01). The associated variant within *PTPRD* is downstream of the most significant locus in the earlier OCGAS case-control GWAS described above (Mattheisen et al., 2014). Taken together, these studies suggest that quantitative symptom data may be useful to find genes for OCD. As with case-control GWAS, larger samples are needed to achieve adequate power to identify more replicated associations. A group of investigators (including two of the authors of this chapter, PA and SM) are currently performing a GWAS of OC quantitative traits a much larger collaborative dataset.

Studies of Rare Variants

Many theories have been proposed to explain why variants identified in GWAS are not accounting for the heritability observed in twin studies. Conventionally, GWAS limit analyses to common variants (minor allele frequency (MAF) ≥5%). It is possible that low-frequency (0.5% ≤ MAF < 5%) and/or rare (MAF <0.5%) variants account for part of the missing heritability (Manolio et al., 2009). Data from SNP arrays can also be used to identify rare copy number variants (CNVs) and structural rearrangements of the genome including deletions, duplications, and insertions which are greater than 1 kb in size. Copy number variants have been strongly linked to autism spectrum disorder and other neurodevelopmental disorders (Dinneen et al., 2022). Another type of rare variant, single nucleotide variants (SNVs) require a different technology known as next-generation sequencing (NGS), which includes targeted sequencing of candidate genes, analysis of all coding variants (whole exome sequencing), or comprehensive analysis of all variants across the genome (whole genome sequencing). Rare CNVs and SNVs can either be inherited or de novo, which means they are new mutations that are detected in affected individuals but not in either of their parents. To date, only a few CNV and NGS studies have been conducted in anxiety disorders and OCD.

Anxiety Disorders In one recent study, investigators examined large (>500 kb) CNVs in a cohort from Wales including just over 1000 adults with self-reported diagnoses of anxiety or depression and a small comparison group (N = 139). They did not find any difference in the rate of large rare CNVs between case and comparison individuals, enrichment of CNVs previously associated with neurodevelopmental disorders, or differences based on biological sex or early reported age of onset (Martin et al., 2021). Using a different approach, another group of investigators found a markedly increase rate of anxiety disorders (47%) and other psychiatric disorders in adults with CNVs compared with population rates (Adams et al., 2022).

The first whole exome sequencing study of anxiety disorders was conducted in 54 patients with panic disorder (PD) and 211 control subjects from a Faroe population. The diacylglycerol kinase eta (*DGKH*) gene demonstrated the strongest association (combined multivariate and collapsing (CMC): $p = 1.25 \times 10^{-4}$) with PD. A smaller whole exome sequencing study on one extended Japanese family, including multiple patients with panic disorders, identified candidate genes, of which the phospholipase A2 group IVE (*PLA2G4E*) gene had the strongest association in a follow-up sample of 952 Japanese and 192 German patients and control subjects (Morimoto et al., 2018).

OCD Genome-wide scans have revealed that the overall burden of rare CNVs does not differ between OCD patients and controls. There is some evidence from these studies for enrichment of genes expressed in brain and genes previously identified in studies of neurodevelopmental disorders (Gazzellone et al., 2016; Grünblatt et al., 2017; McGrath et al., 2014). Specific rare CNVs found in OCD patients are in genes or loci (including *PTPRD*, *BTBD9*, *NRXN1*, *ANKS1B*, 16p13.11) previously linked to OCD, or commonly comorbid conditions (Tourette syndrome,

other neurodevelopmental disorders) (Gazzellone et al., 2016; Grünblatt et al., 2017; McGrath et al., 2014).

The gene *SLITRK1* was originally studied as a candidate gene for Tourette Syndrome (TS) based on its proximity to a chromosomal inversion in a child with TS, the subsequent discovery of other rare variants in individuals with TS, and the absence of such variants when screening control chromosomes (Abelson et al., 2005). Given the phenotypic overlap between TS, OCD, and related disorders (e.g., trichotillomania), investigators subsequently sequenced the complete coding region of genes in adults with OC spectrum disorders (381 cases) and 356 controls, which suggested the possible involvement of novel rare *SLITRK1* variants in OC spectrum disorders (Ozomaro et al., 2013).

Another group applied a novel, cross-species approach and selected 608 candidate genes based on three sources of information: (1) a previous GWAS of a canine model of OCD (Tang et al., 2014), (2) genes previously associated with autism spectrum disorders, and (3) hypothesis-driven candidate genes for OCD (including many of the genes described above). They then performed targeted sequencing on 592 OCD patients and 560 controls. Four genes (*NRXN1*, *HTR2A*, *CTTNBP2*, *REEP3*) were identified as having an increased burden of functionally significant variants in OCD cases compared with controls. All four genes are involved in neurotransmission and synaptic connectivity within cortico-striatal-thalamo-cortical (CSTC) circuits implicated in OCD. When comparing with sequencing data from 33,379 population-based controls, *NRXN1* was highly significantly associated with OCD: $p = 6.37 \times 10^{-11}$ (Noh et al., 2017).

Recently, two whole exome sequencing studies have been performed in OCD. The first study involved family-based exome sequencing of 222 OCD parent-child trios and 777 previously sequenced unaffected trios. Damaging de novo variants were identified in the genes *CHD8* and *SCUBE1* (FDR q-value <0.1) (Cappi et al., 2020). In a larger study, whole exome sequencing was performed on 1313 total cases (including both family-based and case-control samples). In case-control comparison cases (n = 1263 cases and 11,580 controls), the most significant single-gene result was for *SLITRK5* (OR = 8.8, $p = 2.3 \times 10^{-6}$), interesting given the findings for another functionally related gene (*SLITRK1*) noted above. Analysis of trios identified an increase rate of de novo variants predicted to be damaging (Halvorsen et al., 2021).

In summary, next-generation sequencing studies of anxiety disorders are too small to draw conclusions regarding the role of rare variants in these conditions. In contrast, recent advances in OCD from larger samples indicate the potential involvement of rare variants in the pathogenesis of this disorder. Future sequencing studies of larger samples sizes, potentially including newer technologies such as whole genome sequencing, will shed more light on the contribution of rare variants to anxiety disorders and OCD.

Gene by Environment Interplay

The involvement of gene-environment interactions (G × E) in driving the genetic risk for and pathogenesis of anxiety disorders has been explored in a considerable body of literature. Recently, large gene-environment-wide interaction studies (GEWIS) were performed using the UK Biobank cohort (n = 371,903–432,881). A GEWIS examining the risk of maternal smoking during pregnancy (MSDP) and offspring's anxiety and depression (Chu et al., 2021) revealed a significant finding for the Unc-80 Homolog *(UNC80)* gene and anxiety. A GEWIS on socioeconomic factors based on Townsend deprivation index data identified several candidate genes as interacting with socioeconomic factors (Ye et al., 2021). Lastly, a GEWIS identified multiple genes that interacted with long-term antibiotic use in early life in their association with adult mental health traits, including *ANK3* for anxiety (Liang et al., 2021).

For OCD, a candidate gene-by-environment study focused on the interaction between early adversity as measured using the Childhood Trauma Questionnaire (CTQ) and variants within

COMT, monoamine oxidase A (*MAOA*), and monoamine oxidase B (*MAOB*). This study revealed that childhood trauma interacted with haplotypes in all three genes, increasing risk of OCD (McGregor et al., 2016).

These environmentally contingent genetic effects point to a promising future for GxE studies. However, it is essential to consider the reliability of G × E findings due to their limited scope. Limitations in both sample size and conceptualization of environmental risk assessment pose challenges in conducting G × E studies. An estimated sample size of 10,000 participants is minimally necessary to detect moderate G × E significance (Uher, 2014), and G × E studies have focused on functional candidate markers within a limited number of genes. Additionally, defining environmental exposure and timing of exposure is challenging (Klauke et al., 2010).

Epigenetics

Epigenetics is involved in various biological phenomena, including gene expression and cell differentiation (Portela & Esteller, 2010). Epigenetic modifications can be long-lasting, but also temporally highly dynamic and responsive to environmental factors, and can alter gene regulation and expression. Such modifications include DNA methylation (mDNA) at cytosine (CpG) sites, which can alter DNA binding to regulatory proteins, and histone acetylation and methylation at specific amino acids that alter chromatin availability for transcriptional activity (Huang et al., 2014). Unlike genomic DNA, epigenetic changes can be tissue-specific, an important consideration when comparing results from studies that are based on different sample types (e.g., saliva vs. blood). Epigenetics has been suggested to play a key role in the pathogenesis of anxiety disorders and OCD at the intersection of genetic and environmental factors (Klengel & Binder, 2015) and may be a possible explanation for the observed missing heritability (Trerotola et al., 2015; Bourrat et al., 2017) in genetic studies of these disorders.

Anxiety Disorders Previous studies on methylation alterations in anxiety disorders have mostly focused on candidate genes putatively involved in stress response, neurotransmission, and neuroplasticity (Schiele & Domschke, 2018). Unfortunately, most of these studies were underpowered to detect a signal that survives multiple-testing correction (Schiele & Domschke, 2018).

Recent advancements in technology now enable the examination of DNA methylation patterns on a genome-wide level. Global DNA methylation alterations have been reported in individuals with anxiety symptoms at a subclinical level (Murphy et al., 2015). In a large cohort (N = 1522), significantly increased DNA methylation at a single CpG site in the promoter of the *ASB1* gene correlated with high levels of generalized anxiety symptoms (Emeny et al., 2018). An epigenome-wide association study (EWAS) assessing more than 480,000 cytosine residues found panic disorder to be associated with significant differential DNA methylation (hypomethylation in most instances) at 40 CpG sites, in patients compared with controls (Shimada-Sugimoto et al., 2017). In another EWAS including 89 medication-free patients with panic disorder and 76 healthy controls stratified by gender, one locus with genome-wide association was detected in an enhancer region of the *HECA* gene, specific to female patients. The same locus was found to be hypermethylated in a female replication sample. In addition, methylation at this CpG site was associated with *HECA* mRNA expression in another independent female sample (n = 71), both at baseline and after induction by dexamethasone (Iurato et al., 2017). In an EWAS of 66 patients with social anxiety disorder and 77 healthy controls, genome-wide associations were observed in exon 4 of the Tenascin XB (*TNXB) gene* and the intron of the solute carrier family 43 member 2 (*SLC43A2*) gene. Strikingly, hypomethylation of *TNXB* was consistent with results from the EWAS of panic disorder (Shimada-Sugimoto et al., 2017) described above. Similarly, changes in the differential DNA methylation of *SLC43A2* have been described in response to cognitive-behavioral therapy in patients with

panic disorder (Ziegler et al., 2019). Accordingly, these shared associations point towards more general epigenetic effects in the pathogenesis of anxiety disorders.

OCD To date, there are a limited number of epigenetics studies for OCD pediatric samples. The first study on DNA methylation profiles in OCD, focusing on 14 candidate genes previously associated with the disorder, was conducted on neonatal blood spot samples from 33 female children/adolescent subjects (21 cases, 12 controls). There were no statistically significant results reported; however, preliminary results provide evidence for differential methylation profiles of the GABA B receptor 1 (*GABBR1*) and myelin oligodendrocyte glycoprotein (*MOG*) genes (Nissen et al., 2016).

Other candidate methylation studies have focused on single genes. As with candidate studies of genetic variants, *SLC6A4* has been a focus for methylation studies (Schiele et al., 2021a, b; Grünblatt et al., 2018). One study found that DNA methylation levels of *SLC6A4* in an amplicon located at the beginning of the first intron were significantly higher in the saliva of pediatric OCD patients compared to controls and adult patients with OCD (Grunblatt et al., 2018). A more recent study reported that hypermethylation of the *SLC6A4* promoter may be a good indicator of impaired treatment response (Schiele et al., 2021b).

Oxytocin, a hormone linked to emotional regulation and attachment, has been the subject of a few candidate gene methylation studies in small samples of individuals with OCD (Cappi et al., 2016; Schiele et al., 2021a; Park et al., 2020; Siu et al., 2021). Hypermethylation of the oxytocin receptor gene (*OXTR*) was observed in two studies (Cappi et al., 2016; Schiele et al., 2021a), whereas hypomethylation was observed in another study comparing OCD cases with healthy controls (Park et al., 2020). Another study by Siu et al. observed altered methylation levels of *OXTR* in pediatric subjects with primary diagnoses of ASD, ADHD, and OCD. In this study, children with OCD had some CpG sites that were hypomethylated compared with controls, but the differences were small compared with the other disorder groups (Siu et al., 2021). Overall, there has been some inconsistency with findings on OXTR methylation levels in OCD, which can be at least partially explained by low sample power as well as varying tissue types (e.g., blood vs. saliva).

In an EWAS of 65 OCD affected and 96 unaffected individuals, 2190 unique differentially methylated genes were identified. Among these differentially methylated genes, a number had been identified in previous genetic or epigenetic studies of OCD including *BCYRN1*, *BCOR*, *FGF12*, *HLA-DRB1*, and *ARX* (Yue et al., 2016). In another EWAS of saliva DNA, 59 children affected with OCD were compared with 22 children with ADHD and 54 controls. In this study, DNA methylation differences from controls were more readily identified in patients with higher symptom severity (in both the OCD and ADHD groups) (Goodman et al., 2020).

Endophenotypes

One alternative approach to studying genetics of anxiety disorders and OCD is the study of endophenotypes. A strict definition of endophenotype requires certain criteria be met, including heritability, state-independence, co-segregation within families, and greater frequency in unaffected family members compared with the general population (Gottesman & Gould, 2003). Endophenotypes have been suggested from multiple sources including cognitive tasks, physiological measures, and neuroimaging (Domschke & Dannlowski, 2009).

One particularly promising endophenotype is error-related negativity (ERN), an electrophysiological marker measured using electroencephalography (EEG). The ERN, a negative deflection in the event-related potential following an incorrect response during a performance of a task, is a putative mechanistic biomarker of anxiety across the lifespan. The ERN has been associated with OCD and OC traits in adults and children (Carrasco et al., 2013b; Gehring et al., 2000;

Bernstein et al., 1995; Mathews et al., 2012; Hanna et al., 2018) and with pediatric generalized anxiety disorder (Hanna et al., 2020). It is likely that ERN is transdiagnostic, and not specific to either OCD or anxiety disorders, as evidenced, for example, by its association with withdrawn/depressed behaviors in children with OCD (Hanna et al., 2016). ERN is elevated in the first-degree relatives of individuals with both OCD and GAD (Carrasco et al., 2013a; Riesel, 2019) and, therefore, meets the requirement that endophenotypes be heritable. The ERN has been described as an excellent example of the Research Domain Criteria (RDOC) of NIMH (Hanna & Gehring, 2016). Furthermore, an imaging study provided preliminary evidence that structural brain alterations in an extended network for error processing are linked to the ERN (Liu et al., 2014).

There are a number of neurocognitive correlates of pediatric OCD, representing candidate endophenotypes such as decision-making (Ozcan et al., 2016), planning (Bey et al., 2018), response inhibition (Mar et al., 2022), memory (Zhang et al., 2015a), reversal learning (Tezcan et al., 2017), and cognitive flexibility (Ozcan et al., 2016) (reviewed in Marzuki et al., 2020). Two recent, methodologically rigorous studies tested neurocognitive endophenotypes in OCD probands, together with unaffected siblings and/or parents. The results differed, with one study identifying deficits shared by OCD proband and unaffected relatives in cognitive flexibility and response inhibition (Abramovitch et al., 2021), and the other in planning (Negreiros et al., 2020). Another small study focused on "high-risk" (HR) children who were siblings or children of individuals with OCD and who exhibited subclinical obsessive-compulsive symptoms but not did not meet diagnostic criteria for OCD. They identified statistically significant performance deficits in spatial working memory in HR children compared with controls (Bernardes et al., 2020).

Great advances have been made in recent years in defining neuroimaging correlates of anxiety and OCD, and as with other psychiatric disorders, analyses of large neuroimaging cohorts have been accelerated through the ENIGMA consortium (Harrewijn et al., 2021; Heuvel et al., 2022). Endophenotype studies, in which unaffected relatives are studied to identify potential heritable structural or functional brain alterations, have involved smaller samples and have not resulted in consistently replicated findings. Future studies, such as a new global study including 100 unaffected adult siblings of individuals with OCD (as well as 250 medication-free adults and 250 healthy controls), should help address this gap in our knowledge (Simpson et al., 2020). However, this study does not include children and adolescents, which is true of most neuroimaging endophenotype studies to date. A notable exception is a mixed adult and adolescent study that identified structural changes within orbitofronto-striatal and posterior brain circuitry in patients with OCD, which were shared with unaffected relatives, compared with controls (Shaw et al., 2015).

Even without established heritability, imaging phenotypes have been studied for their association with candidate genetic variants in children with OCD. Preliminary associations have been reported with various glutamate and serotonin system genes and structural and functional alterations within corticostriatal circuits based on a range of neuroimaging modalities (Arnold et al., 2009a, b; Gassó et al., 2015; Ortiz et al., 2016; Sinopoli et al., 2020); however, such findings have not replicated across studies. Future studies should be conducted using genome-wide approaches, in sufficiently large samples. Another promising approach is testing whether polygenic risk scores (PRS) for OCD or other disorders predict imaging endophenotypes. One example of this approach can be found in a recent study, in which investigators reported that PRS for OCD predicted brain response during working memory in individuals with OCD and unaffected relatives, but not in controls (Heinzel et al., 2021).

Genetics of Treatment Response

Pharmacogenetics studies have been conducted in OCD, mostly focused on genes in the cytochrome P450 system, involved in liver metabolism of SSRIs (Zai et al., 2014; Elliot et al., 2017;

Müller et al., 2012; Brandl et al., 2014). *CYP2D6* and CYP2C19 genes have been studied in multiple adult OCD studies (Müller et al., 2012; Brandl et al., 2014). In particular, a study involving 184 OCD adult cases showed that genetic variants associated with poor *CYP2D6* metabolism are highly correlated with antidepressant side effects, specifically with side effects from venlafaxine (Brandl et al., 2014).

Serotonergic and glutamatergic genes have also been the subject of antidepressant treatment response studies (Zai et al., 2014, 2019). A study of treatment response in adults with OCD found a significant association between the rs6305 variant in *HTR2A* and non-response (Corregiari et al., 2012). *SLC1A1* has also been investigated in pharmacogenomic studies (Bandelow et al., 2016; Zhang et al., 2015b; Real et al., 2010). The rs301434 variant of *SLC1A1* was significantly associated in one study with both SSRI nonresponse and fluoxetine response (Zhang et al., 2015b). Furthermore, another two variants (rs2228622 and rs3780413) of *SLC1A1* were associated with fluoxetine response in another study (Abdolhosseinzadeh et al., 2019).

Leveraging data from one of the GWAS described above, investigators tested association with medication response in 804 mixed adult and pediatric patients diagnosed with OCD. The most significant variant in this analysis was rs17162912 (P-value = 1.76×10^{-8}) which is near *DISP1*. Further enrichment analysis showed a suggestive association between OCD treatment response and genes involved in glutamatergic and serotonergic neurotransmission (Qin et al., 2016). A subsequent study which sought to replicate the association of *DISP1* with OCD treatment response in an independent sample was negative (Lisoway et al., 2018).

A number of studies have also examined whether the *5-HTTLPR* variant moderates response to cognitive-behavioral therapy in individuals with anxiety disorders. Findings have been mixed, and a recent meta-analysis of 2195 individuals with anxiety disorders attempted to determine whether there was any consistency across studies. The results of this meta-analysis revealed no significant effects of *5-HTTLPR* genotype on categorical or dimensional anxiety outcomes (Schiele et al., 2021c). Future studies should examine whether other genetic variants, polygenic risk scores, or epigenetic factors moderate therapy outcome in anxiety disorders or OCD.

Although little is known to date about the genetics of treatment response in anxiety disorders and OCD, more findings are likely to accumulate in the coming years, holding out the prospect of identifying genetic predictors that will enable better tailoring of treatment to individual patients.

Conclusions and Future Directions

The rapid pace of technological advance and more advanced analytic methods are expected to revolutionize molecular genetic studies over the next decade. Currently, the emphasis is on genome-wide association studies using ever larger samples. More publications based on whole exome and whole genome sequencing approaches are also expected in the coming years. Findings based on GWAS and next-generation sequencing should lead both to identification of biological pathways underlying OCD and improvement in risk prediction models using polygenic risk scores combined with non-genetic predictors. However, currently PRS approaches are significantly limited by the fact that the samples from which they are derived consist almost entirely of individuals of European ancestry. Therefore, increasing diversity of participants is becoming a major emphasis in psychiatric genetics, and it is hoped that more ethnically diverse samples will in turn lead to increased clinical utility of PRS approaches in people from all ancestral backgrounds (Peterson et al., 2019). SNP-based strategies will be complemented by study of copy number variation and epigenetic approaches which will reveal different biological mechanisms underlying anxiety disorders and OCD.

Endophenotypes, such as neurocognitive tasks and brain imaging abnormalities, also represent promising phenotypes for genetic studies, as do

quantitative symptom measures. Future studies will benefit from increasingly sophisticated approaches to modeling gene-gene and gene-environment interaction, and investigating key variables such as age, sex, and gender. Although it may take many years to fully elucidate how genes lead to pathological anxiety or OCD, genetics of drug response is likely to result in practical applications in the relatively near future. The genetic variants involved in drug response are not necessarily the same as those involved in pathogenesis of pathological anxiety or OCD, and therefore, more studies specifically targeting pharmacogenetics are needed.

In summary, convergent and exciting findings are emerging, which given the rapid acceleration in our knowledge of the human genome will likely result in a more definitive understanding of the genetic roots of these complex conditions.

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7 Taxometric Methods in Child and Adolescent Anxiety Disorders

Christian A. Hall and Joshua J. Broman-Fulks

Approximately one-third of US adolescents have experienced symptoms of an anxiety disorder at some point in their lives (Kessler et al., 2012) and an estimated 7.1% of US youth aged 3–17 currently meet diagnostic criteria for an anxiety disorder (Ghandour et al., 2019). The worldwide prevalence of anxiety disorders in child and adolescent populations is similarly high (i.e., 6.5%; Polanczyk et al., 2015) and appears to be increasing over time, especially among adolescent females (Bor et al., 2014). This is a worrisome trend, as an anxiety disorder diagnosis during adolescence is a predictor of future suicidal ideation, chronic stress, substance use, and low well-being, among other forms of psychological suffering (Essau et al., 2014). Despite the existence of efficacious interventions targeting child and adolescent anxiety disorders (see Higa-McMillan et al., 2015), anxiety-related suffering in youth remains a public health issue of significant cost and burden at the individual and societal levels (Olfson et al., 2012; Wittchen, 2002). To address this issue, it is imperative that researchers and clinicians work collectively to develop evidence-based theoretical models and efficacious strategies for the assessment, diagnosis, and treatment of anxiety disorders.

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One issue that permeates the anxiety literature and informs everything from the theoretical conceptualization of anxiety disorders to appropriate assessment approaches and treatment targets regards the latent structure of anxiety and anxiety-related concerns. Latent structure refers to whether anxiety disorders represent naturally occurring taxa (i.e., categories) that are distinct from one another, other psychological disorders, and normality, as is implied by the categorical approach represented in the DSM-5 diagnostic system, or whether these disorders represent continuous variations along one or more relevant dimensions. Fortunately, there is an empirical approach that can inform discussions of latent structure known as taxometrics. In this chapter, we will present a comprehensive review of the taxometric literature as it pertains to anxiety and anxiety-related concerns. We will begin by discussing some issues with the classification of anxiety disorders under current diagnostic systems and outline the history, practice, and application of taxometric methods as they pertain to these issues. Then, we will review the literature of taxometric research on child and adolescent anxiety disorders and related constructs, including several relevant transdiagnostic features and risk factors, and we will discuss what can be inferred from taxometric studies of anxiety-related constructs in adults. The chapter will conclude with a summary, recommendations for

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researchers and clinicians, and a reflection on the state of the field of taxometrics as it concerns the study of child and adolescent anxiety disorders.

Classification

Anxiety disorders, characterized by the experience of excessive and impairing fear and worry, can be examined at multiple levels of analysis. The Diagnostic and Statistical Manual (DSM-5; American Psychiatric Association, 2013) describes anxiety disorders as collections of symptoms that include markers of sympathetic arousal (i.e., increased heart rate, sweating, tension), anxious cognitions (i.e., nervousness, worry, fear), and behavioral responses that function to reduce or eliminate these unwanted experiences. Whether these "symptoms" are attributable to discrete patterns of genetic expression, specific events in childhood, learned behaviors, or interactions between such variables remains an etiological concern unaddressed by the diagnostic system. Though some risk factors for child and adolescent anxiety disorders have been identified, such as parenting style (e.g., Möller et al., 2016) and temperament (e.g., Degnan et al., 2010), individual differences in development and a multitude of other biological and environmental factors complicate causal explanations for the development of anxiety disorders (Creswell et al., 2014; Mian et al., 2011).

For clinicians working with youth, the differential diagnosis of anxiety disorders poses additional challenges (Freidl et al., 2017). Child and adolescent anxiety disorders share many symptomological features with other diagnoses, such as mood, somatoform, and substance use disorders, making it difficult to distinguish between discrete classes of disorder (Jarrett et al., 2012; Kendall et al., 2010). In addition, anxiety disorders in youth are also frequently comorbid with mood disorders, medical conditions, autism spectrum disorders, externalizing disorders, and one another, further complicating diagnosis (Beesdo et al., 2009; Cummings et al., 2014; Kerns et al., 2016; Reale et al., 2017; Verduin & Kendall, 2003). These patterns of symptom overlap, and comorbidity across a spectrum of mental health disorders raises concerns about the validity and utility (Ghaemi, 2016) of diagnostic boundaries between mental disorders (Allsopp et al., 2019; Jablensky, 2016; Rutter & Pickles, 2015).

Assuming for the moment that child and adolescent anxiety disorders are categorically structured diagnostic entities, one must ask from which causal mechanisms (e.g., dichotomous genetic factor, threshold-dependent effect, or interaction effect) these disorders emerge (Ruscio et al., 2011). In many cases, etiological knowledge is necessary for the differential diagnosis of symptoms common to multiple disorders. For example, the presence of an underlying medical condition, such as arrhythmia, asthma, irritable bowel syndrome, or hyperthyroidism, may distinguish justified reactions to associated physical sensations from the often-unfounded sensitivities of GAD or panic disorder (Jordan & Okifuji, 2011; Meuret et al., 2017). Likewise, anxiety and externalizing disorders can be differentiated when symptoms common to both diagnoses (i.e., inattention, restlessness, etc.) are understood in the context of the processes specific to either disorder from which they emerge. For example, avoidance due to excessive worry may be an indicator for anxiety, while avoidance in opposition to requested involvement in a family activity may be an indicator for an oppositional defiant disorder (Freidl et al., 2017). When unavailable to clinicians, the history and timing of symptom development may pose additional challenges in diagnosis. For example, the presence of social fear can be used to differentiate SAD from an autism spectrum disorder when common symptoms like social impairment and avoidance complicate diagnosis. A child with autism may learn to develop social fears not initially present after experiencing the negative consequences of social impairment. Consequently, the presence of social fear may only be useful as a diagnostic tool when clinicians can chart its course through development (Tyson & Cruess, 2011).

In final consideration to the question of why one should care about the latent structure of child anxiety disorders, Beauchaine (2003) outlines five major points that are only briefly summa-

rized here. First, understanding the structure of anxiety disorders that emerge early in development can inform risks for the development and maintenance of other disorders into adulthood. Second, diagnostic systems still in use today (e.g., the DSM-5 and ICD-10) are plagued by assumptions and distinctions that lack empirical support and hold significant implications for treatment. Third, taxometric research has the potential to reveal periods in development during which pathological traits and other risk factors are likely to emerge. Fourth, categorical differences may exist between groups that determine or influence response to treatment. Taxometric analyses would enable clinicians to identify these groups and plan treatments accordingly. This would be especially helpful in cases where certain treatments may be contraindicated by membership to a latent group within the population of treatment seekers. Finally, distinguishing between dimensional and taxonic constructs can enable researchers and clinicians to chart the developmental pathways of anxiety disorders. Whether a disorder emerges at the end of a multifaceted causal pathway (equifinality) or marks the emergence of a variety of pathways that may or may not result in the disorder (multifinality), knowledge of its structure is essential in understanding its development across time.

Taxometrics

The detection of latent clinical classes (i.e., *taxa*) through empirical means was pioneered by Paul Meehl, a clinical psychologist and philosopher of science who assembled a comprehensive method for taxometric analysis (Meehl & Golden, 1982). At the time, it was widely assumed and codified into diagnostic manuals that mental illness was to be diagnosed as a distinct state of impairment – you either "have it or you don't" – contrary to healthy or otherwise normal states of being (Mayes & Horwitz, 2005). Observing the absence of empirical support for such assumptions, Meehl developed a set of nonredundant statistical procedures, collectively known as *coherent cut kinetics*, that can be applied to proposed indicators (e.g., symptoms) of a construct.

Although a detailed explanation of taxometric methodology is well beyond the scope of this chapter, a general understanding of how taxometric procedures function and how their results are interpreted may aid the reader. In short, the procedures Meehl developed represent different ways of evaluating the statistical relationships among two or more prospective indicators of a construct along moving cuts (e.g., scores) of another indicator. The resulting relationships can be plotted and the shape and consistency of the plots examined. In general, plots of the relationships between indicators of a categorical construct will exhibit a characteristic shape (e.g., a bimodal distribution, convex upward) that is distinct from plots produced by dimensional variables (e.g., a unimodal distribution, concave downward). Rather than rely upon null hypothesis testing, the taxometric method employs multiple consistency tests, and the fit of the plots generated by the data of interest is compared to Monte Carlo simulations of categorical and dimensional plots. While early taxometric procedures relied heavily on the subjective visual interpretation of plots, most modern taxometric analyses employ an objective fit index (i.e., the Comparison Curve Fit Index, or CCFI; Ruscio, 2007) when interpreting whether the resulting data plots are more consistent with a categorical or dimensional model. CCFI scores range from 0 to 1, with lower CCFI values (<0.45) imparting greater confidence that the construct of interest has a dimensional latent structure and higher CCFI values (>0.55) suggesting a categorical latent structure. CCFI values ranging from approximately 0.45–0.55 are considered too ambiguous to support either claim, though this range can vary in stringency (Ruscio et al., 2010). An understanding of CCIF score interpretation will be useful throughout this chapter as a means to interpret the results of taxometric studies. For additional information, Beauchaine (2007) and Ruscio et al. (2011) provide excellent primers for taxometric analysis that further detail its theory and application.

Taxometric Findings for Children and Adolescents

To date, only two studies have directly examined the latent structure of anxiety-related constructs among child and adolescent samples using taxometric methodology. The first, conducted by Schmidt et al. (2007), applied taxometric procedures to discern the structure of mixed anxiety depression (MAD) for its consideration as a diagnostic category. In this study, three large cohorts of adolescent participants were randomly selected from high schools in Oregon to complete measures of self-report, parent-report, and clinician-rated symptoms of anxiety and depression at two time points, separated by a little over a year. Indicators from these measures were subjected to two taxometric procedures, the results of which were both interpreted as supporting the existence of a MAD taxon representing approximately 13% of the adolescent population. Additional non-taxometric modeling procedures also supported a categorical model of MAD with an estimated taxon base rate of approximately 12%. One-third of students predicted to belong to the taxon class met criteria for a diagnosis of an anxiety or mood disorder at the first time point, and by the second time point, those students who were thought to belong to the MAD taxon reported increased scores on measures of depression, anxiety, and worry.

All in all, Schmidt and colleagues initiated the search for the structure of anxiety disorders in adolescents with strong support for the categoricity of mixed anxiety depression. However, it is unclear to what extent these findings more broadly represent anxiety disorders in the absence of comorbid depression. Two years prior, Hankin et al. (2005) used indicators from both youth and parent reports of depression symptoms in a large sample of children and adolescents to identify the latent structure of depression. Consistent across report-type, construct domain, and demographic variables, their analyses aligned to suggest that depression was best represented as a dimensional construct. A dimensional structure of depression was also found in an adult sample in the same year and more recently in a sample of youth aged 5–16 (Liu, 2016; Slade & Andrews, 2005). In light of these studies, MAD may have exhibited a taxonic structure in the data collected by Schmidt et al. due to features specific to the anxiety construct, or to an interaction between anxiety and depression. It is also plausible that the indicators used in their analyses were more indicative of an unidentified construct underlying both anxiety and depression. Overlapping symptomatology and shared biological mechanisms provide theoretical justification that a common feature of both anxiety and depression might categorically distinguish the combination of these disorders from normal functioning (Galyamina et al., 2017).

The only other study to date applying taxometric methods to child and adolescent anxiety disorders was conducted over a decade ago. While investigating the structure of posttraumatic stress disorder (PTSD) in a national sample of over 2800 adolescents, Broman-Fulks et al. (2009) subjected indicators representing three PTSD symptom clusters (re-experiencing, avoidance/numbing, and hypervigilance) to taxometric analysis. The results, which included CCFI scores of 0.20 and 0.23 across two non-redundant procedures, provided strong support for a dimensional model of PTSD symptomatology within the youth sample. This dimensional conceptualization of PTSD was also supported through taxometric investigations in adult samples (Ruscio et al., 2002; Forbes et al., 2005; Broman-Fulks et al., 2006). Though commonly associated with a specific traumatic event, taxometric evidence suggests that PTSD symptomatology is not categorically different from "normal" responses to extreme stressors.

Similar findings have emerged from taxometric studies of constructs implicated in the etiology and symptomology of anxiety-related concerns among children and adolescents. For example, anxiety sensitivity (AS), or the fear of anxiety-related sensations, is a known vulnerability factor for the development and maintenance of anxiety disorders. Bernstein et al. (2005, 2006a, b, 2007b) conducted a series of investigations examining the latent structure of AS in youth samples. The results of these studies were consistently interpreted as indicative of

taxonicity, and the researchers were able to replicate these findings in a sample of North American college students (Bernstein et al., 2007a). Of note, other researchers have been unable to replicate the taxonic findings of the Bernstein studies. For example, Broman-Fulks et al. (2008, 2010) conducted a series of taxometric analyses of AS across several adult samples, the results of which consistently supported a dimensional solution. Similarly, Asmundson et al. (2011) reported evidence of dimensional AS structure across undergraduate and community samples.

One potential explanation for these discrepant findings is improvements in taxometric method technology over the years. As Haslam et al. (2012) note, the vast majority of taxonic findings generated through taxometric analysis were produced prior to the introduction and adoption of the CCFI by Ruscio (2007), and nearly every taxometric study conducted since this time has found better fit for dimensional models of anxiety disorders and related constructs than categorical models (Haslam et al., 2020). All in all, reviews of taxometric findings across time suggest that there is little evidence to support the existence of categories within the vast majority of psychopathological and personality-related constructs, including child and adolescent anxiety disorders. However, other inferences made from studies of adult anxiety disorders and their risk factors may better inform hypothesis surrounding the structures of child anxiety disorders that have yet to be studied.

Taxometric Findings for Adults

Taxometric research has yielded consistent evidence for the dimensionality of adult anxiety disorders and their risk factors. We will briefly summarize the taxometric literature on adult anxiety disorders, bearing in mind the limitations that exist for our ability to draw confident conclusions from earlier works. CCFIs are reported when applicable in Table 7.1. Finally, we will discuss the applicability of these adult studies to younger populations at the end of the section.

Anxiety Disorders

Generalized Anxiety Two studies have examined the taxonomy of GAD. In the first, responses collected from 1175 treatment-seeking adults on measures of worry (PSWQ-A) and generalized anxiety (GAD-7) were analyzed using multiple taxometric procedures (Kertz et al., 2014). In the second, responses to a diagnostic interview for GAD administered at two time points to a sample of more than 2000 adults ages 25–74 were converted into seven indicators matching DSM-IV diagnostic criteria for GAD (Marcus et al., 2014). Notably, all members of this sample endorsed "excessive worry" as a prerequisite for inclusion in the study, so this variable was not represented as an indicator. In both studies, results supported dimensional models of GAD. In Kertz et al. (2014), clinical interviews administered prior to admission into the treatment program suggested that 34% of the sample met diagnostic criteria for GAD, while Marcus et al. (2014) estimated a base rate for GAD of 19.5–21.3% in their sample. However, their taxometric findings suggest that such designations may be arbitrary.

Health Anxiety Ferguson (2009) applied taxometric procedures to six indicators of health anxiety obtained from a sample of 501 working adults. Findings supported a dimensional model of health anxiety across three taxometric procedures. Notably, the sample only included adults who reported that they were not being currently treated for an illness or receiving outpatient care. These "healthy" adults may not have adequately represented the full range of health anxiety symptomatology enough for a taxon within the group to have been identified. Also, the indicators used may not have been representative of the health anxiety construct. In response to these limitations, Longley et al. (2010) continued the investigation with a sample of 1083 undergraduate adults, though participants were not excluded based on health status as they had been in Ferguson (2009). Four indicators were selected from three measures of health anxiety that had been administered to the sample and factor

Table 7.1 Taxometric findings for anxiety disorders by sample age

Construct	Study	Avg. Sample Age	Avg. CCFI	Model Supported
Mixed Anxiety Depression	Schmidt et al. (2007)	16.6	N/A	Categorical
Post-Traumatic Stress	Broman-Fulks et al. (2009)	14.6	0.22	Dimensional
Generalized Anxiety	Kertz et al. (2014)	35.0	0.32	Dimensional
	Marcus et al. (2014)	42.9	0.37	Dimensional
Health Anxiety	Ferguson (2009)	40.3	0.39	Dimensional
	Longley et al. (2010)	20.8	0.33	Dimensional
Social Anxiety	Kollman et al. (2006)	33.0	N/A	Dimensional
	Crome et al. (2010)	N/A (18+)	0.34	Dimensional
	Ruscio (2010)	42.4	0.23	Dimensional
	Boyers et al. (2017)	19.2	0.38	Dimensional
	Weeks et al. (2010)	21.3–33.6	0.66	Categorical
Agoraphobia	Slade and Grisham (2009)	33.1	0.24	Dimensional
Separation Anxiety	Silove et al. (2007)	37.0	N/A	Dimensional
Obsessive Compulsive Symptoms	Olatunji et al. (2008)	19.0	0.35	Dimensional
Worry	Ruscio et al. (2001)	18.7	N/A	Dimensional
	Olatunji et al. (2010)	20.2–33.5	0.31	Dimensional
Somatization	Thomas and Locke (2010)	43.0	0.34	Dimensional
	Jasper et al. (2012)	22.2–44.4	0.30	Dimensional
	Kliem et al. (2014)	47.8–49.3	0.38	Dimensional
Alexithymia	Parker et al. (2008)	20.0–35.5	0.32	Dimensional
	Mattila et al. (2010)	51.7	0.41	Dimensional
Fear of Pain	Asmundson et al. (2007)	39.8	N/A	Dimensional
Fear of Evaluation	Weeks et al. (2009)	19.0	0.28	Dimensional
Neuroticism	Longley et al. (2017)	20.7–62.0	0.31	Dimensional
Intolerance of Uncertainty	Carleton et al. (2012)	27.9–36.4	0.28	Dimensional
Disgust Sensitivity	Olatunji and Broman-Fulks (2007)	19.3–20.7	N/A	Dimensional
Perfectionism	Broman-Fulks et al. (2008)	18.9–19.0	0.37	Dimensional

Note: CCFI scores greater than 0.55 indicated better fit with categorical models, while scores less than 0.45 indicate better fit with dimensional models. Reported CCFI scores are averaged across all procedures and samples, when applicable. Average age of participants in each sample is reported in years and provided in ranges for studies reporting multiple samples

analyzed. Taxometric procedures using these indicators provided additional support for the dimensional latent structure of health anxiety that had been previously identified.

Social Anxiety The first taxometric study of the structure of SAD used data from a sample of 2035 adult outpatients at an anxiety treatment center (Kollman et al., 2006). Of this group, 471 met criteria for a primary diagnosis of social phobia (now classified as SAD), though nearly twice this number of outpatients within the sample scored in the upper half of a clinical severity rating for symptoms of social anxiety. Five indicators compiled from a battery of anxiety measures were chosen to represent the SAD construct in subsequent taxometric analyses. The authors reported that the taxometric plots generated from their data more closely resembled simulated graphs of dimensional structure, and fit indices supported their conclusions across three out of three procedures. Extending this research, both Crome et al. (2010) and Ruscio et al. (2010) found evidence for the dimensionality of SAD in large national samples of adults from Australia and the USA, respectively. Finally, Boyers et al. (2017) investigated whether the "performance

only" specifier for SAD represents a discrete subtype of fear categorically different from other social fears as implied in the DSM-V. From a sample of 2019 nonclinical participants, taxometric analyses of indicators for SAD and the "performance only" specifier failed to identify categorical structure in either construct.

Uniquely, Weeks et al. (2010) performed taxometric analyses on data obtained from a combined sample of community/undergraduate and clinical populations and identified a taxonic structure in SAD. This is the only taxometric study of anxiety disorders (of which we are aware) that generated non-redundant support for a categorical model of an anxiety disorder since taxometric methods were improved by Ruscio (2007). However, this finding is likely due to the nature of the combined sample used in this study. By pre-selecting hypothetical taxonic and non-taxonic groups for representation within their sample based on existing categorical diagnostic criteria, Weeks et al. (2010) may have influenced the ability of the taxometric procedure to identify true latent classes within the data. This approach artificially skews results towards distinguishing not the underlying structure of the construct of interest, but the structure of the predefined groups that are purported to represent it (Schmidt et al., 2004).

Agoraphobia Only one taxometric study of agoraphobia has been conducted with adults. Slade and Grisham (2009) analyzed agoraphobia survey data from separate samples of clinical and non-clinical adult populations and found evidence for the dimensional model of agoraphobia in both. Though unlikely, the separation of clinical and non-clinical samples in this study leaves open the possibility that agoraphobia may exhibit a dimensional bimodal structure (i.e., two categories, each with a dimensional structure). Similar to the aforementioned problem of combining pre-classified samples for taxometric analysis, this limitation can be addressed by avoiding the a priori categorization of sample constituents.

Separation Anxiety Though typically seen in early childhood, separation anxiety can be observed in both child and adult populations (Bögels et al., 2013). Taxometric studies of separation anxiety in children have yet to be published, but one study has been conducted on a sample of 870 adult outpatients at an anxiety clinical in Australia (Silove et al., 2007). Two taxometric procedures generated plots suggestive of a latent dimensional structure out of indicators derived from an adult separation anxiety scale. The 15% of the sample that was diagnosed by clinicians as having separation anxiety prior to the study was not identified in these structural analyses, suggesting that whatever diagnostic criteria were being used at the time may have been arbitrarily segregating anxiety symptoms based on their perceived domain (i.e., separation from an attachment figure). While these findings say little about the structure of anxiety more broadly, they suggest that specific manifestations of anxiety (e.g., separation anxiety, social anxiety, health anxiety, etc.) may be categorically indistinguishable from one another on the basis of domain alone.

Obsessive Compulsive Disorder Though no longer classified as an anxiety disorder in the DSM-5, obsessive-compulsive disorder (OCD) shares much of its symptomatology with anxiety disorders (Stein et al., 2010). Only one taxometric study has been conducted on OC symptoms in adults. Olatunji et al. (2008) investigated the structure of OC symptoms in a large sample of young adult undergraduates. Using two measures of OC symptoms, multiple sets of indicators were created for primary symptoms (i.e., obsessing, ordering, hoarding, perfectionism, etc.) and subjected to two taxometric procedures. Though some of the results were ambiguous, the majority suggested that OC symptoms endorsed a dimensional structure. Hoarding was the only exception to this pattern, with its indicators demonstrating an ambiguous-leaning-categorical mean CCFI of 0.54. More recent taxometric research found dimensionality in hoarding when analyzing data

from three large samples of community and young adult populations (Timpano et al., 2013). Perhaps, the deviancy observed with hoarding symptoms in Olatunji et al. (2008) was an artifact of the number of analyses that were run in that study (nine series in total) or of the indicators used. In any case, research seems to suggest that OCD, like other anxiety disorders, is best conceptualized as a dimensional construct.

Symptoms

Worry As mentioned previously, Kertz et al. (2014) found evidence supporting a dimensional structure of worry in a sample of 1175 adults seeking treatment for anxiety. Two previous studies have also looked at the structure of worry in adult populations. In one, scores from 1588 undergraduate students on two measures of worry were used to create sets of paired, unpaired, and dichotomous indicators, which were then subjected to taxometric analysis (Ruscio et al., 2001). Three sets of indicators input into two nonredundant taxometric procedures provided strong evidence for the dimensional structure of worry. More recently, Olatunji et al. (2010) replicated these findings of dimensionality in two adult samples from community and undergraduate populations.

Somatization Similar to many of the constructs that we have reviewed thus far, research suggests that somatization, the expression of psychological distress as physical concerns, is dimensionally structured. During the course of constructing a somatization scale, Thomas and Locke (2010) identified patterns of dimensionality within somatic complaints reported by a sample of adults experiencing both epileptic and nonepileptic seizures. Jasper et al. (2012) extended this line of research to undergraduate and primary care samples of German adults, using indicators derived from a measure of somatic symptom reporting in three taxometric analyses of the somatization construct. Three taxometric procedures evidenced the dimensional structure of somatization in both student samples and the primary care sample, respectively. These findings were later replicated in two additional samples of the German adult population using indicators taken from alternative measures of somatization (Kliem et al., 2014). Of note, participants in both samples of the Kleim et al. (2014) study ranged in age from 14 to 92, meaning that these findings are partially representative of the latent structure of somatization in adolescents as well as adults.

Alexithymia Alexithymia, or the inability to label or identify with emotions, is associated with anxiety in both adults and adolescents (Paniccia et al., 2017). Parker et al. (2008) compiled scores from community, undergraduate, and outpatient samples from a measure of alexithymia into three taxometric indicators. Analyses revealed that across three samples and three taxometric procedures, alexithymia was expressed dimensionally in these populations. In an attempt to generalize the findings of Parker et al. (2008), other researchers extended the taxometric analysis of alexithymia to a large sample of Finnish adults (Mattila et al., 2010). A dimensional latent structure was supported in both the total sample (n = 5194) and subsamples of men and women therein.

Fear Fear is a key characteristic of anxiety disorders, and the identification of taxonic levels of fear would significantly inform how such disorders are treated. Though taxometric studies of fear symptoms are sparse, they corroborate much of what has already been seen with regard to the latent structure of anxiety symptoms. The fear of pain was assessed in 650 treatment-seeking adult patients with a measure of pain anxiety symptoms (Asmundson et al., 2007). This measure was factorized into four item-parcel (grouped) indicators representing different aspects of pain anxiety and passed through three taxometric procedures. All three procedures yielded results that were interpreted as supporting the dimensionality of the fear of pain. Similar findings were reported for the fear of negative and positive evaluations

using a sample of 976 undergraduates (Weeks et al., 2009). These analyses used indicators that were formed from multiple measures and produced evidence supporting dimensional models of fears of both negative and positive evaluations.

Risk Factors

Neuroticism Neuroticism, or the trait-like tendency to experience negative affect, is thought to emerge in childhood and stabilize over the course of adolescence (Lamb et al., 2002), during which time it becomes predictive of the development of anxiety disorders in late adolescence (Zinbarg et al., 2016). Longley et al. (2017) conducted taxometric analyses on data collected from three different measures of neuroticism administered to three large non-clinical undergraduate and adult community samples. Indicators of neuroticism from each of these measures consistently supported dimensional models of the construct.

Intolerance of Uncertainty Carleton et al. (2012) are the only researchers to date that have examined the taxometric structure of intolerance of uncertainty (IU), a construct suggested to be a risk factor for disorders characterized by excessive future-oriented concerns (i.e., anxiety disorders, OCD). In this study, both community and clinical adult subsamples completed a measure of IU. Indicators derived from this measure produced evidence in support of the dimensional latent structure of IU.

Disgust Sensitivity Olatunji and Broman-Fulks (2007) performed taxometric analyses of scores reported by two large undergraduate samples on two measures of disgust sensitivity. All three procedures used to test the data produced plots suggestive of dimensional structure for both samples.

Perfectionism Considered to be a risk factor for a wide range of psychopathologies, perfectionism is an ideal candidate for taxometric analysis. Broman-Fulks et al. (2008) administered three measures of perfectionism to two large undergraduate samples to test for the existence of a "perfectionist" taxon within the general population. One indicator set from each of the three measures was created and subjected to four taxometric procedures. On average, results from both samples converged on dimensional models of perfectionism.

Discussion

A review of the taxometric research among adult samples appears to provide strong and consistent evidence that anxiety disorders manifest as dimensional phenomena that are arbitrarily dichotomized to create the commonly known diagnostic categories. Similarly, studies indicate that most anxiety-related vulnerability factors and symptoms of anxiety disorders that have been examined via taxometric methodology also appear to represent latent continua. Unfortunately, despite expansive evidence for the dimensionality of anxiety disorders in adult populations, relatively little taxometric research has been conducted with child and adolescent samples. Taxometric studies conducted more than a decade ago by Schmidt et al. (2007) and Broman-Fulks et al. (2009) resulted in contradictory claims regarding the latent structure of child and adolescent anxiety disorders, and the debate has been left relatively uninformed since.

Though the field of clinical psychology has largely migrated from categorical models of psychopathology to dimensional models in recent years, there are several reasons taxometric research continues to be needed to ensure that the dimensional solutions found among adult populations extend to earlier developmental stages. One such argument against the invariance of the latent structures of anxiety disorders across time

is that fear conditioned by an aversive stimulus can generalize to broader stimulus classes over time (Dunsmoor & Paz, 2015). For example, a child who develops a fear of balloons in response to an unexpected and aversive auditory stimulus may generalize this response over time to other stimuli associated with balloons (e.g., birthday parties), each eliciting fear responses of differing intensities and controlling the behavior of the child in different ways. The presentation of what could be diagnosed as a specific phobia in childhood may therefore evolve from basic physiological and behavioral responses (e.g., sympathetic arousal, crying, and avoidance) that appear categorically structured to increasingly complex and contextually controlled behavioral repertoires (e.g., rituals) that collectively exhibit a dimensional latent structure. However, this argument assumes that our capacity for fear generalization increases over the course of development. Evidence suggests the opposite is true: compared to adolescents and adults, younger children display greater rates of fear generalization because they are less capable of discriminating between danger and safety cues in the environment (Glenn et al., 2012; Schiele et al., 2016). Further research is needed to test the more general assumption of temporal invariance of the latent structures of anxiety disorders.

It is also possible that the anxiety disorder constructs being measured in youth and adult populations are separate forms of a broader class of pathology, each with independent latent structures. Testing this hypothesis would not only require a replication of extant taxometric studies on child and adolescent populations, but additional efforts to clarify how and when childhood anxiety disorders transition to (or are replaced by) their adult variants. Such an argument presupposes meaningful differences between adult and youth classes of psychopathology as well as between the putative pathological and nonpathological classes typically tested by taxometric analyses. As such, it would require additional methodological tools and techniques beyond those currently available to address.

Conclusion and Future Directions

Available taxometric evidence robustly supports dimensional models of adult anxiety disorders (Haslam et al., 2020), but comparable studies of child and adolescent populations are equivocal and lacking. It is likely that the experiences of younger populations suffering from anxiety also vary in degree, not type, but in the absence of empirical support for this claim, researchers and clinicians should be wary of the costs and benefits associated with assuming either dimensional or categorical models of anxiety disorders in these populations. Categorical models provide clinical utility by allowing clinicians and researchers to more easily discuss and label clusters of related experiences (i.e., symptoms) as disorders. By grouping together individuals with shared experiences into "clinical" and "nonclinical" groups, researchers can more conveniently and efficiently compare symptomology between groups, identify patterns in symptom development across time within groups, and track changes in group membership throughout the course of intervention trials. This sort of approach is useful to the degree that differences between putative groups are captured accurately and in concordance with the "true" nature of the construct of interest. However, when inaccurately drawn, lines dividing those with and without anxiety disorders can lead to unequal treatment availability for individuals straddling the threshold.

As our technologies and methods have advanced, we have become increasingly capable of modeling anxiety disorders dimensionally. Dimensional models preserve valuable information about the nature and presentation of anxiety-related suffering that might otherwise be lost in categorical models; whereas the continuous data associated with dimensional models can be divided into groups as needed, the reverse process is not possible for categorical data. Another benefit of dimensional models is that they tend to predict impairment attributable to emotional disorders (i.e., anxiety and depression) better than categorical models (Bjelland et al., 2009). In adults, issues like high rates of comorbidity and

low diagnostic reliability challenge the utility of the DSM's categorical diagnostic system (Kraemer, 2007). However, even though some of these criticisms of models of adult of anxiety disorders are supported by comparable evidence from child and adolescent populations (e.g., Schniering et al., 2000), it should not be assumed that the models themselves are equivalent across developmental periods. Until researchers expand the taxometric evidence base, these sorts of considerations must be considered when determining how best to assess, measure, and intervene in child and adolescent anxiety disorders.

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Dimensional Diagnosis of Anxiety in Youth

8

Dean McKay

The diagnosis of anxiety disorders in children and adolescents is associated with several problems including high comorbidity and low clinical utility of diagnostic categories. This chapter will begin by outlining the weaknesses of the current categorical diagnostic system and reviewing the history and evidence for taking a dimensional approach to the diagnosis of anxiety disorders in children and adolescents. The problem of the high comorbidity of anxiety and depression in youth will be discussed, followed by a review of several quantitative structural models which have been proposed to differentiate between the shared and specific components of anxiety and depression. Based on the research indicating that anxiety disorders are best classified as highly correlated symptom clusters comprising internalizing syndromes, approaches to assessment and diagnosis will be covered in the last section of this chapter. Tools that have been validated to measure anxiety and depression dimensionally in youth will be presented, as well as measurement of narrow traits that have been found to put children and adolescents at risk for the development of pathological anxiety. Finally, we will discuss the need to move toward a system of classification that corresponds more directly to effective interventions for anxiety disorders in youth.

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DSM-5-TR Diagnostic Categories of Anxiety Disorders

Currently, the diagnostic categories for anxiety disorders are rationally derived and approved by expert consensus in committee. That is, they are grouped together according to phenotypically similar symptoms. This is in contrast with other taxonomic models, such as the Linnaean hierarchical frameworks that define categories through conceptual signs and indicators (discussed in de Queiroz & Good, 1997). However, the tradition in psychology is to evaluate dimensionally, as evidenced by the types of measures used to assess symptom severity. There is a growing movement within psychology to classify using the hierarchical taxonomy of psychopathology (HiTOP; Ruggero et al., 2019), but this model has not yet developed sufficiently to apply in youth anxiety disorders. Therefore, there is tension between the clinically relevant practice of rating symptom severity dimensionally and assigning a categorical diagnosis.

Notably, there were only three categories of anxiety disorders in the second edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-ll;* American Psychiatric Association, 1968). There are nine categories in the current edition (*DSM-5-TR;* American Psychiatric Association, 2022). Brown et al. (1998) argued that the increasing number of anxiety diagnoses indicates that the "classification

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systems have become overly precise to the point that they are now erroneously distinguishing symptoms and disorders that actually reflect inconsequential variations of broader, underlying syndromes" (p. 179). This reflects the "splitting" movement, whereby disorders are defined in increasingly narrow domains. Accordingly, with this level of specificity, existing diagnoses can in some instances lack syndromal validity and fail to offer distinctions that allow for effective treatment planning.

Dimensional Approaches: A Brief History

Dimensional models of psychopathology have been advocated for some time now, and the arguments advanced for this approach include several important points. First, categorically based diagnosis assumes that each disorder is a discrete entity (Carson, 1991). This is generally an inaccurate view, but it is the one understood by the architects of the symptom-based DSM (Frances et al., 1991). Second, since diagnoses in the current DSM are formulated based on consensus agreement in committees and task forces, rather than based on medical and/or psychological etiology from agreed upon theoretical concepts, the diagnoses are potentially arbitrary entities whose existence is based on a posteriori reasoning (for a discussion of different taxonomic methods and models, see Blashfield et al., 2009). Third, dimensional models permeate other medical sciences, where severity and complicating factors play a prominent role in classification. These factors are critical in any taxonomy because they contribute to prediction of course and treatment outcome (again, see Blashfield, Keely, & Burgess). Finally, a guiding principle in the development of many categories in the current DSM was the degree that clinicians would be likely to accept the diagnosis and thereby utilize it in evaluating clients (Carson, 1991). This last difficulty is perhaps most problematic since it undermines the very utility of a diagnostic system by formulating diagnosis on the basis of consensus rather than syndromal validity.

Since the earlier recommendations that a dimensional approach be adopted, a growing effort to develop statistical methodologies for identifying entities that are either continuous or taxonic has emerged. This approach, referred to as taxometric analysis, has allowed for the identification of conditions that may be taxonic (i.e., composed of some discrete point whereby levels of a psychopathological indicator would suggest a unique and separate entity) or may be on a continuum of severity. Two notable examples from the anxiety disorder literature illustrate this. The first involves dissociation, which is commonly associated with trauma and acute anxiety and has been shown to be taxonic. That is, scores on a major measure of dissociation can be categorized where some individuals are considered non-dissociators (or to a very limited degree) and those scoring above that point are considered dissociators (Waller et al., 1996). On the other hand, anxiety sensitivity has been examined for taxonic status. Anxiety sensitivity refers to the degree that changes in internal bodily state are experienced as dangerous, and it is commonly present in most anxiety disorders (Taylor, 1999). Research has shown that this construct is non-taxonic, or dimensional (Broman-Fulks et al., 2010).

In the case of the major constructs used to understand anxious psychopathology, the majority are dimensional in nature. Among those that are dimensional in nature are worry (Olatunji et al., 2010), posttraumatic reactions (Ruscio et al., 2002), and obsessive-compulsive symptoms and beliefs (Haslam et al., 2005). Likewise in children, there is a high degree of dimensionality evident in anxiety disorder relevant constructs. Notably, anxiety sensitivity (Bernstein et al., 2007) and trauma (Goodman et al., 2003) both have been found to have a dimensional structure. There have been far fewer taxometric studies involving children, likely due to the large sample sizes necessary for stable estimates of effect (see Waller & Meehl, 2002, for a technical discussion of taxometric analysis).

What this suggests is that most psychological indicators involved in conceptualization and assessment of anxiety disorders have a

dimensional quality. This would rule out a categorical approach since such models eliminate a great deal of information regarding symptom severity and relevant treatment components.

The Problem of Comorbidity

From an epidemiological perspective, the current DSM system has resulted in a high probability of comorbid conditions. Brady and Kendall (1992) reported a 16% comorbidity rate in a community sample of children and adolescents that were not seeking treatment and comorbidity rates ranging from 28% to 62% in clinical samples of youth that were seeking treatment. As was discussed above concerning the problem of dimensional versus discrete categories, the problem of comorbidity rate has been addressed in the literature. For example, Mineka (1998) described "excessive diagnostic splitting" as a potential cause of comorbidity with regard to highly similar disorders (e.g., overanxious disorder and GAD in children; Caron & Rutter, 1991). Researchers have also provided excellent suggestions for handling this issue in conceptualization and treatment planning. For example, Rachman (1991) offered four recommendations for handling comorbidity, including (a) behavioral analysis of presenting symptoms, (b) assessment of subjective experience of all comorbid conditions to identify overlapping features, (c) commonalities in psychophysiological responses, and (d) semantic overlap among diagnoses.

Around this same time, it was widely recognized that depression and anxiety tend to co-occur, or exist together at sub-threshold levels, but collectively lead to serious psychological disturbance (Barlow & Campbell, 2000). This emerged due to the frequent finding that, regardless of sample, depression and anxiety tend to correlate. In the case of self-report measures, the correlation between depression anxiety is typically greater than 0.6, even after removing items that could reasonably reflect the other construct and thereby inflate the correlation (Barlow, 1991). Similar results have been observed for other methods of assessing these constructs, indicating that this is not due to common method variance.

Among youth, there is significant amount of overlap between symptoms of anxiety and depression. In particular, Brady and Kendall (1992) found that the correlation between self-report measures of anxiety and depression ranged from $r = 0.50$ to $r = 0.70$ among children and adolescents. Although this high correlation may be due in part to similar item content on self-report measures of anxiety and depression, previous research has found that there is still substantial correlation when overlapping items are removed (Stark & Laurent, 2001; Cole et al., 1997).

Generally, the net result has been to recognize that each is dimensional, rather than discrete entities, given the robustness of such a finding. Some in the psychiatry profession have called for a purely dimensional approach given that (a) depression and anxiety are commonly experienced in the general population and (b) severity is not tied to a reliable biological substrate (Goldberg, 2000). Indeed, consider that, even in the realm of behavioral genetics where the aim is to identify phenotypic signs of psychiatric disturbance, the field relies on dimensional models (Kendler, 2006). This is largely because there is recognition of the range of disturbance present in individuals suffering from psychiatric problems, and the dimensional approach permits greater reliability in findings given the increased variability and hence greater power in statistical tests (DiLalla, 2004).

Given the reliance on categorical diagnoses, and the concordant allegiance to specific levels of analyses (i.e., biomedical, psychosocial), it has been suggested that all mental health professionals exert caution in conceptualization. To ensure greater consideration for the full range of putative dimensional variables that may impinge on presenting mental health symptoms, Kendler (2012) has called for a pluralistic approach to the assessing psychiatric conditions. This means that every level of analysis be considered in understanding a case, from the biological underpinnings up through sociocultural influences.

Alternate Conceptualizations of Anxiety Disorders

Because of the high level of comorbidity, it has been suggested that a quantitative approach to diagnosis be used to uncover actual, rather than perceived, similarities among mood disorder diagnoses. Several models have been proposed in which correlated syndromes are grouped together in the same diagnostic class. These models aim to explain the shared and specific factors contributing to the etiology of anxiety and depression and serve to identify relevant treatment targets.

Negative Affect and Positive Affect Negative affect (NA) is the tendency to experience negative moods (e.g., sadness, fear, guilt, and hostility) and has been described as a stable trait. It has been proposed that NA should be considered a main vulnerability factor for the development of anxiety and depression (Clark, Watson, & Mineka, 1994). Positive affect (PA), on the other hand, has been suggested as a vulnerability factor specifically related to depression. Watson, Clark, and Tellegen (1988b) described PA as reflecting "the extent to which a person feels enthusiastic, active, and alert" (p. 1063), with low PA reflecting anhedonia. Watson & Tellegen (1985) theorized that these personality dimensions could be used to differentiate between anxiety and depression. Specifically, he hypothesized that NA is a nonspecific factor related to both anxiety and depression and that the existing symptom overlap and resulting comorbidity are due to this shared trait. Furthermore, he suggested that PA is a specific factor that could be used to distinguish between anxiety and depression because they found that PA was related (negatively) to depression diagnoses in adults, but PA was not correlated with anxiety disorders (Watson, Clark, & Carey, 1988a).

Among a non-clinical sample of elementary school-aged children, Crook et al. (1998) did not find support for this model. Rather, they found that NA was significantly related to both self-reported depression symptoms ($r = 0.66$, $p < 0.001$) and self-reported anxiety symptoms ($r = 0.68$, $p < 0.001$). They also found that PA was negatively correlated with both depression symptoms ($r = -0.50$, $p < 0.001$) and anxiety symptoms ($r = -0.34$, $p < 0.001$). Although these initial results seemed to refute the specific relationship of PA to depression symptoms, Crook and colleagues also performed hierarchical regression to examine the partial correlations of PA and NA with measures of anxiety and depression, and they found that PA had a significant negative partial correlation with depression scores when anxiety and NA scores were controlled, whereas PA was unrelated to anxiety scores when depression and NA scores were controlled.

Tripartite Model Clark and Watson (1991) expanded upon the original two-factor model of anxiety and depression by introducing another factor. They proposed the tripartite model as a means of differentiating anxiety and depression despite their high symptom overlap and diagnostic comorbidity, which posits that depression and anxiety both share the common component of NA. Depression, however, is specifically characterized by low PA, whereas anxiety is associated with high physiological hyperarousal (PH). While NA and PA have been described as stable temperaments or personality traits, PH has not. However, Watson et al. (1995a, b) have related the concept of PH to anxiety sensitivity (AS), and AS has been described in the literature as a trait that is a risk factor for the development of anxiety disorders (McNally, 1990).

Barlow et al. (1996) have also described a very similar three-factor model for conceptualizing anxiety and depression which attributes the development of these disorders to problems with three basic emotions: anxiety (or anxious apprehension), fear, and depression. Their model indicates that (a) general distress (i.e., high NA) leads to *anxiety* (anxious apprehension), (b) autonomic arousal leads to *fear/panic*, and (c) anhedonia (i.e., low PA) and hopelessness lead to *depression*. As in the tripartite model, autonomic arousal is theorized to be specific to anxiety diagnoses, while anhedonia/low PA is related only to depression. High NA/distress is hypothesized to

be a common factor to both anxiety and depression.

Although the tripartite model was developed to explain the relationship between anxiety and depression in adults, it has been shown to be relevant to children and adolescents as well. For example, in a large sample of anxious and depressed youth, Lerner et al. (1999) found factors from measures of anxiety and depression that corresponded to the models described in Clark and Watson (1991). Furthermore, in a large unselected sample ($N = 1289$) of children, similar findings were obtained using a different assessment of depression and anxiety and were replicated in a smaller second sample ($N = 300$) (Chorpita, Plummer, & Moffit, 2000). The relationship among NA, PA, and PH was further examined among inpatient children and adolescents, and support was again found for the tripartite model among youth (Joiner & Lonigan, 2000). Although many studies have supported the tripartite model, there is some evidence that the relationship among the three variables (i.e., NA, PA, and PH) may not be identical across all of the anxiety disorder diagnoses. In particular, there is evidence that predictions made using the tripartite model do not hold for youth diagnosed with social anxiety disorder.

Brown et al. (1998) examined the structural relations among NA, PA, and PH in a large sample of individuals with one of five DSM-IV diagnoses: generalized anxiety disorder (GAD), depression, panic disorder, obsessive-compulsive disorder (OCD), and social phobia. The use of structural equation modeling allowed the researchers to test the tripartite model with a dimensional approach to the DSM diagnostic categories as opposed to other approaches that would require the researchers to confirm a categorical diagnosis. Brown and colleagues found that all paths from NA to the DSM-IV disorder factors were statistically significant, which supports the notion that NA is a general dimension common to mood and anxiety disorders. The strength of the relationship varied across diagnosis, with the strongest relationships existing between NA and depression and NA and GAD. The smallest association was found between NA and social phobia. When PA was added to the structural models, there was a significant negative path from PA to depression. Notably, after creating a path from PA to depression, the modification indices suggested that a path should also be added from PA to social phobia. A significant negative path was found between PA and social phobia, and the results indicated that the fit of this model was so good that it would not be improved by adding additional paths from PA to any other latent variable (i.e., other DSM-IV anxiety diagnoses). Furthermore, the strength of the path between PA and depression (−0.29) was comparable to the strength of the path from PA to social phobia (−0.28). Finally, the addition of PH to the structural models did not improve the fit of the models. In terms of the different anxiety disorders, the strongest path from PH was found to panic disorder/agoraphobia. The paths from OCD and social phobia to PH were not significant. Notably, the path from GAD to PH was significant and negative.

Turner and Barrett (2003) found that the tripartite model was consistent across three age groups (ages 8–9, 11–12, and 14–15) suggesting that the three major components of the model are not developmentally dependent. The balance of research has generally supported the tripartite model, but much of this has involved self-report measures or assessments that do not necessary pose a strict test of the model (Anderson & Hope, 2008). However, the tripartite model has shown considerable promise in assessment of anxiety in youth, may be relatively robust across major anxiety diagnoses, and illustrates the potential clinical utility of a dimensional model of nosology.

Hierarchical Models Although there has been empirical support for the tripartite model of depression and anxiety, this structural model asserts that all anxiety diagnoses are characterized by the shared component of high autonomic arousal, which differentiates anxiety from depression. Researchers have instead proposed that a hierarchical model of anxiety disorders may be more appropriate to account for the heterogeneity of anxiety diagnoses (Brown et al., 1998; Zinbarg & Barlow, 1996). In this model, each anxiety

disorder has unique and shared components, with the shard component representing a higher-order factor of anxious apprehension (i.e., high NA). This model not only accounts for the high correlation among anxiety disorder diagnoses due to this shared component but also accounts for the high comorbidity among anxiety and depression because high NA is common to depression as well as anxiety.

Mineka, Watson, and Clark (1998) suggested a more comprehensive structural model that combines the tripartite model with the hierarchical model described above based on the fact that it is unlikely that each is equally and adequately explained by the dimension of autonomic hyperarousal as proposed by those models. Therefore, Mineka and colleagues proposed the integrative hierarchical model, which suggests that syndromes have both common and unique components. As in previous models, high NA/distress is considered to be the shared component of both anxiety disorders and depression, but anxious arousal is not viewed as broadly characteristic of all anxiety disorders. Instead, each individual anxiety disorder is presumed to have some unique component that differentiates it from all others. Anxious arousal is viewed as the specific component of panic disorder alone.

Support for this model has been found in children using structural equation modeling. In a sample of children, Spence (1997) examined four models to see which best explained the structure of self-reported anxiety symptom data (i.e., a single-factor model, a six uncorrelated factor model for each specific DSM-IV anxiety diagnosis, a six correlated factor model, and a higher-order model with six first-order factors loading onto a single second-order factor). The results indicated that the correlated six factor model with these six factors loading onto a higher second-order "anxiety" factor provided the best fit to the data. Additionally, she found the major proportion of variance in anxiety symptoms was explained by this higher-order anxiety factor, which suggests that while there are distinguishable anxiety diagnostic categories, the high comorbidity can be explained by a high correlation among the diagnoses in youth.

The integrative hierarchical model need not be confined to anxiety disorders and depression alone, but can be broadened to encompass other disorders that are characterized by high NA (Mineka et al., 1998). Krueger and Piasecki (2002) proposed the hierarchical-spectrum model, which was an attempt to capture the correlation among DSM diagnoses by clustering symptoms to comprise syndromes with these syndromes comprising broader families of disorders or spectra. The broadest categories identified are the internalizing and externalizing disorders, with the internalizing disorders being comprised of depression and the anxiety disorders. Externalizing disorders include substance dependence, antisocial behavior, and disinhibited behavior diagnoses. This model has been promising in understanding anxiety disorders (Taylor et al., 2010), but has not yet been extensively examined in youth.

Krueger (1999) analyzed data from the National Comorbidity Study (NCS) to find that a three-factor structure best accounted for the relationship among psychiatric diagnoses. The three latent factors were anxious-misery (which included major depression, dysthymia, and GAD), fear (which included panic disorder, agoraphobia, social phobia, and simple phobia), and externalizing disorders (which included alcohol dependence, drug dependence, and antisocial personality disorder). The anxious-misery and fear latent factors were highly correlated and thus were found to comprise a second-order factor of internalizing disorders, which collectively form a group of conditions that tend to co-occur in varying levels. Interestingly, while the three-factor structure was found for the total NCS sample, in a treatment-seeking sample, the lower-order latent factors of anxious-misery and fear could not be recovered. This suggests that among individuals experiencing functional impairment the individual diagnoses are even more highly correlated in a "superclass" of emotional disorders (Clark & Watson, 2006; Krueger & Markon, 2006; Watson, 2005). Since then, the HiTOP

model has been further refined, although these analyses have not yet been extended to child samples.

The presence of such a superclass of disorders provides additional weight to the need for a dimensional approach to diagnosis since the underlying phenotype of anxiety confers a higher risk for a wide range of putative psychiatric conditions. Hereditability data has borne this out, whereby no single diagnosis increases the risk for anxiety disorder in offspring. Instead, the presence of any anxiety disorder increases the risk of any anxiety disorder in offspring (Hettema et al., 2001).

Measuring Anxiety Along a Dimension in Children

In general, the procedures used to assess and diagnose anxiety in children and adults are quite similar and typically include diagnostic interviews, self-report measures, and behavioral assessment. However, it is important to consider developmental differences throughout the assessment process because due to speed of physical, emotional, and cognitive development in childhood, assessment strategies will differ according to age. For example, a multi-informant, multimethod approach is recommended to gather comprehensive information about symptoms and impairment. Thus, in addition to clinical interview, observation, and self-report, reports from parents and teachers are recommended when assessing emotional symptoms in a child, and the amount of collateral data needed from caretakers is typically inversely related to the age of the child. Furthermore, when assessing young people, it is also necessary to have knowledge of normative development so that manifestations of "normal fears" are not considered abnormal behaviors (Beidel & Turner, 2005).

The Child Behavior Checklist (CBCL; Achenbach, 1991; Achenbach et al., 2003) and Teacher Report Form (TRF; Achenbach, 1991) are the most widely used parent and teacher reports. The CBCL is a standardized assessment that asks parents to report on behaviors, problems, and competencies in children aged 4–18. The TRF is completed by teachers and is identical in content to the CBCL. The clinical scales of the CBCL and TRF are comprised of a total problems score, internalizing problems, externalizing problems, and eight syndromes (i.e., aggressive behavior, delinquent behavior, withdrawn, somatic complaints, anxious/depressed, attention problems, social problems, and thought problems). These syndrome scales were not developed to reflect DSM-IV diagnoses, but they were derived through multivariate statistical analyses to identify separate empirically validated syndromes in line with the hierarchical models described above. Specifically, with regard to anxiety, it was determined that anxiety and depression were so highly correlated they represent a singular syndrome in youth.

Although the CBCL and TRF were originally developed with this empirically based approach to identifying symptoms along a continuum, Achenbach et al. (2003) created DSM scales by asking pediatric psychologists and psychiatrists from diverse cultural backgrounds to rate how consistent CBCL/TRF items were with a specific DSM category. Achenbach et al. selected items that were reliably rated as "very consistent with the DSM category" to create the DSM scales. A six-item anxiety subscale was developed through this approach. Kendall et al. (2007) noted that these six items do not include any somatic symptoms, and this omission calls the validity of the anxiety subscale into question given that somatic symptoms are a necessary criterion for many of the DSM-IV anxiety disorder diagnoses. Thus, Kendall and colleagues derived an alternative measure of anxiety based on the CBCL/TRF items.

Kendall et al. (2007) developed an initial list of 22 items by asking experienced clinicians with a specialty in childhood anxiety disorders to select CBCL/TRF items related to the diagnosis of an anxiety disorder. Of these items, 18 achieved item-total remainder estimates above 0.40 and were retained in their anxiety scale. These researchers found that their anxiety scale significantly discriminated anxious and non-anxious children aged 9–13, and their anxiety scale better

predicted an anxiety disorder diagnosis than did the anxious/depressed and internalizing scales of the CBCL and TRF. In addition, they found that their anxiety scale was sensitive to treatment effects. Participants who received treatment demonstrated a significantly lower score after treatment, while those on the waitlist showed no significant change in score. Therefore, Kendall et al.'s (2007) anxiety subscale of the CBCL seems to be a good predictor of pathological anxiety in children and adolescents and can be used to identify gains made in treatment. However, there is some evidence that its utility may depend on the reporter. Kendall and colleagues found that when compared to the CBCL anxiety subscale developed by Achenbach et al. (2003), their anxiety scale better predicted anxiety disorder status according to mother report, while the Achenbach et al. anxiety subscale better predicted anxiety disorder status according to father report.

Another dimensional measure that may be useful for measuring factors related to anxiety is the Positive and Negative Affectivity Scale – Child version (PANAS-C; Laurent et al., 1999). The PANAS-C is a 20-item self-report measure consisting of two scales: positive affect (PA) and negative affect (NA). Respondents are asked to rate how often within the last week they have experienced 20 mood adjectives. The 10 positive mood adjectives and 10 negative mood adjectives are rated on a 5-point Likert-type scale. The scale choices are "very slightly or not at all," "a little," "moderately," "quite a bit," and "extremely." The findings suggest that the children's version of the PANAS has a similar structure as the adult counterpart. Since the development of this scale, several investigations have shown that it performs consistently across different cultural groups (Kiernan et al., 2001), in unselected elementary and high school children (Jacques & Mash, 2004), and in children with diagnosed anxiety disorders (Hughes & Kendall, 2009). This last study identified difficulties in discriminant validity for the scale, however, with higher than anticipated relations with social anxiety and depressive symptoms. In some ways, this is not surprising and reflective of the aforementioned long-standing difficulty in distinguishing anxiety from depression (see, e.g., Rapee & Barlow, 1991).

A third measure that has been developed to measure mood symptoms along a dimension is the Mood and Anxiety Symptom Questionnaire (MASQ; Watson et al. (1995a, b). The MASQ was created as a specific measure of the tripartite model described above. It is a 77-item self-report measure with three subscales: (1) General distress: depressive symptoms (12 items), anxious symptoms (11 items), and mixed symptoms (15 items), (2) anxiety-specific [anxious arousal (AA), 17 items], and (3) depression-specific [anhedonic depression (AD), 22 items]. Buckby et al. (2007) found support for the clinical use of the MASQ to differentiate between anxious and depressed adolescents and young adults. Using ROC curve analyses, these authors found that the AD scale accurately predicted the presence of a mood disorder (72.8%), and the AA scale predicted anxiety disorders (61%). Thus, it seems that the AD scale may be superior to the AA scale in predicting the presence of the particular disorder it is intended to measure. Notably, the AA scale did better at identifying the absence of an anxiety disorder (83.5%). Furthermore, Buckby et al. (2007) found that AA and AD scores were highly and significantly correlated in all participants with a current Axis I disorder ($r = 0.59$). This high correlation calls into question the assumption that these are separate constructs, which is in line with the hierarchical models which indicate that these both fall on the broader spectrum of internalizing disorders.

Narrow Traits and Risk Factors in Youth

Given that heredity studies suggest that the presence of an anxiety disorder in a biological parent predicts development of *any* anxiety disorder in offspring (Hettema et al., 2001), it is assumed that a general tendency to develop anxiety disorders (i.e., anxiety proneness) is inherited rather than a specific anxiety disorder (Turner et al., 2005). Thus, it is recommended that assessment also includes attention to these personality traits

and temperaments that have been identified as risk factors for the development of anxiety disorders.

Behavioral Inhibition Behavioral inhibition (BI) is a temperamental trait that is characterized by the tendency of children and adolescents to become uncomfortable in, and avoid, novel social situations. These youth are extremely shy and are reluctant to engage in adventurous activities or participate in unfamiliar social situations (Kagan et al., 1988). BI has consistently been found to be related to the development of anxiety disorders, particularly social anxiety disorder (Hirschfeld-Becker et al., 2006). Furthermore, BI seems to be most predictive of anxiety disorders when it is found among the children of parents with anxiety disorders (Biederman et al., 2001).

BI is typically measured using objective standardized laboratory observation protocols which involve exposing toddlers and preschoolers to unfamiliar people and situations. There are also several parent, teacher, and self-report measures of BI. For example, the Behavioral Inhibition Questionnaire (BIQ; Bishop et al., 2003) may be used to assess BI in preschool-aged children (i.e., 3–5 years old). There are both parent and teacher report forms of the BIQ. In older children and adolescents (i.e., 11–18 years old), the Behavioral Inhibition Instrument (BII; Muris et al., 1999) can be used.

Anxiety Sensitivity Anxiety sensitivity (AS) refers to a person's beliefs that his or her anxious physical symptoms will lead to aversive physical, psychological, and social consequences (Reiss, 1991; Reiss et al., 1986). In other words, AS can be understood as the likelihood for an individual to report that normal bodily changes associated with anxiety are likely to have extreme negative consequences. For example, an individual with high anxiety sensitivity is likely to believe that heart palpitations are a sign of a heart attack, whereas an individual low on anxiety sensitivity perceives heart palpitations to be nothing more than brief physical discomfort. Those with high anxiety sensitivity have been described as having the "fear of anxiety" (Reiss et al., 1988, p. 341).

AS has consistently been shown to be higher among youth with anxiety disorders as compared to those without anxiety (Hayward et al., 1997; Weems et al., 2002). This indicates that AS likely serves as a risk factor in the development and maintenance of anxiety disorders in young people. AS is measured using the Childhood Anxiety Sensitivity Index (CASI; Silverman et al., 1991).

Anxiety Control Anxiety control (AC) is a cognitive construct that is defined as a person's perceived control over his or her emotional and bodily reactions due to anxiety (e.g., internal physiological reactions) as well as his or her perceived control over external events or threats that cause anxiety (Rapee et al., 1996). Low AC has been identified as a factor that can differentiate between youth who have been referred to a clinic for anxiety treatment and controls, and AC has been shown to predict anxiety disorder status among children and adolescents when controlling for anxiety symptoms (Weems et al., 2003).

The Anxiety Control Questionnaire for Children (ACQ-C; Weems et al., 2003) may be used to measure AC. The ACQ-C measures beliefs along two dimensions: (1) Internal reactions (e.g., "I can take charge and control my feelings") and (2) external threats (e.g., "When something scares me, there is always something I can do"). In a recent study, Marin et al. (2008) found that both dimensions of AC predict anxiety symptoms in youth, but they found a different pattern for boys and girls. Specifically, in boys, low perceived control over internal reactions predicted anxiety symptoms. However, in girls, low perceived control over external threats predicted anxiety symptoms.

Diathesis-Stress Model The presence of any one of these identified risk factors alone is likely not sufficient to lead to the development of an anxiety disorder. In other words, even if a child is anxiety-prone, a disorder's onset will probably be triggered by the interaction of the biological

predisposition with environmental/psychological factors (e.g., parenting factors) as described in the diathesis-stress model. In fact, there is evidence that some of these inherited vulnerability factors may be mitigated by environmental factors. For example, BI, which has been identified as a relatively stable temperamental trait, has been shown to be reduced among young children if parents are instructed in the risks associated with overprotective parenting and how to intentionally expose their child to novel social situations (Rapee et al., 2005). There is ample empirical support for the usefulness of measuring these narrow traits as part of dimensional diagnosis of anxiety disorders in youth. Because many of these traits are currently measured via self-report, Turner et al. (2005) recommended that physiological reactivity can be used as a measure of anxiety proneness that is not dependent on subjective report.

Correspondence to Treatment Models Rather Than Diagnostic Categories

A shift in diagnostic classification from a categorical to dimensional conceptualization can lead to a fuller understanding of the components that underlie anxiety and mood problems. The current DSM-IV criteria focus on the differential diagnosis of anxiety problems at the risk of neglecting aspects relevant to the amelioration of these anxiety problems. However, a dimensional model, which supports an understanding of mood disorders as highly related disorders residing together in a broader spectrum and consisting of common and unique components, can be used to hone in on relevant aspects of the disturbance in therapeutic interventions. Specifically, cognitive behavioral treatments have been shown to be effective treatments for anxiety disorders in children and adolescents (e.g., Kendall, 1994), and the adoption of a dimensional model may ensure that all relevant cognitive aspects are addressed in treatment even though they may not be narrow (i.e., unique) symptoms associated with a particular diagnosis. For example, treatment of social anxiety disorder without attention to the identified correlate of low positive affect may not be as effective, but this relationship that has been shown empirically is not reflected in the diagnostic criteria. Similarly, Marin et al. (2008) found that different aspects of anxiety control were useful for predicting anxiety disorders for boys and girls, which suggests that cognitive behavioral interventions may have separate targets for the different genders. As the literature covered in this chapter amply illustrates, there are many advantages that can be conferred on treatment of children with anxiety disorders by relying on dimensional perspectives. Further research into quantitatively derived models for the dimensional diagnosis of anxiety in youth promises to inform and improve our treatment of these disorders by highlighting the relevant personality traits, cognitive factors, and emotional and behavioral responses that will lead to increased functioning. This can also provide a rich understanding of what dimensions may potentially form distinct categories at the extreme boundaries based on empirically based evaluations. In contrast to the large and diverse number of diagnoses that currently exist, it appears that there are in fact numerous dimensions but few distinct binary categories. Refinement of dimensional models would permit better treatment decisions based on severity level and on the rarer categorical psychiatric conditions.

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9 Transdiagnostic Treatment Models for Child and Adolescent Anxiety Disorders

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Following from the initial publication of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM; American Psychiatric Association [APA], 1952), mental health conditions were historically conceptualized as distinct and separable diagnostic categories. These categories each have specific criteria to classify individual disorders, in part to ease communication about such concerns and to provide a reliable means by which to assess change in specific diagnostic criteria related to particular disorders over time (Barlow et al., 2004). Following the development of the DSM-III (APA, 1980), the ability to reliably classify change in anxiety and other disorders was associated with a paradigm shift in clinical psychology, during which several, relatively brief, often cognitive-behavioral interventions were developed to ameliorate these now reliably, if narrowly, defined concerns, particularly with regard to internalizing disorders (Pearl & Norton, 2017). However, this "disorder-specific" approach to treatment development is arguably poorly suited to youth samples, and childhood anxiety disorders, in particular.

In the case of anxiety disorders in children and adolescents, comorbidity rates (i.e., the co-occurrence of multiple mental health disorders) are high (Mohammadi et al., 2020), diagnoses frequently emerge and change during youth development (Garber & Weersing, 2010), diagnostic reliability may be lower than in adults (Norton & Paulus, 2017), and symptom presentations across disorders may appear quite similar (Leyfer et al., 2013). A growing body of research on common mechanisms in youth anxiety and depressive disorders (e.g., high negative affect, intolerance of uncertainty, etc.) has subsequently guided the development and empirical testing of more transdiagnostic or multidiagnostic evidence-based therapies to treat children and adolescents with co-occurring anxiety disorders and other related emotional disorders (e.g., depressive, externalizing, eating). The need for transdiagnostic interventions is bolstered by their flexible treatment structure, which allows for

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easier adaptation to variability in case presentation (Ehrenreich-May & Chu, 2013) and potentially speeds dissemination efforts (McHugh et al., 2009).

Comorbidities

The criteria for most anxiety disorders is characterized by similar features, including persistent fear or anxiety in a number of domains (or a more singular one, as in the case of panic disorder or a specific phobia), behavioral responses to such fears or anxiety (e.g., avoidance, escape behaviors) that temporarily suppress distress related to a trigger(s), and significant functional impairment associated with these emotions and resulting behaviors (American Psychological Association, 2013). Youth presenting with anxiety symptoms may meet full or partial criteria for a number of DSM-V diagnoses simultaneously (Beesdo et al., 2009), and differentiation between such often requires detailed and time-consuming clinical interviews that may be further hampered by difficulty obtaining youth self-reports, ambiguous diagnostic thresholds, or discrepant reports across informants (Beesdo et al., 2009).

Pediatric mental health disorders are highly prevalent and co-occur at high rates in children and adolescents (Kendall et al., 2010; Mohammadi et al., 2020). A meta-analysis conducted between 1985 and 2012 examining youth mental health disorders across 27 countries found the worldwide prevalence rate of clinically significant anxiety disorders in youth was 6.5% (Polanczyk et al., 2015). Separation anxiety disorder is commonly implicated as one of the earliest appearing anxiety disorders in youth and is estimated to have a prevalence of 5.3% in youth ages 6–18, though prevalence rates are higher in children ages 6–9 (Mohammadi et al., 2020). Mohammadi et al. (2020) found that 16% and 19.3% of youth who met criteria for separation anxiety disorder later met criteria for generalized anxiety disorder and social anxiety disorder, respectively, although previous studies have found even higher rates (Spence et al., 2018). Such data has supported the hypothesis that the presence of an anxiety disorder increases the risk of having or developing another anxiety disorder later in childhood (Bittner et al., 2007; Garber & Weersing, 2010). These sequential and concurrent comorbidity patterns may also be driven by crosscutting processes that contribute to the development of anxiety disorders (e.g., poor cognitive reappraisal of threat, greater parental accommodation behaviors, etc. (La Buissonnière-Ariza et al., 2018)).

The co-occurrence patterns of anxiety and depression and youth are also important for intervention given the high prevalence of these concerns (Garber & Weersing, 2010; Leyfer et al., 2013; Schleider et al., 2014) and the possibility of anxiety's stability or even worsening trajectory over time (Cummings et al., 2014). For example, it appears likely that child anxiety is associated with onset of depression symptoms (Schleider et al., 2014). Three pathways have been identified to explain the temporal relationships between anxiety and depressive disorder symptomatology. Across development, anxiety may lead to depression, anxiety and depression may co-occur, or depression results in anxiety (Cummings et al., 2014). For example, youth with anxiety concerns may be overwhelmed by their ruminative thoughts and may withdraw or avoid triggering situations, leading to decreased peer interaction, decreased self-esteem, and depressive symptoms (Garber & Weersing, 2010). As compared to single-disorder diagnoses (e.g., anxiety or depression alone), comorbid anxiety and depression are associated with more functional impairment, more frequent suicide attempts, increased service utilization, sleep disturbances, and additional comorbidities such as substance use disorders and conduct problems (Gallerani et al., 2010; Sarchiapone, 2013; Schleider et al., 2014).

Anxiety disorders in youth may also present with a wealth of other comorbidities, such as obsessive-compulsive disorders (OCD), attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), or eating disorder. Research suggests that generalized anxiety disorder (GAD) and OCD are "near-neighbor" disorders with similar presentations (e.g., repetitive and distressing cognitions related to an anticipated

event), shared mechanisms (e.g., intolerance of uncertainty), and common etiological pathways (Comer et al., 2004). Youth with ADHD and a comorbid internalizing or externalizing disorder experience greater difficulties with social functioning or academic performance, compared to youth with ADHD alone (Booster et al., 2012), and youth with behavioral problems such as ODD or conduct disorder have an increased risk of experiencing anxiety or depression (Ollendick et al., 2008). Many similar personality characteristics have been implicated in anxiety and anorexia nervosa, such as rigidity, perfectionism, and avoidance of perceived harm, potentially explaining comorbidities and the causal mechanisms between these two disorders (Hildebrandt et al., 2012).

Evidence from a range of fields suggests that the development and maintenance of pediatric mental health disorders are due to the presence and interaction of genetic and neurobiological factors (Weems et al., 2005), cognitive and behavioral factors (e.g., neuroticism/negative affect (Beesdo et al., 2009)), and environmental factors such as stressful life events and parenting behaviors (Beesdo et al., 2009). Because of the similar etiologies and shared constructs of anxiety and other related disorders, transdiagnostic treatments for youth anxiety that possess the ability to pivot or adapt to near-neighbor disorders and presentations (e.g., depression or irritability) may be a simple and efficient solution to these challenges.

Evidence for Transdiagnostic Mechanisms

The efficacy of transdiagnostic treatments in ameliorating diverse symptom clusters is posited to be the result of successfully targeting higher-order factors in treatment (Chu, 2012) and thus improving cognitive and behavioral patterns that maintain related clusters of psychopathology. An increasing body of research has focused on identifying and understanding underlying mechanisms associated with the development and maintenance of emotional disorders, including anxiety disorders (Chu & Harrison, 2007), such that treatments can be better personalized and adapted to target mechanisms that are particularly dominant in each individual youths' presentation via specific intervention elements (Nolen-Hoeksema & Watkins, 2011).

Transdiagnostic features or mechanisms may be described as the "tendency to adopt particular styles of responding to situations, such as a pessimistic attributional style, emotion regulation tendencies like chronic suppression, or personality characteristics such as neuroticism or negative affectivity" (Nolen-Hoeksema & Watkins, 2011, p. 594). One possible mechanism in anxiety is neuroticism, a broad, higher-order trait that predisposes an individual to experience increased overall negative affect. According to Barlow et al. (2014), individuals with higher levels of neuroticism experience greater levels of distress in response to internal and external cues and therefore tend to perceive the world as an unsafe place, leading them to feel incapable of coping with their stress (Barlow et al., 2014; Simons & Gaher, 2005; Tull & Gratz, 2008). Over time, these individuals develop lower self-efficacy to manage their strong emotions and have difficulty foreseeing positive outcomes (Sauer-Zavala et al., 2020). Individuals with higher neuroticism then learn to utilize behavioral strategies to prevent or deescalate the experience of strong distressing emotions, such as avoidance and cognitive suppression (Sherman & Ehrenreich-May, 2020).

Neuroticism has been implicated in the development of a range of psychopathologies in youth (Norton & Paulus, 2017) and is associated with other transdiagnostic mechanisms, such as distress tolerance (Tonarely et al., 2020b), psychological inflexibility, and emotion dysregulation (Norton & Paulus, 2017). Although neuroticism and other related mechanisms can be methodologically difficult to study in youth due to the internal nature of the construct and differences in observable facets of neuroticism in developing youth compared to adults (e.g., irritability versus sadness or anxiety in young children (Brandes et al., 2019)), aspects of neuroticism have been reliably measured in children as young as 3 years

old (Tackett, 2006) and in large samples of diverse youth (Brandes et al., 2019). These findings suggest that general, trait negative affectivity may account for the majority of the overlaps among common emotional problems and that neuroticism and its facets are immanent throughout the various spectra of psychopathology (e.g., internalizing, thought disorder, disinhibited or antagonistic externalizing, etc. (Brandes et al., 2019; Kotov et al., 2017)).

Distress tolerance, or the ability to tolerate uncomfortable states (Zvolensky et al., 2010), has received a great deal of attention in the transdiagnostic literature (Wolitzky-Taylor et al., 2015). Tonarely and Ehrenreich-May (2019) recently validated a self-report measure of distress tolerance (DT) in samples of clinical and nonclinical youth (Tonarely & Ehrenreich-May, 2019). Behavioral measures of DT in youth may effectively measure DT (Tonarely et al., 2020a); however, findings suggest that youth's perception of their ability to handle distressing emotions may differ from their actual persistence on behavioral tasks that incite frustration (Tonarely et al., 2020a). Similar to distress tolerance, intolerance of uncertainty (IUC) has also been shown to be transdiagnostic in youth with anxiety disorders. IUC has been measured with the adapted Intolerance of Uncertainty Index-A for Children (Rifkin & Kendall, 2020) and the Intolerance of Uncertainty Scale for Children (IUSC (Comer et al., 2009)). IUSC scores have been shown to predict overall anxiety severity, regardless of diagnostic category (Read et al., 2013). Evidence shows that IUC is a transdiagnostic feature that is associated with anxiety severity, rather than GAD specifically (Cowie et al., 2018; Hearn et al., 2017; McEvoy et al., 2019; Rifkin & Kendall, 2020).

Anxiety sensitivity (AS), the fear of anxiety-related sensations, has been empirically supported as a transdiagnostic feature seen across youth anxiety disorders (Noël & Francis, 2011; Wauthia et al., 2019). Fear of physiological anxiety-related sensations, such as physical feelings (e.g., racing heart) and observable symptoms (e.g., blushing), in the absence of a danger or threat, leads one to search for a source of their experience, reinforcing a cognitive bias, and to take some action to decrease the intensity of their experience (Silverman et al., 1991) negatively reinforcing efforts to suppress or avoid the experience. AS has been reliably measured using the Child Anxiety Sensitivity Index (CASI) (Silverman et al., 1991) in both clinical and nonclinical children and adolescents ages 7–17 years old (Chorpita & Daleiden, 2000). Behavioral studies of AS in youth show that the CASI can also predict state anxiety and changes in fear responses to a challenge task (MacIntyre, 2001; Rabian et al., 1999). In youth, AS prospectively predicts anxiety disorders (Schmidt et al., 2010). There is some evidence that DT and AS together form a higher order construct of affect intolerance (Bernstein et al., 2009; Keough et al., 2010); however, more research is needed to clarify the validity of these hierarchical relationships in children and adolescents and their relationships to specific anxiety symptomatology (Shaw et al., 2021).

Other features of emotion regulation have also been studied as transdiagnostic features. Understanding and/or labeling of affective states (Kranzler et al., 2016), dysregulated expression of sadness and anger, and ruminative responses to distress have been implicated as transdiagnostic factors that predict anxiety and other emotional disorder symptoms (e.g., aggressive behavior, eating pathology (McLaughlin et al., 2011)). Rumination, which can be thought of as an anxiety-related behavior and/or as cognitive avoidance (Jacobson et al., 2001), has also been identified as an important transdiagnostic feature in anxiety and other internalizing disorders (Klemanski et al., 2017). Studies of rumination show that this cognitive action may partially explain the co-occurrence of internalizing symptoms and other emotionally driven behaviors (e.g., aggressive behavior) and that rumination is related to executive function patterns seen in internalizing disorders, supporting the transdiagnostic nature of this thinking pattern (Chu et al., 2016; McLaughlin et al., 2014; Snyder et al., 2019; Verstraeten et al., 2011).

There are also transdiagnostic features that can be categorized as cognitive deficits or biases in information processing (e.g., attentional biases, working memory deficits) that have been identified and validated in children and adoles-

cents with anxiety, other internalizing disorders, and externalizing disorders (Schweizer et al., 2020). Cognitive vulnerabilities can include dysfunctional attitudes (Abela & Sullivan, 2003), negative inferential style (Hankin & Abramson, 2002; Lakdawalla et al., 2007), and self-criticism (Abela & Taylor, 2003). Attentional bias toward threatening information, threat appraisal, memory, and learning biases all appear to confer risk for child anxiety disorders (Muris & Field, 2008; Rheingold et al., 2003; Schmidtendorf et al., 2018). Interpretation bias can be reliably assessed using an ambiguous vignette paradigm (Fliek et al., 2019), which utilizes a series of descriptions of everyday situations and asks children to score the perceived level or threat or indicate how they would respond if they encountered them (Bell-Dolan, 1995; Bögels & Zigterman, 2000; Cannon & Weems, 2010; Muris et al., 2009; Waters & Craske, 2016). Confirmation bias, or the tendency to selectively search for information that coincides with one's views while ignoring disconfirming information (Muris et al., 2014), can also be reliably measured via a task assessment. Children are asked to select additional, positive, or negative information about a novel, which potentially includes threatening stimulus or situation (Dibbets et al., 2015; Muris et al., 2009; Remmerswaal et al., 2014). The tendency to pay more attention to threatening or dangerous stimuli (i.e., attention bias), perceive situations as being more threatening or dangerous than they actually are (i.e., interpretation bias), and selectively recall memories similar to the causes of anxiety (i.e., memory bias) further biases the interpretation of ambiguous situations and has all been supported as transdiagnostic processes in youth with different anxiety disorders and comorbid depressive disorders (Hankin et al., 2010; Salum et al., 2013; Waters & Craske, 2016).

Transdiagnostic Conceptualization of Child Anxiety

A transdiagnostic conceptualization of pediatric anxiety disorders accounts for the behavioral tendencies or cognitions commonly seen across individual anxiety disorders. For example, a child with comorbid panic disorder and specific phobia of vomiting may perceive somatic/physical feelings or body sensations more generally as threatening, further explaining elevated comorbidity rates between the two diagnoses (Leyfer et al., 2013). Without treatment that targets heightened anxiety sensitivity and avoidance, this cycle of avoidance and maladaptive behaviors might continue into adolescence and adulthood. When avoidance behaviors continue across development, negative emotion and fears can continue to intensify, worsen, and/or generalize to other related domains or situations.

Forms of avoidance, or behaviors that result in an individual not engaging in or retreating from a fear-evoking or distressing situation (Chu et al., 2016), are characterized by their negative reinforcement function and are a main target of most evidence-based cognitive-behavioral interventions for anxiety. Avoidant behaviors can be thought of as maladaptive emotion regulation attempts, as they are often engaged in out of attempts to decrease the intensity or avoid the experience of strong emotions. The use of avoidant behaviors, including types of experiential or situational avoidance, not only alleviates anxiety, but it also further reduces opportunities for positive reinforcement and safety or inhibitory learning (Ferster, 1973; Jacobson et al., 2001; McGuire & Storch, 2019). Avoidant behaviors can be measured by self-report and parent report measures and are related to other forms of avoidance in youth with various anxiety disorders (Whiteside et al., 2013).

Avoidance can occur either behaviorally (e.g., fleeing, procrastination) or cognitively (e.g., worrying, distracting) and can also include the use of safety behaviors (e.g., hunching or shrinking postures), objects (e.g., carrying water or benzodiazepine in case of a panic attack), or people (e.g., only attending a birthday party with a close friend). These behaviors may also include aggression and irritability or behaviors that other caregivers do to accommodate child anxiety. From a behavioral perspective, regardless of the specific diagnostic domain, behaviors that decrease the intensity of strong emotions (e.g., safety behaviors, reassur-

ance seeking, overt avoidance) temporarily decrease distress, fear, or anxiety caused by a presenting stimulus or perceived threat, thereby negatively reinforcing maladaptive behavioral patterns (Krypotos et al., 2015). For example, escaping from a classroom or avoiding school may cause momentary relief, but the child becomes conditioned to avoid feared or unpleasant stimuli (Blakey & Abramowitz, 2016), whether it be a performance, an exam in school, or the sensation of his/her heart racing. This can also reinforce a child's low self-efficacy or belief in his/her ability to cope with a feared situation or trigger. Familial accommodation in the context of pediatric anxiety disorders occurs when caregivers or other family members modify their own behaviors to conform to and reduce their youth's distress surrounding a feared stimulus (Thompson-Hollands et al., 2014). Family accommodation has also been identified as a maintaining factor of youth anxiety that may even intensify or worsen symptoms across time (La Buissonnière-Ariza et al., 2018). Anxious youth may also attempt to cope with the intensity of their emotions through excessive reassurance seeking, which also reinforces a child's anxious symptoms (Varela et al., 2009).

These symptoms, related behaviors, and their associated distress cause clinically significant functional impairment in a range of settings, including in the home, school, and other social settings (Beesdo et al., 2009). Transdiagnostic interventions seek to identify these cycles of avoidance and target the mechanisms that are contributing the intensity and intolerability of these emotional states. To note, in all clinical conceptualizations and treatment approaches, it is also important to distinguish normative versus clinically impairing avoidance and distress in children.

Transdiagnostic Interventions

Support for transdiagnostic approaches to anxiety may be gleaned from research with adults, evidence for shared mechanisms of youth anxiety and related emotional disorders, and the challenges in diagnosing mental health disorders in settings without detailed or formal diagnostic assessment (Beesdo et al., 2009). Transdiagnostic interventions may be inclusive of differing theoretical approaches to treatment, including acceptance and commitment therapy (ACT), dialectical behavioral therapy (DBT), and cognitive-behavioral therapies (CBT). Transdiagnostic approaches often possess unique advantages in treating a range of emotional disorders beyond anxiety alone (Dalgleish et al., 2020), may have increased feasibility, and could alleviate burdens in training, dissemination, and implementation (Ehrenreich-May & Chu, 2013). It is known that evidence-based treatment (EBT) fidelity impacts treatment outcomes, but the flexibility of some transdiagnostic interventions also allows for increased adherence to an intervention under challenging treatment conditions, while also maintaining a manualized approach (Ehrenreich-May & Chu, 2013; McHugh et al., 2009).

Both the Coping Cat (Kendall, 2006) and the Modular Approach to Therapy for Children with Anxiety, Depression, Trauma, or Conduct Problems (MATCH-ADTC) (Chorpita & Weisz, 2009) may be conceptualized as both evidence-based and multidiagnostic treatments that can be applied to individual anxiety presentations and, particularly for MATCH-ADTC, may serve as an efficient and targeted option to treat closely related disorders (Chorpita et al., 2017; Podell et al., 2010). The Coping Cat (Kendall, 2006) was designed to simultaneously target a range of youth anxiety disorders (GAD, social phobia, separation anxiety disorder), and options for flexible delivery and adaptations of the intervention are available (Beidas et al., 2010). In a randomized controlled trial, Weisz and colleagues found that MATCH-ADTC showed better outcomes than treatment as usual or another evidence-based treatment in a sample of treating treatment-seeking youth in a community (Weisz et al., 2012) and used an algorithm-based treatment model to allow clinicians to easily pivot between anxiety symptoms and other problem areas, as needed.

The primary *transdiagnostic* approach to anxiety and related disorders is the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders in Children and Adolescents (UP-C/A)

(Ehrenreich-May et al., 2017). Developed simultaneously with the adult Unified Protocol (UP) (Barlow et al., 2017), the UP-C/A are transdiagnostic manuals for children and adolescents, respectively, with emotional disorders. The UP-C/A broadly employ cognitive-behavioral therapy (CBT) techniques, with an emphasis on behavioral principles of change. CBT and mindfulness strategies are integrated into a modular approach to treatment in the UP-C/A that includes both parent-directed and child-focused materials, which can be adapted to fit the needs of an individual client or to be delivered in a group setting. The UP-C/A utilize the Top Problems, an idiographic weekly progress monitoring (Weisz et al., 2011) to track changes in nondisorder-specific "emotional behaviors" (e.g., avoidance, reassurance seeking, angry behaviors). Skills are introduced and then adapted such that they can target a range of emotional behaviors related to the clinical presentation. For example, to increase emotion regulation and improve distress tolerance, the UP-C/A employ emotional awareness and interoceptive exposures, as well as "opposite action" skills used to foster a personalized behavioral activation or exposure plan that can be adapted to fit the needs of the child. Further, mindfulness skills such as present moment awareness and nonjudgmental awareness are aimed at decreasing mechanisms such as rumination and repetitive negative thinking, constructs commonly seen in youth with a range of anxiety and related disorders.

Overall, investigations into the efficacy of the UP-C/A in a range of settings have shown significant success in treating youth with a broad range of mental health concerns. In an open trial utilizing the UP-C in a group setting, by both child and caregiver reports, children experienced a significant reduction in anxiety symptoms across disorders diagnosed at baseline (e.g., GAD and social anxiety, GAD and separation anxiety disorder (Ehrenreich-May & Bilek, 2012)). Further research on the efficacy of the UP-C in targeting anxiety disorders indicates reduction in child-rated anxiety from pretreatment to post-treatment; however, social anxiety symptoms specifically predicted poorer response to the intervention (Kennedy et al., 2018). When compared to an anxiety-focused intervention, the UP-C was as efficacious in reducing anxiety symptoms as the anxiety-focused treatment and indicated longer-term remission in symptoms (Kennedy et al., 2018). Further investigations have shown the efficacy of the UP-C/A in reducing obsessive-compulsive symptoms, depression, and serious mental illnesses (e.g., bipolar disorder, psychosis, schizophrenia), though additional research on long-term outcomes is warranted on the ways in which applications and adaptations of the UP-C and UP-A may be most efficacious. In an open trial of youth who were treated with the UP-C and UP-A (n = 170), obsessive-compulsive symptoms significantly decreased throughout the course of treatment, by both parent and child self-reports (Shaw et al., 2020). Preliminary data has also shown that the UP-A is effective in targeting adolescents at high risk for serious mental illnesses, such as psychosis risk or unspecified bipolar disorder (Weintraub et al., 2020). Applications for the UP are also being explored to treat borderline personality disorder, eating disorders, nonsuicidal self-injurious behaviors, and severe pediatric irritability (Bentley, 2017; Hawks et al., 2020; Lopez et al., 2015). See Table 9.1 for an overview of the extent efficacy literature on the UP-C/A.

Other EBTs, such as ACT and DBT, also aim to target transdiagnostic features and have been shown to address a range of symptom clusters in youth (Swain et al., 2015). When compared to CBT and a waitlist-controlled condition in youth with primary or comorbid anxiety disorder diagnoses, ACT showed similar outcomes to CBT in significantly reducing youth anxiety by child and parent reports (Hancock et al., 2018). Research also suggests that DBT for adolescents (DBT-A) can be utilized to treat both internalizing and externalizing symptomologies in youth (Fleischhaker et al., 2011; Nelson-Gray et al., 2006), in addition to the borderline features for which it was originally developed. In adults, some results have also shown that DBT skills (e.g., mindfulness, psychological flexibility) have led to reduction in anxiety symptoms more specifically (Webb et al., 2016).

Table 9.1 Notable studies supporting the efficacy of the UP, UP-A, and UP-C

Citation	Design	Treatment	Outcome
Barlow et al. (2017) and Eustis et al. (2020)	RCT	UP vs. single-disorder treatment	Participants who received the UP showed equal improvements in symptomology to those who received a single-disorder treatment at post-treatment and at a 12-month follow-up. Participants in the UP condition were also more likely to complete treatment.
Bilek and Ehrenreich-May (2012)	Open trial	UP-C	Children and caregivers reported significant reductions in anxiety and depressive symptoms from pre- to post-treatment.
Kennedy, Ehrenreich-May, and Bilek (2018)	RCT	UP-C vs. anxiety-focused CBT	All youth showed significant declines in anxiety symptoms and the groups did not significantly differ in their improvements at post-treatment. At follow-up, those in the UP-C condition showed greater long-term symptom remission than those who received anxiety-focused CBT.
Ehrenreich-May et al. (2017) and Queen, Barlow, and Ehrenreich-May (2014)	Waitlist-controlled RCT	UP-A vs. waitlist	Adolescents treated with the UP-A showed greater improvements in anxiety, depressive, and global severity at post-treatment and 6-month follow-up than adolescents in the waitlist condition.
Ehrenreich, Goldstein, Wright, and Barlow (2009), Sherman and Ehrenreich-May (2020) and Trosper, Buzzella, Bennett, and Ehrenreich (2009)	Multiple baseline and open trial	UP-A	Adolescents with clinical emotional disorders showed significant improvement in symptoms from pre- to post-treatment.
Shaw et al. (2020)	Open trial	UP-C and UP-A	Obsessive-compulsive symptoms (OCS) significantly decreased from pre- to post-treatment.
García-Escalera et al. (2020)	Randomized waitlist-controlled trial	UP-A	Youth who received an adaptation of the UP-A for school-based preventative intervention showed effective reported reductions in anxiety and depression symptoms at post-treatment and a later follow-up.
Kennedy et al. (2021)		UPC-SC	A piloted stepped-care version of the UP-C (UPC-SC) showed improvements in a range of emotional disorder symptoms in youth.

Researchers globally are disseminating transdiagnostic interventions in brief formats that could be widely implemented to large samples of youth in a range of settings (Martin et al., 2018). For example, an ongoing school-based randomized controlled trial (RCT) in New Delhi, India, was designed to target adolescents who are reporting any elevated or persistent mental health difficulties and their associated distress or impairing effects using the basics of the MATCH-ADTC framework as a starting point for adaptation (Michelson et al., 2020; Parikh et al., 2019). Single-session interventions (SSIs) are also increasing in use as they offer an accessible, low burden, and efficient method to treating large samples of youth populations displaying a range of co-occurring disorders and symptom variabilities, including anxiety and depression (Ehrenreich-May & Chu, 2013; Schleider & Weisz, 2018). These nonintensive interventions show promise in robustly improving youth anxiety and depression immediately following the session and 9 months later (Schleider & Weisz, 2018). The UP-A has also been adapted for preventative intervention and implemented in school settings, with youth reporting significant declines in both depression and anxiety from pre- to post-treatment (García-Escalera et al., 2020).

FRIENDS, a universal, school-based preventative intervention for Australian youth displaying elevated anxiety and depressive symptoms, has also shown effective outcomes for adolescents at long-term follow-ups (Barrett et al., 2006). Preliminary outcomes for stepped care models of cognitive-behavioral interventions have shown positive outcomes for anxiety and depressive symptoms in youth (Kennedy et al., 2021; Rapee et al., 2017; Salloum et al., 2016).

Conclusion

In the development of pediatric anxiety disorders and across diagnostic categories, "common elements" are often seen among youth presenting with anxiety disorders, such as anxiety sensitivity, distress intolerance, cognitive inflexibility, and so on. Researchers have continued to probe these common elements and identify transdiagnostic mechanisms of change that may predict treatment outcomes in youth anxiety disorders and further explain elevated comorbidity rates across anxiety disorders. By targeting these mechanisms using a standardized, evidence-based treatment approach, impairing anxiety concerns and conditions that often co-occur with anxiety may be treated more effectively than utilizing a diagnosis-specific intervention. Youth presenting with anxiety disorders may also be impaired across a number of domains, warranting the rapid dissemination and implementation of effective intervention strategies to reach a broader range of children and adolescents with anxiety concerns.

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Part II

10 Differential Diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) in Child and Adolescent Anxiety

Alasdair Vance, Jo Winther, and Elham Shoorcheh

Anxiety disorders and attention deficit hyperactivity disorder (ADHD) are both common conditions in children and adolescents. Furthermore, there is a known greater-than-chance association between them, which is evident in epidemiological and clinical studies (Anderson et al., 1987; Jensen et al., 2001; Pliszka, 2019). This chapter explores how ADHD affects the diagnosis, clinical presentation, assessment and treatment of anxiety disorders and emerging mechanisms to deepen our understanding of these effects. There is a particular emphasis on key differential diagnoses to consider in a comprehensive approach to assessment and composing more specific and targeted treatment plans for young people with anxiety disorders and comorbid ADHD.

ADHD and the Diagnosis of Anxiety Disorders

ADHD is categorised in the neurodevelopmental disorder group and characterised by developmentally inappropriate levels of inattention and/or impulsiveness-overactivity (American Psychiatric Association, 2013). There are three main presentations of ADHD, ADHD-combined presentation (ADHD-CT), ADHD-hyperactive-impulsive presentation (ADHD-HI) and ADHD-inattentive presentation (ADHD-IA) (American Psychiatric Association, 2013). A patient must present with more than six symptoms of inattention and less than six symptoms of hyperactivity-impulsiveness to meet the threshold criteria for ADHD-IA, more than six symptoms of hyperactivity-impulsiveness and less than six symptoms of inattention to meet the threshold criteria for ADHD-HI and more than six symptoms of inattention and hyperactivity-impulsiveness to meet the threshold criteria for ADHD-CT. If the patient is 17 years and older, then the threshold is reduced to 5 symptoms. Further criteria stipulate that the symptoms must have been present and caused some clinically significant impairment before the child was 12 years of age, and the impairment must be present in 2 or more settings over the preceding 6 months. The diagnosis of ADHD is made only if the symptoms are not better accounted for by any other disorders such as a psychotic disorder, mood disorder, personality change disorder due to a medical condition and/or any substance-related disorder.

Similarly, a number of different anxiety disorders are recognised in the current *Diagnostic and Statistical Manual for Mental Disorders* (DSM) nosology (American Psychiatric Association, 2013). Importantly, like the three ADHD

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subtypes, they share a number of clinical, aetiological risk factors and treatment response features in common. However, there are also key differences: for example, generalised anxiety disorder (GAD), separation anxiety disorder (SAD), social anxiety disorder (SoAD) and specific phobia (SpPh) form a coherent group of anxiety disorders that are closely aligned (Fonesca & Perrin, 2001; Vance, 2005). In contrast, obsessive compulsive disorder (OCD), a former anxiety disorder now categorised with ADHD in the neurodevelopmental disorder group, has a distinctive clinical presentation, set of aetiological risk factors and psychological and/or medication treatment responses (Fonesca & Perrin, 2001). This essential heterogeneity in both ADHD and anxiety disorders presents a significant hurdle for the clinician and the researcher to overcome, for instance, the sheer number of possible ADHD subtype and anxiety disorder combinations to be considered and the potential additive risk or ameliorating effect of given different combinations of ADHD and anxiety disorders (Fonesca & Perrin, 2001; Vance, 2005). For example, children with ADHD and anxiety may be less likely to develop comorbid oppositional defiant disorder (ODD) or conduct disorder (CD) symptoms (Bilgic et al., 2013) while those with panic disorder (PD) may be more likely to develop comorbid major depressive disorder (MDD) with or without persistent depressive disorder (PDD) (Bittner et al., 2004). Nevertheless, while much research is yet to be done to elucidate these complexities, there have been significant gains in theoretical understanding, clinical knowledge and treatment approaches over the past decade (D'Agati et al., 2019).

Epidemiological studies suggest point prevalence rates from 2% to 24% for anxiety disorders, defined in various ways, categorically and/or dimensionally, and from 1% to 17% for ADHD, again variably defined, categorically and/or dimensionally (Tannock, 2009). Categorical diagnostic rates are almost always lower than those that are questionnaire-derived. GAD, SpPh, SAD and SoAD are the four most common anxiety disorders, while PD is less common, particularly prepuberty. In epidemiological samples, ADHD-IA is the most common subtype of ADHD followed by ADHD-CT, while ADHD-CT predominates in clinical samples (Biederman et al., 1991a; Taylor et al., 1986). This is broadly consistent with increased rates of ODD associated with ADHD-CT compared to ADHD-IA (Cantwell & Baker, 1992), for ODD is a common reason for a child's or adolescent's referral to mental health services (Loeber et al., 2000). Of course, there are other factors that also affect this difference; these are beyond the scope of this chapter. Approximately, 30–40% of patients with ADHD will have comorbid anxiety disorder(s) (Biederman et al., 1996), while 15–30% of those with anxiety disorders are noted to have ADHD (Last et al., 1991). Twenty-five to thirty-three percent is a consistent average range from clinical and epidemiological samples (Pliszka, 2019), confirming the greater-than-chance association of anxiety disorders with ADHD. Interestingly, child, adolescent and recently adult samples confirm the enduring association between anxiety disorders and ADHD across key developmental stages (Schatz & Rostain, 2006). Also, this association is evident across different social groups, cultures and nations (Buyn et al., 2006). Further, gender does not moderate the association between anxiety disorders and ADHD in children, adolescents or adults (Biederman et al., 1991b).

Early studies noted the robust association between anxiety disorders and ADHD-IA compared to ADHD-CT (Lahey et al., 1988; Stanford & Hynd, 1994). In contrast, studies using clinical samples have failed to demonstrate any differences between these two ADHD subtypes (Willcutt et al., 1999; Wolraich et al., 1996). Indeed, it appears that ADHD-IA and ADHD-CT, the two most common subtypes of ADHD in epidemiological and clinical samples, do not differ in their greater-than-chance association with anxiety disorders or in the specific types of anxiety disorders with which they are comorbid. Interestingly, parent- and child-reported anxiety disorders have similarities and differences from childhood into adolescence, although their underlying nature is congruent (Vance, 2005).

Cantwell et al. (1992) noted that increased rates of SAD were reported with ADHD-CT (DSM-III equivalent) compared to

ADHD-IA. Our group has reported point prevalence rates of 20–40% child-self-reported anxiety disorders in medication naïve children with ADHD-CT (Vance et al., 1999). We have also noted the weak correlation between parent- and child-reported anxiety disorders and the decrease in child-reported anxiety disorders over time, while there is no change in parent-reported anxiety disorders (Vance et al., 2002). Furthermore, we have reported that the child self-report of SAD was the only parent- or child-self-reported anxiety disorder to be significantly increased in the anxiety disorders and ADHD-CT compared to the anxiety disorders alone group (Vance, 2005). This suggests an additive or multiplicative effect between SAD and ADHD-CT that requires further investigation using epidemiological data with larger numbers, particularly in the anxiety disorders alone group. These divergent parent- and child-reported findings are consistent with studies that have shown that only approximately 50% of children with self-reported anxiety have been noted to also be reported with anxiety by their parents (Pliszka, 1992) and that the parent and child report may have different origins: the parent report of their given child's anxiety disorder(s) may represent their child's 'negative affectivity and associated behavioural problems' rather than 'neurotic anxiety suffered by children with anxiety disorders alone' (March et al., 2000). This is consistent with Pliszka's (2019) assertion that the presence of comorbid ODD/CD may explain this difference in parent and child reports of anxiety in ADHD. Moreover, significant clinical correlates, such as levels of self-confidence and impairments in activities of daily living, may be associated with the child anxiety self-report alone (Tannock, 1994).

Anxiety disorders and ADHD can persist or actually worsen from childhood into adolescence (Barkley et al., 1996) and are associated with greater symptom severity and worse levels of impairment (Bowen et al., 2008). Furthermore, additional comorbid conditions may preexist, for example, autistic spectrum disorder (ASD) (Gordon-Lipkin et al., 2018), or develop, such as sleep problems (Beriault et al., 2018; D'Agati et al., 2019), ODD/CD and/or depressive disorders (Biederman et al., 2006; Bowen et al., 2008; Melegari et al., 2018). These conditions invariably confer additional functional impairment in one or more academic, social, home or occupational domains. In particular, impaired social functioning manifest via worse social skills and increased social problems has been outlined in young people with ADHD and anxiety (Bowen et al., 2008; Bishop et al., 2019). However, developmental stage, ADHD subtype, gender and additional comorbidities are crucial determinants affecting social functioning (Bishop et al., 2019). Hechtman et al. (2016) reported that young adults followed up from the Multimodal Treatment Study of Children with ADHD (MTA) study with emotional outcomes that included ADHD and anxiety, where ADHD symptoms were desistent, had a functional outcome no different from the local normative comparison group.

Developmental stage is also crucial for understanding the potential risk or protective effects that ADHD and anxiety may exert: worse working memory (WM) deficits during adolescence and worse sleep difficulties in adulthood but better inhibitory function in childhood (D'Agati et al., 2019). Similarly, Bilgic et al. (2013) have reported that anxiety sensitivity may decrease conduct disorder symptoms in childhood and adolescence, and Winther et al. (2020) have outlined that ADHD and GAD in childhood are prospectively linked with lower rates of ODD in adolescence. Recently, Shoorcheh et al. (2018) reported that spatial WM, especially its strategy component involved in planning, organising and prioritising information held in WM, were better in young people with ADHD (all three presentations) and anxiety compared to ADHD alone at follow-up. They completed a 3-year longitudinal study of prepubertal children with ADHD (all presentations), successfully treated with stimulant medication using a standardised regimen, then followed up 3 years later postpuberty. The ADHD with/without anxiety groups did not differ with respect to their medication status (medication used, dose received, duration medication treatment, responder status). The two groups did not differ on any confounding factors (e.g. age, gender, full-scale IQ, social adversity status) that

may explain this cognitive difference. Importantly, ADHD subtype may be linked with differential cognitive benefits for spatial WM (Ferrin & Vance, 2014): ADHD-CT and anxiety/depressive symptoms may be associated with a better strategy performance, while ADHD-IA and anxiety/depressive symptoms may be linked to better cognitive spatial span. Interestingly, Gomez et al. (2014) outlined that worse verbal and spatial WM performance was associated with increased depressive disorders (MDD and/or PDD), implying that anxiety alone may be the factor conferring a WM benefit.

The exact nature of comorbid anxiety disorders with ADHD remains unclear. Current possibilities include (1) the ADHD (usually ADHD-IA) symptoms being secondary to the primary anxiety disorder (e.g. DSM-IV GAD), (2) the anxiety disorders arising from a maladjustment of the patient to a primary ADHD (usually ADHD-CT), (3) both disorders arising from common biological and/or psychosocial antecedent risk factors and (4) the association between both disorders arising from their separate association with a third disorder such as ODD, CD or depressive disorders such as persistent depressive disorder (PDD) and/or major depressive disorder (MDD).

A number of lines of evidence are emerging to support options (3) and (4). The former is supported by accumulating evidence examining underlying cognitive risk factors: ADHD and anxiety are associated with decreased processing speed, increased reaction times, increased response inhibition and worse WM performance in children and adolescents (Mayes et al., 2009; Bloemsma et al., 2013; Jarrett et al., 2016). Moreover, Van der Meer et al. (2018) reported that adolescents and young adults with ADHD and anxiety manifest decreased neural activity when performing a spatial WM task in brain regions subserving information gating (cerebellum, striatum and thalamus). In contrast, other studies investigating ADHD and anxiety in children, adolescents and young adults have found no WM differences, primarily due to methodological differences in sample phenomenological definition and how WM is assessed (Adamo et al., 2019; Villemonteix et al., 2017; Yurtbasi et al., 2018). Vance et al. (2013) noted that there was no evidence of an additive effect of ADHD-CT and anxiety on impaired spatial WM, strategy and span performance in children and adolescents with ADHD-CT. However, anxiety disorders alone were associated with impaired spatial WM and cognitive spatial span performance compared to healthy control participants. In contrast, strategy did not differ between children and adolescents with anxiety disorders alone and healthy control participants, suggesting that with anxiety cognitive span is the most affected component. Further, these findings were age-independent.

At the phenomenological level, option (4) is supported by the greater-than-chance association of ODD with ADHD-CT, depressive disorders and anxiety disorders as a replicated finding (Angold et al., 1999). Maughan et al. (2004) have also noted previous epidemiological studies that have reported this association and confirmed it using data from their own epidemiological study. Within the ADHD-CT literature, the greater-than-chance association of ADHD-CT with ODD, depressive disorders and anxiety disorders has also been noted (Lahey et al., 2000; Vance et al., 2005). Vance et al. (2005) found that the relationship between anxiety disorder symptoms and ODD symptoms is mediated by the relationships between ADHD-CT symptoms, PDD symptoms and ODD symptoms. This finding extends Angold et al.'s (1999) reported association of conduct disorder with anxiety disorders via each disorder's link with depressive disorders by specifically demonstrating the association between ODD and PDD symptoms within a primary school-age ADHD-CT sample.

A second line of evidence supporting option (4) involves underlying biological risk factors. We examined the association of neurodevelopmental deficits (NDD) with anxiety disorders, ADHD-CT and PDD in primary school-age children (Vance et al., 2006). The ADHD-CT and PDD groups had significantly increased total neurological subtle signs compared to the anxiety disorder group and the healthy control group. The anxiety disorder group also had significantly increased neurological subtle signs compared to the healthy control group. The findings replicated

earlier work by Taylor et al. (1991) and are consistent with results reported by Piek et al. (1999). Shaffer et al.'s (1985) findings were extended through demonstrating that (1) within the rubric of 'affective diagnoses', PDD rather than anxiety disorders may better explain the reported association between 'emotional' disturbance and neurological 'soft signs' and (2) 'emotional *and* behavioural disturbances' are associated with neurological subtle signs, as the strength of the association with neurological subtle signs does not significantly differ between PDD and ADHD-CT, compared to healthy children, although the magnitude of the difference for ADHD-CT was large and for PDD was moderate compared to primary school-age children with anxiety disorders.

A third line of evidence supporting option (4) involves underlying cognitive risk factors. We extended our investigation of biological risk factors associated with each condition by examining the association of anxiety disorders and ADHD and separately PDD and ADHD on a robust cognitive neuroscience construct, spatial WM. Of particular interest is whether comorbid anxiety disorder differs from comorbid PDD in its effects on SWM performance and the putative prefrontal cortical neural networks known to subserve this measure. The extant literature suggests that comorbid anxiety disorder should have an independent impairing effect on SWM (Tannock et al., 1995; Vance et al., 2013), as does PDD (Franklin et al., 2010), separate from MDD. A total of 125 children (aged 7–12 years) were identified using the DSM-IV: ADHD-CT alone (N = 25), ADHD-CT and anxiety disorder(s) (N = 25), anxiety disorder(s) alone (N = 25), ADHD-CT and PDD (DSM-IV equivalent) (N = 25) and PDD alone (N = 25). Anxiety disorders were defined as DSM-IV GAD, SAD, social phobia (DSM-V equivalent SoAD) and SpPh (American Psychiatric Association, 1994), diagnosed through a semi-structured clinical interview with the child's parent(s) (Silverman & Albano, 1996) and by the parent and/or child report of the total anxiety scores being greater than 1.5 standard deviations above the mean for a given child's age and gender (Achenbach & Edelbrock, 1983; Reynolds & Richmond, 1985). A similar categorical and dimensional approach was used to define ADHD-CT and separately PDD. The children were all stimulant, anxiolytic and antidepressant medication naïve. All groups were matched for age, gender, verbal/ performance/full-scale IQ, spelling, arithmetic and social adversity. Children with ADHD-CT had worse SWM, an ability to generate strategy and spatial span than anxiety disorder, whether comorbid 'anxiety' was present or not. Further, the children with ADHD-CT and anxiety disorder, whether comorbid or not, performed the SWM task in the same way. As age increased, SWM ability improved in all groups, although ADHD-CT had a worse SWM performance, whether anxiety disorder was present or not. In contrast, children with ADHD-CT and PDD were indistinguishable on their SWM performance and differed in their approach to completing the SWM task: the ADHD-CT group relied on spatial span and strategy while the PDD group depended on strategy alone. As age increased, SWM ability improved in all groups, which remained unable to be differentiated. Gomez et al. (2014) similarly found that as verbal and spatial WM increased in ADHD young people, there was an increase in depressive disorders, not anxiety.

In summary, current lines of evidence suggest that comorbid anxiety disorders with ADHD may arise from common biological and/or cognitive risk factors. Furthermore, their association may also arise from their separate association with a third disorder such as a depressive disorder. Of course, there may be a myriad of additional biological and psychosocial risk factors and further mediating third disorders yet to be characterised. Such factors and disorders may affect the children's response to medication and/or psychological treatments offered.

ADHD and the Clinical Presentation of Anxiety Disorders

Children with anxiety disorders and comorbid ADHD manifest features of both disorders in a variety of situations – mainly the home environment, the school classroom and the peer social interactions. It remains unclear whether the features of anxiety disorders and/or ADHD are affected by the presence of the other. The Multimodal Treatment Study of Children with ADHD (MTA) (Jensen et al., 2001; Newcorn et al., 2001) data implied that inattention rather than hyperactivity-impulsiveness characterised children with 'anxiety' and ADHD and that this group had lower teacher-rated impulsiveness than children with ADHD and ODD/CD. However, subsequent observation of these children did not discern significant differences in their inattention, motor overactivity and/or impulsiveness in the school environment (Abikoff et al., 2002). Earlier studies were similarly inconclusive (Pliszka, 1992; Livingstone et al., 1990), and currently, there are no compelling explanations for these inconclusive results. Core anxiety disorder symptoms and separately ADHD symptoms can be better in some individuals while worse in others with additional comorbid ODD and/or CD symptoms. ADHD and anxiety disorders may be similar to each other in presentation via observation. Also, it may be harder to identify anxiety disorders in the presence of core ADHD symptoms because of a clinician bias to focus preferentially on the latter. Certainly, different contexts affect the manifestations of both types of disorder. This is particularly pertinent for the anxiety disorders.

Generalised anxiety disorder, SpPh, SAD and SoAD are the most frequent anxiety disorders comorbid with ADHD. Children's worries about how well they are performing compared to their peers, how accurate they are, how quick they are, checking for errors and repeated requests for reassurance are common, although the worries will vary depending on the child's situation and context. Specific fears of the dark, particular strangers or dogs may occasionally motivate avoidance behaviours that can be repetitively impulsive. Fears about moving from a low-threat, easily managed environment, such as the home living room, to perceived higher-threat environments where there are many more novel cues and competing stimuli to manage and prioritise are a particularly important form of anxiety. As noted above, such separation anxiety is especially comorbid with ADHD-CT and may indeed worsen with age and the degree of defiance (Cantwell & Baker, 1992; Vance, 2005). Furthermore, they may become a main driver for school refusal behaviour as can social anxiety, especially the fear of being critically appraised by peers and/or teachers and found wanting. This type of anxiety is especially crippling from late childhood into adolescence when peer group interactions become normative for young people, aside from their family of origin. Together, these forms of anxiety are associated with children being more tentative about engaging with new situations, novel tasks, taking appropriate risks to facilitate their learning and trying new things repeatedly in order to consolidate their skills base.

Less commonly, these children may have severe and frequent tantrums associated with severe mood lability and marked defiance that can predispose them to developing early-onset depressive disorders such as DD and/or MDD (Fonesca & Perrin, 2001). The exact mechanisms for these outbursts can be hard to uncover clinically without careful interview of multiple informants and occasionally direct observation over a number of days in an inpatient setting. Similarly, panic attacks are relatively rare prepuberty and tend to occur in older children and adolescents once their cognitive capacities are sufficiently well developed. The younger the child with panic attacks, the more likely the presence of a depressive disorder (Fonesca & Perrin, 2001).

Acute stress disorder and post-traumatic stress disorder are also relatively rare prepuberty. However, there has been considerable debate in the health and welfare literature about the possibly different phenomenology and clinical presentation of these disorders in younger patients. Nevertheless, both anxiety disorders and ADHD are known to worsen in the context of traumatic

life events, particularly when repeated and/or of chronic duration.

Perhaps one of the most challenging clinical decisions is separating anxiety symptoms from inattentive symptoms as the main driver for a given child's presentation. Moreover, there are children who manifest both equally. Usually on careful history, taking the child with a primary anxiety disorder will self-report a number of key anxiety symptoms that complete the impairing pattern of symptoms of one or more of the anxiety disorders above. ADHD inattentive symptoms, with and without hyperactive-impulsive symptoms, may be present but will be less frequent, less severe and clearly linked to worsening anxiety symptoms and better as they abate. In contrast, the converse is true for a child manifesting primary ADHD (parent and teacher report) with secondary, more fragmentary self-reported anxiety symptoms. However, when both are equally present, there is similar frequency, severity and timing of onset of both.

ADHD and the Assessment of Anxiety Disorders

When taking the history, there are a number of key factors to identify that increase the risk of anxiety disorders and ADHD, separately: these include for ADHD, a positive family history of first-degree relatives with ADHD (Biederman et al., 1990), maternal smoking during their child's pregnancy (Linnet et al., 2003), perinatal complications (e.g. birth hypoxia) (Ben Amor et al., 2005) and a vulnerable temperament with high levels of motor activity, inattention and distractibility (Sheese et al., 2007). Similarly, for anxiety disorders, a positive family history of first-degree relatives with anxiety disorders, shyness and behavioural inhibition in infancy increased frequency of adverse life events across developmental life stages and social adversity (e.g. multiple parental relationship breakdowns) (Leech et al., 2006; Phillips et al., 2005). Such factors form nonspecific risks for ADHD and anxiety disorders, amongst other internalising and externalising disorders.

In addition, there are three more specific factors that may be particularly important to identify in children with anxiety disorders and comorbid ADHD: First, it is known that children with ADHD and anxiety disorders have first-degree relatives with substantially increased rates of anxiety disorders although they have similar levels of ADHD compared to children with ADHD alone (Biederman et al., 1991a). Importantly, anxiety disorders and ADHD appear to be transmitted independently in families (Braaten et al., 2003). This suggests that the familial risk of anxiety disorders is separate from that of ADHD. This adds more weight to models that predict that anxiety disorders and ADHD are not directly related but rather are associated through the presence of biological and/or psychosocial risk factor(s) and/or disorder(s) that they have in common. Second, maternal anxiety, overprotectiveness and the lack of positive parenting are associated with anxiety disorders comorbid with ADHD (Pfiffner & McBurnett, 2006). These interpersonal factors emphasise the environmental contribution to the onset and progression of anxiety disorders. Furthermore, they suggest key targets for the effective treatment of anxiety disorders. Third, antenatal maternal stress, especially 'anxiety', is associated with increased rates of core ADHD-CT symptoms, ODD symptoms, CD symptoms, aggression, anxiety and depressive disorder symptoms and more difficult temperament during infancy (Huizink et al., 2004; O'Connor et al., 2003; Van den Bergh et al., 2005a). Indeed, it has been estimated that the risk of anxiety disorders comorbid with ADHD doubles if maternal anxiety levels are in the top 15% (Van den Bergh et al., 2005b).

The key risk gestational phase appears to be from 12 to 22 weeks during the pregnancy (Van den Bergh & Marcoen, 2004): a time of peak neuronal migration, proliferation and differentiation (Nowakowski & Hayes, 2002). This would necessarily contribute to aberrant prefrontal cortical, basal ganglia, medial temporal lobe and parietal lobe neural network formation. These anomalous neural networks are known to subserve working memory, response inhibition, mood and arousal regulation difficulties

associated with both anxiety disorders (lesser extent) and ADHD (greater extent) (Vance et al., 2006, 2007). Possible mechanisms by which antenatal maternal anxiety may contribute to such neural network dysfunction include (1) vulnerability gene by environment interaction, (2) enhanced maternal hypothalamic-pituitary-adrenal (HPA) axis function (hypercortisolaemia) leading to alterations in the foetal HPA axis that influences the developing foetal brain and (3) alterations in foetal blood flow affecting circulation in the developing foetal brain (Sjostrom et al., 2002; Talge et al., 2007). Regardless of these possible mechanisms, this increased antenatal maternal anxiety along with paternal anxiety and parenting style is an important target for psychological and/or medication intervention.

Examination of the child with comorbid anxiety disorders and ADHD should involve assessment of cognition. There is emerging evidence that children with comorbid 'anxiety' and ADHD are impaired in their performance of cognitive tasks that require progressively more short-term memory and working memory (Tannock et al., 1995). It remains unclear which specific anxiety disorders may be associated with this impairment and whether there are other types of 'anxiety' that enhance performance. In contrast, tasks that are focussed on reaction time with minimal working memory demands are usually performed better by this comorbid group (Pliszka, 1992). This pattern of results may be due to a modicum of increased anxiety leading to an increased allocation of working memory processing resources and alternative strategies within working memory that are overwhelmed by tasks requiring large working memory reserves (Eysenck et al., 2007). Levy (2004) articulated a succinct neurophysiological model to explain such findings: altered tonic/phasic dopaminergic firing in mesolimbic systems drives core ADHD symptoms while impaired prefrontal cortical and hippocampal gating of amygdala-linked fear 'anxiety' activity at the level of the nucleus accumbens drives 'anxiety'. Both these theories help explain the academic underachievement and social difficulties these children experience that exacerbates their low self-esteem and 'giving up' attitude. Both academic literacy and numeracy tasks and the interpersonal cues involved in making and keeping friends require considerable working memory processing and strategising resources. These resources may be habitually, continually and progressively more overwhelmed as these children move from one developmental stage to the next. Further, these theoretical models suggest clear medication and/or psychological treatments that may aid children with comorbid anxiety disorders and ADHD.

ADHD and the Treatment of Anxiety Disorders

There are a variety of psychological and/or medication treatment options available for children with comorbid anxiety disorders and ADHD that have been shown to be effective. These include cognitive-behavioural therapy (CBT) and medication options (Jensen et al., 2002; Pliszka, 2011; Houghton et al., 2017; Silverman & Berman, 2001). CBT includes response prevention, mood and arousal regulation, social skills training and desensitisation techniques, parent management training and educational school-based interventions. To date, key issues remain such as whether ADHD affects the response of children with anxiety disorders to CBT with or without selective serotonin reuptake inhibitors (SSRIs), whether anxiety disorders affect the response of children with ADHD to stimulant medication, whether ADHD medication treatment also helps anxiety disorders, whether the psychological and/or medication treatment of anxiety disorders helps ADHD and whether an optimal treatment algorithm can be formulated for the treatment of anxiety disorders comorbid with ADHD. In this section, each of these key issues is addressed.

There is an inconsistent literature that notes the variable effect of ADHD and its treatment on the response of children with anxiety disorders to CBT (Pliszka, 2019). In addition, this same variable effect of ADHD and its treatment has been reported in children with anxiety disorders treated with SSRI medication (Faraone, 2018). At present, it remains unclear how comorbid

ADHD is exerting this variable treatment effect. Possible mechanisms include the increased difficulty of children with ADHD developing insight into their situation in life; inhibiting their responses; planning, organising and prioritising their thoughts and actions; regulating their feelings and mood; and controlling their level of anxiety and/or aggression. In addition, children with ADHD tend to have a greater severity of associated anxiety disorder symptoms. Interestingly, Bloch et al. (2017) noted that stimulant medication may decrease state anxiety in adults with ADHD and anxiety, along with improving their core ADHD symptoms. Future systematic investigation of these potential pathways is needed.

A number of early studies suggested that children with ADHD and comorbid anxiety disorders had an attenuated response to stimulant medication and experienced more adverse effects, particularly autonomic adverse effects such as stomach ache, headache, nausea, dysphoria and irritability (Buitelaar et al., 1995; Pliszka, 1989; Taylor et al., 1987). However, recent controlled investigations have suggested that core ADHD symptoms improve regardless of the presence of anxiety disorders and that approximately 20% of patients have significantly improved 'anxiety' symptoms (Abikoff et al., 2005; Diamond et al., 1999). The MTA (Jensen et al., 2001; The MTG Cooperative Group, 1999) study data revealed that the ADHD and 'anxiety' group responded to the psychological intervention alone arm, while the ADHD alone and ADHD and comorbid ODD/CD groups did not. They also required a lower dose of stimulant medication and optimally responded to both stimulant medication and psychological treatment together. Interestingly, the comorbid ADHD and 'anxiety' and ODD/CD group required combined medication and psychological treatment, while medication alone was sufficient for the ADHD alone and ADHD and ODD/CD groups. Adverse effects were not increased in this comorbid anxiety disorders and ADHD group.

The response of cognitive deficits associated with ADHD to stimulant medication when anxiety disorders are evident remains unclear. These cognitive deficits, such as impaired working memory, are important because they contribute to educational underachievement as well as social skills difficulties, particularly the separate processes of making and keeping friends (Gathercole & Alloway, 2006). Future systematic examination of this issue is needed, particularly parsing out specific anxiety disorders on their own versus being associated with an additional comorbid disorder such as a depressive disorder [MDD, PDD] that has an independent separate effect on these cognitive functions (Vance, 2005, 2007). In fact, it is crucial to not 'miss' anxiety disorders associated with an early-onset depressive disorder such as PDD and/or MDD comorbid with ADHD: such a depressive disorder may affect the patient's response to the medication and/or psychological treatment provided (Vance, 2007). For example, there is evidence that the presence of a depressive disorder can be associated with an attenuated response of core ADHD symptoms to stimulant medication through increased prefrontal cortical neural network dysfunction (Faraone, 2018; Vance, 2007). Similarly, there is evidence that increased depressive disorder symptoms can decrease the responsiveness to CBT, whether ADHD is comorbid or not (Ewbank et al., 2020).

Atomoxetine, a selective noradrenaline reuptake inhibitor, may be helpful for decreasing ADHD, anxiety and depressive symptoms, when these conditions occur together (Stock et al., 2001). However, more controlled trials focussed on again separating anxiety disorders from comorbid DD and/or MDD are needed (Vance, 2007). In contrast, there is ample evidence supporting the effectiveness of selective serotonin reuptake inhibitors (SSRIs) for a range of anxiety and depressive disorders (Geller et al., 2007). Interestingly, to date, there is not compelling evidence that the SSRIs in association with stimulant medication improve comorbid anxiety symptoms while the core ADHD symptoms are improved by stimulant medication, regardless (Abikoff et al., 2005). Similarly, a recent trial of SSRIs and atomoxetine in this comorbid group revealed that core ADHD symptoms alone improved (Kratochvil et al., 2005). There are no controlled trials of other key third-line

medications for ADHD such as clonidine, imipramine or risperidone. However, there are published case reports (Huffman & Stern, 2007) combined with clinical experience that allow some further pertinent observations: Clonidine, a central noradrenergic agonist that decreases the functional level of activity of the noradrenaline system, has been shown to decrease the core symptoms of ADHD. There may be a subset of children with anxiety disorders comorbid with ADHD that also gain benefit for their anxiety symptoms because of this reduced noradrenaline drive. Imipramine is remarkably similar to atomoxetine in its pharmacodynamic and pharmacokinetic effects, apart from its potential cardiotoxic (conduction anomaly) adverse effects that atomoxetine does not share but clonidine does. Imipramine has known benefits for anxiety and depressive disorder symptoms along with core ADHD symptoms. However, because of potential cardiotoxic effects, imipramine and clonidine should only be used by specialist psychopharmacology units and practitioners after a thorough assessment that includes a cardiac history and examination and an electrocardiogram prior to using these medications (Vance, 2008). Risperidone, an atypical neuroleptic medication with particular dopamine (D2) and serotonin (5HT2) receptor blockade effects, helps reduce anxiety and depressive symptoms and core ADHD symptoms, particularly in low dose for children with autistic spectrum disorders and/or intellectual disability. Again, because of its potential motor adverse effects, especially tardive dyskinesia, risperidone should only be used by specialist psychopharmacology units and practitioners (Vance, 2008).

Chapter Summary

There are a number of assessment and treatment points that emerge from this overview of comorbid ADHD and childhood anxiety disorders: Early recognition of the comorbid state is crucial for many parents, teachers and children, themselves, who do not understand that they may have anxiety disorders in addition to ADHD and that both disorders need specific, targeted treatment. Multi-informant reports are imperative because parents and teachers are better at identifying externalising problems such as ADHD while children are best at revealing anxiety and depressive problems that are affecting their lives at home, in the school classroom and in the school playground. Detailed symptom patterns of different anxiety disorders are needed, especially as the clinical research fields begin to work out which anxiety disorders confer risk and which anxiety disorders may be helpful for comorbid ADHD symptom domains and associated cognitive deficits such as working memory. Also, possible third disorders, like PDD and/or MDD, exerting an effect on the relationship of anxiety disorders with ADHD need to be carefully and systematically uncovered and treated if children's response to treatment is to be optimised. Structured clinical interviews and parent, teacher and child questionnaires can be very helpful and efficient ways of obtaining this information. Details of family history, particularly of anxiety disorders in first-degree relatives, maternal antenatal stress and family overprotectiveness and the lack of positive parenting practices are especially relevant for comorbid anxiety disorders and ADHD. Finally, overt signs of physiological anxiety need to be noted such as motor tension, restlessness, autonomic arousal (including dilated pupils, sweating and fine peripheral tremor), variations in speech volume and rate, emotional inflection and abnormal involuntary movements (including tics, mannerisms and stereotypies).

The first treatment issue is to ensure parent's, child's and teacher's awareness of the comorbid state and to emphasise that both anxiety disorders and ADHD need specific and targeted treatment, monitoring of treatment outcomes and clear ongoing prioritisation of psychological and/or medication treatments depending on the child's and family's response. A range of psychological treatments and/or medication treatments are available, and the possible options should be discussed with each child and his/her parents, using a benefit/adverse effect/crisis plan/review plan treatment planning model. The effects of treatment will vary from the home environment to the

school classroom and playground for both anxiety disorders and ADHD. Finally, the current literature suggests that specific, single psychological and medication interventions should be trialled first and evaluated in each patient before combining treatments. This is crucial to avoid potential adverse effects being augmented when benefits remain modest. As the clinical research field matures, these potential psychological and medication treatment combinations will be continually refined to ensure their optimal synergism. So maximal developmental and functional outcomes for these children will be facilitated and achieved.

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11 Comorbid and Secondary Depression in Child and Adolescent Anxiety

Robert W. Garvey, Michelle K. Hiner, Chris A. Kelly, and Margaret S. Andover

A high rate of comorbidity between anxiety and depressive disorders has been demonstrated in children, adolescent, and adult populations. Among adults and youth with a primary depressive disorder, comorbidity with anxiety is as high as 75% (e.g., Lamers et al., 2011; Sørensen et al., 2005), and among those with primary anxiety disorders, comorbidity with depression is 81% greater than expected by chance (e.g., Kovacs & Devlin, 1998; Lamers et al., 2011). These rates have been reported in both community and clinical samples of youth (e.g., Costello et al., 2003; Sørensen et al., 2005). Moreover, studies may underreport due to a presumption of diagnostic stability within and between depressive and anxiety disorders (e.g., Oquendo et al., 2004; Scholten et al., 2016). In this chapter, we discuss issues pertinent to the understanding of comorbid anxiety and depression among children and adolescents.

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Comorbidity Among Specific Anxiety Disorders

Although high rates of comorbidity between depressive and anxiety disorders have been well documented, comorbidity varies in rate and presentation across individual anxiety disorders. Among patients with a primary anxiety disorder, comorbidity of depressive disorders is greatest with generalized anxiety disorder (GAD) and social anxiety disorder (SAD) and lowest with separation anxiety disorder and agoraphobia (e.g., Lamers et al., 2011; Verduin & Kendall, 2003). Increasing evidence regarding variation in the presentation and outcomes across individual anxiety disorders has led to a distinction between anxiety disorders related to the emotion of fear (i.e., panic or phobia) and those related to the emotion of anxiety (i.e., GAD; Krueger & Markon, 2006), including the associations between fear- and anxiety-related disorders and familial major depressive disorder (MDD). Warner et al. (2008) found that fear-related disorders, but not anxiety-related disorders, mediated the association between parental MDD and child MDD. Nonfamilial MDD, however, is associated with both fear- and anxiety-related disorders. These results support the distinction between fear- and anxiety-related disorders in some children and suggest that treating fear-related disorders in the children of depressed parents may help prevent the subsequent onset of depression. Li et al. (2012)

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demonstrated heterogeneity in the number of MDD diagnoses across various anxiety disorders; specifically, GAD predicted early onset of MDD, while PD predicted the highest number of MDD diagnostic criteria. Research that fails to attend to specific anxiety disorders may yield nonsignificant associations due to differences in associations and the directionality of relationships.

Depression Secondary to Anxiety Disorders

Research has shown the onset of anxiety disorders to generally precede the onset of depressive disorders in children and adolescents (e.g., Avenevoli et al., 2001; Lamers et al., 2011; Starr et al., 2014)). In studies of youth with comorbid anxiety and depression, the anxiety disorder preceded the depressive disorder in two-thirds of cases (e.g., Seligman & Ollendick, 1998; Starr et al., 2014). Risk of secondary depression is 2–4 times greater among adolescents with an anxiety disorder (Wittchen et al., 2000), and the presence of anxiety has longitudinally predicted depression in children and adolescents (e.g., Costello et al., (2003). Particular characteristics of anxiety disorders also increase the risk of depression secondary to anxiety. Specifically, depression secondary to anxiety is positively associated with the number of comorbid anxiety disorders, severity of anxiety disorders at baseline, frequency of avoidance, and presence of panic attacks (Bittner et al., 2004; Wittchen et al., 2000). However, research suggests that this temporal pattern may not be present for all anxiety disorders. While individuals with SAD and GAD are particularly at risk for the development of subsequent depression (e.g., Bittner et al., 2004; Kessler et al., 2008; for an exception, see Avenevoli et al., 2001), onset of PD typically does not precede depression (Avenevoli et al., 2001).

Models of Comorbidity

Several models have been developed to explain the relationship between anxiety and depression (e.g., Cummings et al., 2014; Jacobson & Newman, 2017). However, comorbidity may not be best represented by any single model. This nuanced, transdiagnostic landscape is representative of the inherent difficulties in identifying the etiology, biomarkers, and treatments for all individual mental disorders, which may be best captured by one General Psychopathology dimension (p value) rather than the traditional higher-order factors of internalizing, externalizing, and thought disorder (e.g., Caspi et al., 2014). This p factor is highly heritable, and increased levels of p factor in childhood and adolescence predict dysfunction and diagnosis of a psychiatric disorder in adulthood (Allegrini et al., 2020; Cervin et al., 2021). Thus, the development of a transdiagnostic model for comorbid anxiety and depression may be representative of the approach needed to refine psychiatric nosology and treatment more generally.

Tripartite Model

Early models characterized anxiety and depression as expressions of the same underlying process included in the internalizing dimension and comorbidity between the disorders representing this single construct (Krueger & Markon, 2006). As an alternate model, Clark and Watson's (1991) tripartite model of anxiety and depression recognizes their shared and unique presentations. According to this model, anxiety and depression share high levels of negative affect, but while low positive affect is unique to depression, high physiological arousal is unique to anxiety. Longitudinal studies of adolescents show strong support for a three-factor model, demonstrating that despite the presence of one underlying common factor, factors specific to depression and anxiety account for the differences in symptom presentation (Olino et al., 2008). However, some have found high physiological arousal and negative affect to be the underlying factor (Anderson & Hope, 2008; Chorpita et al., 1998; Compas et al., 2004), while others lend partial support to the tripartite model (Jacques & Mash, 2004; Ollendick et al., 2003). In addition, the tripartite model does not perform similarly across anxiety

disorders. For example, negative affect is related to GAD as well as depression, and physiological hyperarousal is more strongly associated with PD than other anxiety disorders (Anderson & Hope, 2008). Even within a single anxiety disorder, patterns of positive affect, negative affect, and physiological arousal have been found to differ between adolescents meeting diagnostic criteria and those experiencing elevations in symptoms (Anderson et al., 2010). Consequently, the tripartite model may best fit GAD-depression comorbidity, while alternative models may characterize comorbidity among other anxiety disorders and depression.

Bidirectional Model

Findings of the strong temporal relationship between anxiety and depression suggest that the presence of an anxiety disorder may actually be a risk factor for depression (Hammen et al., 2008; Seligman & Ollendick, 1998; Wittchen et al., 2000). The consequences of anxiety, such as deficits in social and academic functioning, may be depressogenic factors that lead to the later development of a depressive disorder (e.g., Seligman & Ollendick, 1998). Avoidance, low sociability, and interpersonal oversensitivity mediate later depressive disorders (Jacobson & Newman, 2014; Starr et al., 2014). However, in a meta-analysis of the longitudinal relationship between anxiety and depression, depression predicted some anxiety disorders to a greater degree than did anxiety predict depression (Jacobson & Newman, 2017). One possible explanation for these contrary results lies in the examination of symptom onset rather than onset of diagnosis, as the impact of comorbid anxiety and depressive disorders may be in their effect on the other's symptoms (e.g., Bubier & Drabick, 2009). For example, a child may develop subthreshold depressive symptoms leading to the development of broad levels of avoidance and low behavioral activation. In turn, newly developed anxiety symptoms are exacerbated to a level of chronicity needed for disorder diagnosis. Finally, the anxiety symptoms increase the likelihood of intensified depressive symptoms and the development of a depressive disorder. Although the anxiety disorder preceded the depressive disorder, depressive symptoms preceded anxiety symptoms. Jacobson and Newman (2017) propose a model in which anxiety and depression symptoms bidirectionally predict one another in short-term fluctuations until a threshold of symptom severity is met, resulting in risk for the development of the other disorder. However, this model does not rule out the existence of additional contributing variables (e.g., stress) and is based on only one study on the bidirectional longitudinal relationships between anxiety and depression symptoms and disorders. Additional research on the longitudinal association and mechanisms of anxiety and depression are needed to better assess the model's validity.

Developmental Model

A growing body of evidence supports a developmental approach in accounting for the differences in the onset of anxiety and depression and examining how their relationship changes as a function of time, rather than observing trends in already developed comorbidity (e.g., Kovacs & Devlin, 1998; Rice et al., 2004). Olino et al. (2008) propose that the temporal relationship between anxiety and depression may be due to the presence of a common factor early in development (e.g., an internalizing factor; Fergusson et al., 2006). Then, an anxiety-specific factor presents early in development, with depression-specific and additional common factors developing as the individual matures. For example, negative affect, underlying both anxiety and depression, may present in early childhood, but children may be protected from depressive symptoms by positive affect until later in the development when physiological and neurological maturation decreases the ability to experience reward and positive affect (e.g., Forbes et al., 2009; Poletti, 2009). Alternatively, Kovacs and Devlin (1998) propose that childhood anxiety may be a manifestation of developmental

maturation related to the psychophysiology of emotional dysregulation and associated psychopathology. They suggest that the younger a child is, the more likely that the onset of such pathology will take the form of anxious symptoms. As such, comorbidity models emphasizing a single mixed factor may fit best for young children, while two-factor models may be a better fit for older children (Cannon & Weems, 2006; Cole et al., 1997).

Cummings et al. (2014) propose a developmental model which maps depression comorbidity with specific anxiety disorders rather than as one homogenous group. The first of three pathways is characterized by the development of fear-related anxiety symptoms during childhood (e.g., SAD), which, when untreated, become a risk factor for the development of depression during adolescence (Cummings et al., 2014; Watson, 2005). The second pathway is indicative of children with anxiety-related disorders, demonstrated to be distinct from fear-related anxiety disorders and associated with greater overlap between anxiety and depression (Warner et al., 2008). This pathway most commonly manifests as depression-GAD comorbidity, marked by an overlap of symptoms associated with worry, and includes the most shared risk factors between anxiety and depression of any pathway (Cummings et al., 2014). Although onset of depression and anxiety may occur simultaneously in this pathway, they may also onset separately due to age-related life events (Hyde et al., 2008). The third pathway is the least common form of anxiety-depression comorbidity, in which depressive impairment leads to the development of anxiety secondary to impairment. Depressive impairment has been linked to subsequent anxiety (Rudolph et al., 1994) in older adolescents and adults, but additional research is needed (Cummings et al., 2014). One advantage of the multiple-pathways model is that it incorporates alternative developmental models of comorbid anxiety and depression. Longitudinal studies should continue to examine the developmental trajectories of anxiety-disorder comorbidity among specific anxiety and depressive disorders.

Risk Factors for Comorbid Depression

Various biological, psychological, and environmental factors have been implicated in the etiology of early-onset anxiety and depression. While research explicitly investigating comorbid anxiety and depression is limited, research investigating anxiety or depression alone often contributes to an understanding of an underlying common etiology. In the following sections, we examine some of the specific factors involved in the etiology of anxiety and depression that are also implicated in the comorbidity of the disorders.

Biological Risk Factors

Genetics Research Parental depression, comorbid anxiety and depression, and primary anxiety disorders have been strongly associated with an increased genetic risk for comorbid anxiety and depression in offspring (e.g., Micco et al., 2009; Guffanti et al., 2016). Family and twin studies indicate at least a moderate influence of genes on risk for comorbid anxiety and depression in children, with studies finding much of the covariation of anxiety and depressive symptoms in child twins due to a common genetic influence (Middeldorp et al., 2005). It should be noted, however, that genetic effects for comorbidity may differentially affect children based on age. For example, the magnitude of genetic effects may increase with age (Waszczuk et al., 2014), and certain genetic vulnerabilities may only become active post-puberty (Waszczuk et al., 2016). Despite increased rates of comorbid anxiety and depression in adolescent females (Zavaglia & Bergeron, 2017), increased genetic liability does not appear to differentially affect children based on sex (Trzaskowski et al., 2019). For stand-alone disorders, parental anxiety disorder—especially PD and GAD—confers greater risk for offspring anxiety and depressive disorders, although the risk for offspring anxiety disorders may be greater than for offspring depressive disorders (Lawrence et al., 2019). Further, specific anxiety disorders comorbid with

depression have different genetic risk profiles (Kendler et al., 1995; Waszczuk et al., 2014). Genetic research also provides support for the temporal pattern of onset. Specifically, Eaves et al. (2003) found that genes that increased risk for childhood anxiety directly influenced the later development of depression.

In twin studies, the shared environment influences the development of anxiety symptoms and disorders and depression symptoms (Burt, 2009; Ehringer et al., 2006; Thapar & McGuffin, 1997). The nonshared environment has a small to moderate effect on the development of comorbid anxiety and depression in children and adolescents (Cerdá et al., 2010; Eley et al., 2015) and a moderate to large effect on most of the unique variance of discrete anxiety and depressive disorders (Waszczuk et al., 2014). Genetic influence on comorbid anxiety and depression is also influenced by phenotypic heterogeneity and by heritable neurological and cognitive risk factors (Ormel et al., 2019).

Neurobiology Research The amygdala and hippocampus are implicated in fear, memory, and information processing (for a review on information processing and risk for anxiety and depression symptoms in youth, see Lau & Waters, 2017). Anxious and depressed youth have been found to have smaller amygdalae than healthy children (Merz et al., 2018; Strawn et al., 2015). Child and adolescent anxiety and depression are correlated with altered amygdala activation to negative information, although there may be distinct activation differences between the disorders even when comorbidity is present (Beesdo et al., 2009; Roberson-Nay et al., 2006). Studies indicate decreased hippocampal volumes in child and adolescent depression, even when accounting for stressful life events, but the presence of comorbid anxiety appears to contribute no influence (Barch et al., 2019; McKinnon et al., 2009); however, both reduced amygdala and hippocampal volume have been found to be impacted by adversity (Frodl et al., 2017; Weissman et al., 2020). Functional connectivity between the amygdala and the prefrontal cortex is impacted by increased adversity in early childhood (Park et al., 2018) and may be a functional marker for increased vulnerability to the development of anxiety symptoms during the transition to adolescence (Barendse et al., 2020). Imaging studies in youth MDD have implicated connectivity between the anterior cingulate cortex, the ventromedial prefrontal cortex, and the amygdala as predictive of depressive illness markers including severity and duration (Kerestes et al., 2014).

HPA Axis Research The amygdala, hippocampus, and prefrontal cortex are also involved in hypothalamus-pituitary-adrenal (HPA) axis regulation, which is implicated in both depression and anxiety (Juruena et al., 2020; Pariante & Lightman, 2008). Chronic stress-induced activation of the HPA axis, which results in higher levels of cortisol, can disrupt functioning in regions of the brain responsible for regulating emotion and therefore interfere with the ability to cope effectively with stress. While depression specifically disrupts the HPA response to stress, anxiety appears to be more relevant in noradrenergic disruption. Thus, HPA disruptions in anxiety disorders may be due to the influence of comorbid depression. While depression has been associated with HPA axis anomalies among children, only anxiety subscales, and not specific anxiety disorders themselves, have been associated with such anomalies (Adam, 2006; Chen et al., 2017; Kallen et al., 2008). Additional research on the role of the HPA axis is necessary, especially among children and adolescents specifically (Lopez-Duran et al., 2009).

Neurotransmitter Research All anxiety and depressive disorders are polygenic in nature, and few specific genetic loci have received consistent empirical support due in part to this broad underlying vulnerability. Polymorphisms of the serotonin transporter gene promoter (5-HTTLPR), in interaction with stress, may increase risk for both anxiety and depression in adolescents, although particular alleles may confer different risks for comorbid anxiety and depression depending on

the developmental period and sex (Jenness et al., 2011; Perry et al., 2017; Uher & McGuffin, 2008). The allelic variants of 5-HTTLPR may also be related to cognitive, psychological, and neurological risk factors for comorbid anxiety and depression, such as neuroticism, shyness, behavioral inhibition, and amygdala activation (Arbelle et al., 2003; Johnson et al., 2016; Kruschwitz et al., 2015). However, candidate-gene approaches, like those used to identify the 5-HTTLPR polymorphism, have been criticized for failures to replicate.

Psychological Risk Factors

Temperament and Personality Certain types of temperament, such as behaviorally inhibited and neurotic temperaments, may serve as vulnerability factors for the development of psychopathology. Behavioral inhibition, marked by amplified sensitivity to novel stimuli and avoidance of unfamiliar environments and people (Fox et al., 2005; Henderson et al., 2015), is identifiable from infancy and is notably stable from early childhood into adulthood (e.g., Henderson et al., 2015). Evidence suggests that behavioral inhibition is related to comorbid anxiety and depressive disorders in youth and adults (Dougherty et al., 2013; Muris et al., 2011; Schofield et al., 2009; Sportel et al., 2011). However, the relationship between behavioral inhibition and internalizing disorders may be influenced by multiple factors, including parenting style, attachment style, and life experiences (Muris et al., 2011; Williams et al., 2009).

A neurotic disposition, defined as the tendency to have negative affectivity, irrational ideas, and poor reactions to stressors, is also related to anxiety and depression (e.g., Costa & McCrae, 1992; Moscati et al., 2016; Mathew et al., 2011). Differences in neuroticism levels may explain between 20% and 45% of comorbidity between depressive and anxiety disorders, as comorbidity is related to neurotic traits (Khan et al., 2005; Lamers et al., 2011). However, neuroticism rates are heterogenous across different anxiety disorders (Li et al., 2012).

Interpretive Biases Interpretive biases, or fallacies in how people decipher ambiguous stimuli, are a type of cognitive bias that bears a linear relationship with the severity of depressive symptoms (Lee et al., 2016; Smith et al., 2018). Certain types of interpretive biases have been implicated in anxiety disorders as well, showing a possible similarity in the cognitive mechanisms for anxiety and depression. For example, catastrophizing (i.e., anticipating the outcome of an experience will be disastrous), personalizing (i.e., taking inordinate personal responsibility for negative events), and overgeneralizing (i.e., assuming that the outcome of one experience will apply to similar experiences in the future) are more closely associated with youth with anxiety disorders than those without (e.g., Cannon & Weems, 2010). Additionally, these three subsets of interpretive bias in particular are more strongly related to individuals with comorbid anxiety and depression than to individuals with noncomorbid anxiety disorders or depressive disorders (Weeks et al., 2017).

Behavioral Processes Dysfunctional social behaviors are common coping mechanisms in children with anxiety, although these behaviors may cause or exacerbate secondary depression. For example, self-isolating from peers is frequently seen in children with certain anxiety disorders, especially SAD (Teo et al., 2013). Though avoiding social interaction may be a protective behavior in anxiety, social isolation may lead to feelings of loneliness, which can trigger or worsen preexisting depressive symptoms (e.g., Cohen & Wills, 1985). Although avoidant behaviors may temporarily alleviate anxiety, they mediate earlier anxiety and later depression, indicating that evading anxiety-provoking situations may reduce social support that acts as a preventative factor in depression (Jacobson & Newman, 2014; Mathew et al., 2011).

Seeking reassurance from others is another strategy used often by children with some anxiety disorders, such as GAD and SAD (e.g., Beesdo-Baum et al.; 2012; Cougle et al., 2012). However, excessive reassurance seeking is associated with negative responses from others and can lead to interpersonal rejection, a factor that prospectively predicts depression (Nolan et al., 2003; Starr & Davila, 2008).

Contextual Risk Factors

Demographic Variables Female sex is associated with an increased likelihood of experiencing internalizing disorders. Rates of anxiety and depression are similar among boys and girls up until the ages of 12–13 years, after which females begin to experience more anxiety and depressive symptoms than their male peers (Hankin et al., 2015; Letcher et al., 2012). By adulthood, rates for anxiety disorders and MDD are 1.9 times higher and 1.7 times higher for females, respectively (Baxter et al., 2014). This may be in part due to unique problems faced by females during adolescence, such as an increased emphasis on body image (Slater & Tiggemann, 2010) or more significant peer relationships (De Goede et al., 2009). Moreover, sex is one of the only notable demographic factors that consistently predicts both anxiety and depression.

Sexual orientation and gender identity are additional salient risk factors for the development of depression. Girls who reported romantic and/or physical attraction to the same sex reported suicidal ideation at more than five times the level as heterosexual girls, and boys reported it at more than ten times the level as their straight male peers (Almeida et al., 2009). Similarly, transgender adolescents report anxiety and depression at 2–3 times the rate of their cisgendered peers (Reisner et al., 2015). By adulthood, more than half of transgender individuals and more than one-third of lesbian, gay, and bisexual individuals experience clinically significant depressive symptoms (Kaniuka et al., 2019). These disparities are partially explained by the greater amounts of perceived discrimination that members of sexual minority communities experience when compared with heterosexual, cisgendered individuals (Almeida et al., 2009).

Parental Psychopathology Parental psychopathology is among the most reliable and clinically salient risk factors for the development of internalizing problems and associated pathological behavioral outcomes in children. Weissman et al.'s (2016) 30-year longitudinal study found that the likelihood of an individual developing either an anxiety disorder or MDD in their lifetimes was three times as high in offspring of depressed parents as in offspring of nondepressed parents. This same study found that children of depressed parents were at a tenfold risk of developing prepubertal (i.e., early-onset) depression when compared to children of nondepressed parents (Weissman et al., 2016).

However, because internalizing disorders are more common among females than males (e.g., Mathew et al., 2011) and because the role of primary caregiver has historically been concomitant almost exclusively with women (e.g., Ruiz & Nicolás, 2018), much of the existing literature on this topic is focused on the psychopathology of birth mothers and how it relates to child outcome (e.g., Goodman, 2020). Longitudinal research indicates that prenatal maternal depression is correlated with health outcomes (e.g., depression, anxiety, immune function) into young adulthood (Capron et al., 2015; Pearson et al., 2013; Plant et al., 2016). Moreover, maternal depression is associated with increased heart rate and augmented activity levels in utero (Kinsella & Monk, 2009), less positive affectivity in infancy (Aktar et al., 2019), less active regulation in early childhood (Feng et al., 2007), and increased delinquent behaviors in adolescence (Wickham et al., 2015). This shows a pervasive pattern of negative outcomes in children across development and can likely be explained by a diathesis-stress model. Moreover, children with comorbid MDD and anxiety disorders report more familial dysfunction than children with pure anxiety despite nonsignificant differences in maternal psychopathology,

indicating a need to examine paternal symptomology and parenting styles in addition to maternal factors (O'Neil et al., 2010). Overall, these studies further support the critical need for early identification and intervention for this particularly vulnerable population of at-risk offspring.

Life Events Stressful life events have been shown to have negative effects on the mental health of young children (e.g., Moscati et al., 2016). Specifically, common stressful life events within the family, such as the death of a grandparent or frequent arguments between parents, are predictive of anxiety disorders later in life (e.g., Kessler et al., 2008; Platt et al., 2016). Other stress-inducing life events in childhood, such as serious illness and witnessing violence, are predictive of depression symptoms later in life, though this relationship can be mediated by parental and social support (e.g., Elmore & Crouch, 2020; Eisman et al., 2015).

Trauma and abuse are also major predictors of internalizing psychopathology; however, the impact of trauma is more salient in depressive disorders than anxiety disorders (Hovens et al., 2012). Further, trauma in childhood is a strong predictor of the emergence of comorbid depression and anxiety later in life (Hovens et al., 2010).

Outcomes

Early-onset anxiety and depression are associated with an array of short-term and long-term negative outcomes. Studies focusing on the effects of noncomorbid early-onset anxiety have shown that in general, youth anxiety disorders—particularly SAD and separation anxiety disorder—are associated with high levels of impairment, including social dysfunction, school avoidance, and academic failure (Shatkin, 2015). Likely because of the heterogeneous nature of anxiety disorders themselves, there have been noted differences in the long-term outcomes of individuals diagnosed with youth anxiety disorders (Ginsburg et al., 2018). The adverse effects of early-onset depression, however, are better documented and salient in both short- and long-term outcomes. One in ten cases of MDD in childhood and adolescence becomes chronic, with comorbid anxiety as a key predictive factor (Rey et al., 2015; Shatkin, 2015).

Whereas comorbidity inherently confounds and complicates evidence of etiology, comparing noncomorbid and comorbid outcomes facilitates a more comprehensive understanding of the compounded effect of youth depression comorbid with anxiety. However, research examining comorbid outcomes using DSM-5 criteria is scarce, as the DSM-5 has added new criteria for MDD with anxious distress (American Psychological Association, 2013). This change in nosology addresses the overlap in symptomology between MDD and anxiety, as well as the prevalence of comorbid presentations. Literature using DSM-IV-TR criteria has found that children and adolescents with comorbid anxiety disorders and depression exhibit outcome characteristic of, but more severe than, those who experience noncomorbid depression (Costello et al., 2003; Merikangas et al., 2003; Moffitt et al., 2007). For example, Foley et al. (2006) examined proximal psychiatric risk factors for suicidality in youth and found that individuals with an MDD-GAD comorbidity had the greatest suicide risk of any pure or comorbid anxiety or depression diagnosis. Individuals with comorbid presentations may also exhibit more greater rates of chronic/multiepisodic presentations, physical and mental debility, suicidality, and poor treatment response to medication and psychotherapy than those with noncomorbid anxiety or depression (e.g., Bijl & Ravelli, 2000; O'Neil et al., 2010; Rush et al., 2005). Findings such as these raise essential questions regarding the fundamental disparity between the pure and comorbid forms of these disorders.

Clinical Implications of Comorbid Depression

Assessment

Neither anxiety nor depression is a unitary phenotype, thus complicating the assessment of

these disorders. Depression and anxiety inventories are highly correlated, demonstrating a lack of discriminant validity in the measures and an overlap in symptomatology (e.g., Kendall et al., 1992). For example, two frequently used assessment tools, the Kutcher Adolescent Depression Scale and the Revised Children's Manifest Anxiety Scale (RCMAS-2), have items assessing irritability, nervousness, concerns about being a "good person," sleep problems, somatic complaints, and difficulties with concentration (LeBlanc et al., 2002; Reynolds & Richmond, 2008). As researchers create new measures that better discriminate between depression and anxiety, difficulties in doing so indicate the lack of specificity between disorders (Cox et al., 1999).

Belzer and Schneier (2004) make a series of recommendations regarding the assessment of comorbid anxiety and depression in adult patients, saying clinicians should: (1) ask patients with symptoms of depression about anxiety-related symptoms, (2) inquire about age of onset and whether any life events that act as risk factors accompanied the first symptoms, (3) discuss the patients' beliefs regarding the etiology of their symptoms (e.g., if their anxiety occurs only during depressive episodes), and (4) discuss responses to prior treatment. While these recommendations are in reference to adults, they are useful in child and adolescent populations.

Treatment

As discussed above, youth with comorbid anxiety and depression often experience more severe symptomology and deficits in functioning than youth with only one disorder. However, closely related risk factors for anxiety and depression suggest that treatments addressing both disorders simultaneously are more likely to use the same mechanism of action and be more efficacious (Garber et al., 2016; Garber & Weersing, 2010). Therefore, treatment of comorbid anxiety and depression among youth should be considered when either diagnosis is present.

Nontransdiagnostic treatments targeting either anxiety or depressive disorders demonstrate crossover effects leading to improvements in the comorbid condition. In a meta-analysis of RCTs (randomized controlled trials) measuring the effects of depression or anxiety treatments on both constructs, Garber et al. (2016) found that treatments for depression led to improvement in both depressive and anxiety symptoms, although more significantly in depressive symptoms. Likewise, treatments for anxiety disorders resulted in improvements of anxiety and depression symptoms with greater improvement in anxiety symptomology. However, those with more severe anxiety may benefit from focusing specifically on anxiety symptoms in treatment (Young et al., 2006).

Some studies have shown that comorbid anxiety disorders are associated with a poorer outcome for depression treatment among children and adolescents (Ollendick et al., 2008; Young et al., 2006). This, in combination with the lower efficacy of the primary treatment on the comorbid condition, highlights the need for treatments to purposefully target comorbid disorders. Chu et al. (2012) suggest three pathways of treatment for comorbid anxiety and depression: (1) flexible single-target interventions, (2) modular-based interventions, and (3) transdiagnostic interventions. For example, patients with a great degree of symptom overlap may benefit from a transdiagnostic approach, while those with a primary depressive disorder may benefit from a flexible implementation of a depression treatment, including the use of cognitive-behavioral principles to address anxious thoughts/distortions linked to depressive impairment.

Conclusions

Comorbid depression presents unique challenges to the understanding, assessment, and treatment of anxiety in children and adolescents. Youth with comorbid anxiety and depression experience more severe symptoms of depression than those with depression alone, and comorbidity may be associated with a life-course of psychopathology. While research has consistently demonstrated that the onset of anxiety

precedes that of depression, the exact relationship between anxiety and depression is uncertain. Further, the effect of the interactions of different biological, psychological, and environmental risk factors over time on the developmental trajectories of comorbid anxiety and depression should be considered. Although treatment of one disorder can be effective in improving the symptoms of the comorbid disorder, interventions may be tailored to address comorbid anxiety and depression. Given the high rates of comorbidity among children and adolescence and the associated negative outcomes, specific attention to this topic is warranted in research and clinical work.

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The Role of Disgust in Childhood Anxiety Disorders

12

Ana Rabasco and Dean McKay

There has been extensive research into the role of disgust in a wide range of psychopathologies (e.g., Olatunji and McKay (2007), Schienle et al. (2003a)). Most of this research has focused on anxiety disorders where disgust may figure prominently in avoidance. The early work in this area focused on specific phobias and avoidance of contact with disease and contagion (Matchett & Davey, 1991). Since that time, the range and nature of disgust's involvement in psychopathology have become refined and include a multifaceted conceptualization drawing on the postulates of the emotion as described by Rozin and Fallon (1987). This chapter focuses on the conjoint roles of disgust and development in childhood anxiety.

The Role of Disgust in the Maintenance of Avoidance Behaviors

Disgust has been described as "the forgotten emotion of psychiatry" (Phillips et al., 1998), a description that, until recently, was far from unwarranted. Despite the central role of disgust in several influential theories and accounts of emotion (e.g., Darwin (1872/1998), Ekman (1992, 1999)), the disease-avoidance and social functions ascribed to disgust (Keltner & Haidt, 2001; Matchett & Davey, 1991), and the growing appreciation for the role of disgust in adult psychopathology (Olantunji et al., 2010; Olatunji & McKay, 2009), it was only after the publication of Matchett and Davey's (1991) disease-avoidance model that researchers began to recognize the pertinence of disgust to anxiety disorders and their treatment. The field has since witnessed a significant increase in the number of articles and book chapters published specifically addressing the role of disgust in the phenomenology and maintenance of anxiety disorders and other conditions characterized by avoidance behaviors. This is especially true of contamination-related obsessive-compulsive disorder (OCD) (e.g., Berlin et al. (2017), Moretz and McKay (2008), Olatunji et al. (2004), Tolin et al. (2006)), animal phobias (e.g., de Jong et al. (1997), Matchett and Davey (1991), Polák et al. (2020)), and blood-injection-injury (BII) phobia (e.g., Bianchi and Carter (2012), Olatunji et al. (2006), Sawchuk et al. (2002)).

While it appears that there is considerable support for the role of disgust in anxiety disorders, the majority of this research has focused on adults. Nonetheless, the limited research that has investigated the role of disgust in childhood anxiety disorders is promising and seems to resem-

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ble the findings from the adult literature. The aim of this chapter is to summarize the major findings for the role of disgust in specific anxiety disorders, including the extant literature detailing this relationship in children. Where literature is limited or absent, we will provide predictions and directions for future research in the area. The following section provides an overview of disgust in general and its impact on psychopathology. First, disgust will be defined and essential theoretical issues presented. Second, the assessment of disgust in children and its relationship with anxiety disorders will be discussed.

Disgust Defined

Disgust has been defined as an emotion characterized by "a feeling of revulsion or profound disapproval aroused by something unpleasant or offensive" (Lindberg et al., 2002, p. 389). Rozin and Fallon (1987) provided a detailed theoretical account that describes how disgust may operate both behaviorally and cognitively. According to their definition, disgust is "revulsion at the prospect of (oral) incorporation of an offensive object. The offensive objects are contaminants; that is, if they even briefly contact an acceptable food, they tend to render that food unacceptable" (p. 23). Both of these definitions adequately capture the fundamental essence of disgust, namely, the feeling of repugnance or intense aversion that is triggered by exposure to a distasteful or offensive object or situation. Disgust sensitivity is the trait-like predisposition of a person to become disgusted in response to a particular group of stimuli, known as disgust elicitors (Woody & Teachman, 2000).

Disgust is conceptualized as a universally experienced emotion that was evolutionarily selected to help humans solve a specific recurring threat to survival via avoidance of contamination (Oaten et al., 2009). Over time, disgust has come to serve additional adaptive functions, such as defending against ideological contagions, regulating relations between social groups, safeguarding social order, and protecting the soul from moral transgressions (Keltner & Haidt, 2001; Rozin et al., 2004, 2009).

A closer inspection of the disgust state reveals a topography that distinguishes disgust from other basic emotions, such as fear, anger, guilt, sadness, and joy (Ekman, 1999). The first defining component of disgust lies in its eliciting stimuli. Disgust is elicited by stimuli that have the potential to contaminate (Rozin & Fallon, 1987). Disgust elicitors are well known to many as a result of socialization and include stimuli such as spoiled, dirtied, or socially unacceptable food (e.g., moldy yogurt, monkey meat, food that is infested with cockroaches, ketchup on ice cream), body envelope violations (e.g., mutilated or missing body parts, exposed innards, sores, deep wounds), body products (e.g., feces, urine, mucus, vomit), death and dead bodies (e.g., rotting corpses, graveyards, ashes of a cremated person), animals (e.g., maggots, cockroaches, flies, rats), sexual behaviors that may be considered unacceptable within specific cultural groups (e.g., sex with animals, incest), poor hygiene (e.g., body odor, dirt under fingernails, greasy hair, sticky hands), and general violations of social and moral norms (e.g., cruelty, bad manners, vulgarity (Haidt et al., 1994)). Although there are some cross-cultural differences with regard to the kinds of stimuli that people find disgusting, these seven domains of disgust elicitors appear to be consistent across cultures (Olatunji et al., 2009). Furthermore, evidence of disgust reactions in response to some human disgust elicitors (e.g., contaminated food) has been found in nonhuman great apes, although their response is muted (Case et al., 2020).

Disgust is also unique on the basis of its distinctive facial expression (Cisler et al., 2009; Ekman, 1999). Izard (1977) described the typical disgust facial expression as looking as if "one is gagging or spitting out" (p. 336). Specifically, when disgusted people typically open their mouth, raise their upper lip, and wrinkle their nose. The tongue may also be protruding. The person may lower his or her eyebrows and squint his or her eyes as a result of drawing up the nose and upper lip (Izard, 1971). It has been shown that there is cross-cultural agreement in

recognition of the disgust facial expression (Ekman & Friesen, 1986; Izard, 1971), which indicates that it is likely a universal human expression. This facial expression is found across cultures (Ekman, 1999) and in human infants when administered bitter tasting substances (Steiner, 1979).

In addition to its unique facial expression, disgust is characterized by unique autonomic nervous system activity (Cisler et al., 2009; Ekman, 1999; Vrana, 2009). Physiological studies have consistently indicated a heart rate deceleration for disgusting compared to fear-inducing and neutral stimuli (see Cisler et al. (2009), Vrana (2009)). This is likely reflective of activation of the parasympathetic nervous system (Page, 1994). In contrast, disgust imagery has been found to increase heart rate (Vrana, 1993, 1994). McKay and Tsao (2005) offered an explanation for this apparent inconsistency. According to these authors, imagery "may better address anticipatory reactions. In this case participants may label the anticipatory reaction as anxiety, leading to sympathetic activation, while live exposure more likely produces the diphasic reaction, with parasympathetic arousal then occurring as well" (p. 356). Similar to other negatively valenced emotions, disgust has also been linked to an augmentation in the magnitude of startle reflex upon presentation of disgust pictures, an increase in corrugator supercilii EMG (electromyographic) activity, and increased skin conductance (Vrana, 2009). Finally, there has been some neural circuitry research suggesting projections from the insula to regions controlling fear response (i.e., Schienle et al. (2017)), further supporting a role for disgust in anxiety reactions.

Disgust can also be set apart from other emotions on the basis of associated cognitive phenomena (Cisler et al., 2009; Ekman, 1999; Teachman, 2006; Williams et al., 2009; Woody & Teachman, 2000). Central to this is the transferability of disgust via the laws of sympathetic magic. The two laws of sympathetic magic shape the circumstances under which people may perceive an unrealistic threat of contamination when there is no actual danger of becoming contaminated. First, the cognitive processing of disgust-related information is often biased by the *law of contagion* (Rozin et al., 1986), which states that objects pass on some of their properties when they touch other things in such a way that the effect of contact is sustained even after the connection has been broken (i.e., "once in contact, always in contact" [p. 703]). For example, a patient may avoid touching an object that he fears to be contaminated prior to entering his own bedroom out of fear that his hand will contaminate his room, which he considers to be a contaminant-free "safe haven." The processing of disgust-related material also has a propensity to be biased by the *law of similarity* (Rozin et al., 1986). According to this law, if a neutral stimulus resembles a disgusting stimulus, there is a greater likelihood that it too will be perceived as being disgusting (i.e., "the image equals the object" [Rozin et al., 1986, p.703]). For example, people may refuse to consume chocolate that is shaped like dog feces.

The cognitive processing of disgust-relevant information seems to differ from that of other emotions (e.g., fear) on the basis of primary disgust appraisals. Applying Salkovskis' (1985) model of OCD-related appraisals to disgust, Teachman (2006) differentiated between primary and secondary appraisals. In contrast to secondary appraisals, which have to do with the consequences of becoming disgusted, Teachman posited that primary disgust appraisals reflect beliefs about the properties of a stimulus (e.g., "blood and guts are disgusting") or the likelihood of feeling disgusted (e.g., "if I look at the screen, I will feel sick"). Thus, the content of primary disgust appraisals is thought to be related to disgust or contamination, while the content of primary fear appraisals is believed to be related to danger (Woody & Teachman, 2000). Lastly, it appears that the cognitive landscape of disgust may be characterized by unique attention, perceptual, and memory biases. If this is the case, then these biases may have important implications for the treatment and maintenance of disgust-related disorders. For example, Charash and McKay (2009) have shown that individuals with elevated contamination fear showed a bias in interpretation for vague situations that could

be associated with disgust, but not attention or biases for memory. Recent analyses have also shown that disgust biases are more consistent than fear biases and that disgust facilitates recognition of otherwise phobic stimuli (Wiens et al., 2008). Williams et al. (2009) provide a detailed discussion of cognitive biases associated with disgust.

Finally, the action tendency associated with disgust is behavioral avoidance (Ekman, 1999), a characteristic shared with fear and anxiety. Similar to fear-based avoidance, the disgust reaction is characterized by the avoidance of objects or situations determined to be upsetting or disturbing (Woody & Teachman, 2000). For example, an adolescent who is easily disgusted by spoiled foods would theoretically be more likely to avoid consuming buttermilk or blue cheese than would a disgust-insensitive child. Similarly, a child who finds body envelope violations to be objectionable might avoid looking at television shows depicting surgery. However, fear- and disgust-related avoidances are conceptualized as serving different functions. In contrast to fear-related avoidance, which is believed to have served the function of distancing humans and other organisms from imminent threats to physical survival (Barlow, 2002; LeDoux, 1996), disgust-related avoidance is theorized to have aided by distancing humans from potential contaminants (Keltner & Haidt, 2001; Matchett & Davey, 1991).

The Disease-Avoidance Model of Disgust

The aforementioned characteristic facial expression of disgust is strongly connected to the behavioral immune system. The behavioral immune system involves a series of psychological mechanisms that detect the presence of infectious pathogens and trigger emotional, cognitive, and behavioral responses, which are meant to protect people from infection (Schaller & Park, 2011). Disgust has been strongly associated with the behavioral immune system, as it is an emotional response to potentially dangerous substances that usually results in behavioral avoidance. Even the facial expression of disgust can function as a natural mechanism in the behavioral immune system. For example, the function of the disgust facial expression is to reduce the amount of offensive odor coming in through the nostrils and to expel the possibly hazardous contents of the mouth after something distasteful has been eaten or to serve as a barrier to ingestion in the first place. In addition to the facial expression, neurovegetative components have also been identified as part of the disgust reaction, specifically an increase in saliva production and the tendency to vomit (Angyal, 1941). The extra saliva serves to dilute the offensive taste in the mouth and the nausea and vomiting function to avoid the ingestion of offensive objects. Physiologically, disgust is associated with parasympathetic nervous system activation. Recently, Stark et al. (2005) found that participants experienced a decrease in heart rate and an increase in skin conductance response while viewing disgusting pictures. Thus, Tomkins (1982) described disgust as an "innate defensive response" (p. 377).

Disease Avoidance and Animal Phobias

Matchett and Davey (1991) proposed that there was a connection between disgust and animal phobia, known as the disease-avoidance model. These researchers suggested that fear of some animals is mediated by disgust sensitivity, as opposed to being mediated by the threat of being attacked or physically injured. In other words, individuals fear and avoid relatively harmless animals because these creatures are theoretically connected to disease and contamination and therefore evoke feelings of disgust (e.g., rats, cockroaches, and spiders). As evidence, Matchett and Davey found that measures of disgust sensitivity and contamination were significantly correlated with measures of fear for "fear-relevant" (but typically harmless) animals (e.g., rats, cockroaches, and spiders) and "disgust-relevant" animals (e.g., slugs, maggots, and frogs). These measures of disgust and contamination were not

significantly correlated with fear of the predatory animals that are likely to physically harm a person (e.g., lions, tigers, and bears).

Webb and Davey (1992) utilized an experimental design to further explore the role of disgust sensitivity in some animal phobias. After completing self-report measures of fear for several types of animals (i.e., fear-relevant, disgust-relevant, and predatory animals, as described above), participants were subjected to one of three different experimental conditions. Participants viewed one of the following: a fear-inducing video depicting extreme violence, a disgust-inducing video of bloody surgery in a hospital, or a neutral video of outdoor landscapes. The participants' animal fears were reassessed after viewing the video, and for each experimental condition, pairwise comparisons conducted for change in fear scores between the different types of animals. The results indicated that the violent material significantly increased fear of predatory animals only, while exposure to the disgusting video led to a significant increase in fear of the fear-relevant and disgust-relevant animals only.

Ware et al. (1994) confirmed through factor analysis that animal fears can be divided into two distinct categories, which they labeled fear-relevant and predatory. Ware et al. also found a significant correlation between disgust sensitivity and fear-relevant animal phobias only with no such correlation between disgust and predatory animal fears. Furthermore, individual differences in disgust sensitivity accounted for a significant amount of variance in fear of animals in the fear-relevant category (e.g., snakes, bats, and spiders).

Disease Avoidance and Disgust Elicitors

Curtis and Biran (2001) have also proposed a disease-avoidance theory of disgust based on extensive qualitative research on disgust elicitors in several different cultures, including Africa, India, the Netherlands, the United Kingdom, and Greece. They concluded that hygiene-related behaviors across cultures were consistently motivated by avoidance of contact with disease-causing pathogens. Extrapolating from their hygiene-related research, Curtis and Biran asked people in these different countries about objects that elicited disgust and found that these disgust elicitors fell into five categories, including (1) bodily excretions and body parts, (2) decayed and spoiled food, (3) particular animals and insects, (4) certain categories of "other people," and (5) violations of morality and social norms. These categories, in their opinion, provide support for the role of disgust as a defense against the spread of infectious disease. The disgust elicitors in the first three categories clearly have the potential to harbor disease. However, the last two are more loosely related. According to Curtis and Biran, avoidance of contact with disgusting "other" people (e.g., "Americans," as one respondent indicated in Greece) may prevent exposure to pathogens to which a person may not be immune. These authors also proposed that avoidance of immoral people and acts "may serve to promote the avoidance of social rather than physical parasites" (p. 29). This theory adds partial support to the theory that disgust functions to drive people away from potential sources of infection.

Disease avoidance and Children With the exception of facial expressions, most accepted indicators of disgust (i.e., aversions to body products) appear to be absent in very young children, not developing until about 5 years of age (Rozin & Fallon, 1987). Although Darwin (1872) noted that he "never saw disgust more plainly than on the face of one of [his] infants at the age of 5 months, when, for the first time…a piece of ripe cherry was put into his mouth," he qualified this observation by adding that he "doubt[ed] whether the child felt real disgust" (p. 261). While the characteristic facial expression may be the same, there seems to be a difference between the distaste expressed by an infant and the "real" disgust, endowed with meaning, which adults experience.

Although there is ample support for the disease avoidance model of disgust in adults, there is little evidence that the same theory applies to children. It has been shown in several experimental studies (Rozin et al., 1986; Stein et al., 1958) that very young children react positively to typical disgusting odors, such as synthetic sweat and feces. Furthermore, children are even willing to taste objects that would be rejected by most adults, such as realistic-looking dog excrement made from peanut butter and stinking cheese. Although children begin to reject food at around age five, Rozin and Fallon (1987) suggested that children do not yet refuse food based on disgust as it relates to contamination. They proposed that the relationship between food rejection and disgust emerges around age eight as cognitive skills develop that allow children to make a connection between an object being introduced to a substance and then removed, leaving trace amounts behind (e.g., the concept that a bug briefly dipped into a cup of juice may leave "germs" behind). Furthermore, in a study of 38 monozygotic (MZ) and 34 same-sex dizygotic (DZ) twin pairs, Rozin and Millman (1987) found that although the siblings were similar in their food preferences and beliefs about disgust and contamination, there was not a significant genetic contribution to these variables. Similarities in food preference and disgust sensitivity were therefore contributed to by the shared family environment.

Development of Disgust Evaluative conditioning (EC; de Houwer et al., 2001) has been proposed as a mechanism for the acquisition of disgust (Schienle et al., 2001). Evaluative conditioning is the process by which individuals learn to like or dislike an object based on its pairing with a positive or negative stimulus and a verbally mediated label (de Houwer et al., 2001). Oaten et al. (2009) recently reviewed the empirical evidence supporting the disease avoidance model of disgust and concluded that it is likely that disease-related disgust develops in childhood through EC via the pairing of disease-related events with disgust reactions by their parents (e.g., parental facial expressions and verbal cues). For example, when a child drops food on the floor, the parent may throw away the food and react with disgust by giving certain facial and vocal responses that are observed and learned by the child. In support of this theory, Repacholi (1998) found that young infants ranging from 14 to 18 months old showed aversion to items toward which an adult had responded with disgust (i.e., made a disgust face and said, "Eww! I've found something! Eww! I can see it! Eww!" [p. 1019]). Additional research has found that disgust reactions and avoidance behaviors can be learned by children simply through observation of adults (Askew et al., 2014; Reynolds & Askew, 2019). For example, Askew et al. (2014) conducted two experiments with children examining the effects of disgust observational learning on children's disgust and fear beliefs and avoidance preferences for novel animals. They found that children's fear beliefs and avoidance preferences for animals increased after they saw them together with adult faces expressing disgust.

Assessing Disgust

Disgust sensitivity is most often measured by self-report. As the conceptualization of disgust has changed over time, the content of the self-report measures has also changed accordingly. An early self-report assessment was the Disgust Sensitivity Questionnaire (DSQ; Rozin et al., 1984), a measure of disgust that addresses only one specific aspect of disgust sensitivity, food contamination. There is a simplified version of the DSQ (Muris et al., 1999) for administration to children. This simplified DSQ is comprised of 18 items that ask how disgusting they would find it to eat particular contaminated food items (e.g., "How disgusting would you find it to eat your favourite soup from a soup bow, after it had been stirred by a thoroughly washed fly swatter?" "How disgusting would you find it to drink your favourite lemonade, when a non-toxic leaf from a houseplant falls into your glass and goes to the bottom?" and "How disgusting would you find it to eat your favourite cookie, after a bite had been taken by a waiter in a restaurant?" (Muris et al., 2008b, p. 137)). Each item is rated on a five-point

Likert scale ranging from 1 (i.e., "not at all disgusting") to 5 (i.e., "very much disgusting"), and the scores for all 18 items are summed to yield a total score ranging from 18 to 90, with higher scores indicating increased disgust sensitivity. In a study of the connection between spider phobia and disgust sensitivity with young girls, de Jong et al. (1997) added two items to the original DSQ to assess spiders' disgust-evoking status (i.e., "How much would you like to eat your favourite chocolate bar after a spider has walked across the bar when it is still wrapped in its package?" and "How much would you like to eat your favourite chocolate bar after a spider has walked across the unpacked bar?" [p. 560]).

A more comprehensive and widely used measure is the disgust scale (DS; Haidt et al., 1994). The DS consists of 32 items measuring disgust sensitivity among seven domains of disgust elicitors: food, animals, body products, sex, envelope violations, death, and hygiene. There is an additional eighth scale, sympathetic magic, which measures respondents' attitudes about objects that resemble or have had brief contact with disgust elicitors from the seven domains. Each subscale of the DS is composed of four items. The first two items are answered true or false (scored 0 or 1), and the last two items are assessed on a three-point Likert scale ranging from 0 ("not disgusting at all") to 1 ("very disgusting"). Three of the true/false items are reverse-scored (i.e., items 1, 4, and 10). The alpha coefficient for the DS is 0.84, and the alpha coefficient for the eight subscales range from 0.34 to 0.60: food, $\alpha = 0.34$; sympathetic magic, $\alpha = 0.44$; hygiene, $\alpha = 0.46$; body products, $\alpha = 0.55$; animals, $\alpha = 0.47$; body envelope violations, $\alpha = 0.60$; sex, $\alpha = 0.51$; death, $\alpha = 0.59$ (Haidt et al., 1994). The reliabilities of the individual subscales are quite low; thus, scores on individual subscales should be interpreted with caution. This scale has not yet been adopted for use with children.

The DSQ and DS are limited to measuring disgust propensity (how readily or easily an individual responds with disgust); however, research has demonstrated that disgust sensitivity (the emotional impact of experiencing disgust) may contribute to psychopathology. The Disgust Emotion Scale (DES) was designed to specifically measure disgust sensitivity. It consists of 30 items and assesses five domains of disgust: (1) rotten foods, (2) small animals, (3) injections and blood draws, (4) mutilation and death, and (5) smells. Participants are asked to rate their degree of disgust using a five-point Likert scale. Research has shown that the DES total scale has excellent internal consistency ($\alpha = 0.91$) and each subscale showed at least adequate internal consistency (rotting foods, $\alpha = 0.89$; small animals, $\alpha = 0.88$; injections and blood draws, $\alpha = 0.58$; mutilation and death, $\alpha = 0.84$; and small animals, $\alpha = 0.59$ (Olatunji et al., 2007b)).

The Disgust Propensity and Sensitivity Scale (DPSS; Cavanagh & Davey, 2000) is a self-report measure that assesses for both disgust sensitivity and disgust propensity. Each item is rated on a scale from 1 (never) to 5 (always). The original DPSS measure consists of 32 items and has demonstrated good psychometric properties, including good internal consistency for both the disgust propensity ($\alpha = 0.89$) and disgust sensitivity ($\alpha = 0.87$) subscales. The measure has also demonstrated good convergent validity (Davey & Bond, 2006). The DPSS was revised to include only 16 items (DPSS-R) and has also demonstrated adequate reliability (disgust propensity, $\alpha = 0.78$; disgust sensitivity, $\alpha = 0.77$ (van Overveld et al., 2006)) and good convergent and discriminant validity (Olatunji et al., 2007a).

Some research on the role of disgust sensitivity in psychopathology among children and adolescents has relied on the DSQ and DS. For example, Muris et al. (2008b) measured disgust sensitivity with both the DSQ and the DS; some modifications to the DS were made before administering the scale to children. These authors reported that they simplified some items and replaced "too offensive formulations" (e.g., "You see a man with his intestines exposed after an accident" was changed into "You see a man with an injured face after an accident") (p. 136). Muris and colleagues also removed the sex domain from the scale because they deemed that these items were inappropriate for children. Lastly, they changed the response scale for the last 16 items into a Likert scale with four, rather than

three, options: "not at all disgusting," "somewhat disgusting," "disgusting," and "very disgusting."

More recently, a version of the DES was adapted for children, the Disgust Emotion Scale for Children (DES-C). The DES-C measures disgust toward the same five factors as the DES: (1) rotting foods, (2) injection and blood, (3) odors, (4) mutilation and death, and (5) animals. The DES-C consists of 30 items rated on a 0 (no disgust at all) to 4 (extreme disgust) scale. The DES-C has shown good reliability (total scale, $\alpha = 0.93$; food subscale, $\alpha = 0.91$; injection and blood subscale, $\alpha = 0.88$; odors, $\alpha = 0.85$; mutilation and death, $\alpha = 0.85$; animals, $\alpha = 0.77$), excellent convergent validity, fairly good predictive validity, and acceptable parent-child agreement. Importantly, the DES-C proved to perform better on some psychometric indicators than an age-downward version of the DS (Muris et al., 2012).

Finally, Viar-Paxton et al. (2015) developed the Child Disgust Scale (CDS), a self-report measure of disgust specific to children. The CDS has 18 items that assess sensitivity to core disgust (i.e., items related to oral corporation of contaminants or contact with bodily waste or small animals), contamination disgust (i.e., items related to possible contamination by contagion of ill persons), and animal-reminder disgust (i.e., items related to threat to the body envelope, injury to the body, or death). Items are rated on a three-point response scale (0 = always, 1 = sometimes, 2 = never), which was determined to be more developmentally appropriate for children compared to a five-point response scale. Research has shown that the CDS measures disgust affect and disgust avoidance, as well as general disgust sensitivity response. The CDS has shown good internal consistency ($\alpha = 0.77$) and convergent and discriminant validity, suggesting that the CDS is a developmentally appropriate measure with good psychometric properties (Viar-Paxton et al., 2015).

Beyond using the typical paper-and-pencil approach to measure disgust sensitivity, other methods have been used including observation of facial expressions (Ekman & Friesen, 1986), neuroimaging techniques (Schienle et al., 2005), psychophysiological measures (Stark et al., 2005), and behavioral tasks (Klieger & Siejak, 1997; Tsao & McKay, 2004). These alternative means of measuring disgust sensitivity have not only added to the expanding literature on disgust sensitivity but also served as a means of validating self-report measures. Rozin et al. (1999) demonstrated that scores on the DS predicted behavior on a series of behavioral tasks designed to evaluate disgust in a large sample of undergraduate students. Rozin et al. found that performance on the behavioral tasks correlated with the score on the DS for participants who took the DS 2 months prior to the behavioral tasks, as well as for participants who took the DS immediately following the experiment.

In a sample of children, Muris et al. (2008b) included a behavioral measure of disgust sensitivity in addition to the DSQ and DS by asking the children to select "defiled candy" (p. 135) as a reward for their participation in the task. Children were asked to choose whether they would like either "five pieces of fresh chocolate, ten pieces of chocolate that had passed the best-before date, or 15 pieces that had been dropped on the floor" (p. 137). The authors conducted a pilot investigation of their behavioral task with a sample of 114 children and asked them to rate their level of disgust for each of the three conditions from 1 ("not at all disgusting") to 5 ("very disgusting") and found that ratings for condition 1 were low ($M = 1.34$, SD = 0.74), but ratings for conditions 2 and 3 were each significantly higher ($M = 3.68$, SD = 1.16 and $M = 3.48$, SD = 1.21, respectively).

The Role of Disgust in Psychological Disorders

Although disgust was referred to as the "forgotten emotion of psychiatry" a decade ago (Phillips et al., 1998), it has recently emerged as an increasingly important variable in psychological research (Olatunji & McKay, 2007, 2009). Foremost, trait disgust has been proposed as a central variable in the etiology and maintenance of some anxiety disorders, including

contamination-related OCD, animal phobias, and BII phobia, all of which are discussed in detail below. Anxiety disorders have primarily been conceptualized as being phenomenologically and etiologically related emotional responses associated with overdeveloped and overgeneralized danger perceptions that result in anxious arousal (Barlow, 2002; Barlow et al., 2004; Cisler et al., 2009). However, the literature investigating the relationship between disgust and anxiety disorders is quickly mounting, and the results have begun to provide a more comprehensive perspective on factors involved in avoidance. Indeed, disgust sensitivity has been conceptualized as a dispositional trait that increases the likelihood of an individual developing avoidance reactions (McNally, 2002).

In a review of 41 studies examining the emotional responding toward disorder-relevant stimuli, Cisler et al. (2009) demonstrated that spider phobia, BII phobia, and contamination-related OCD are all characterized by fear and disgust. The authors of this study investigated fear and disgust across four separate response domains believed to differentiate between these emotions: heart rate, cognitive appraisals, facial expression, and neural substrates. Several additional lines of research have examined disgust's relationship with small animal phobia, BII phobia, and contamination-related OCD and, taken together, suggest that disgust may be implicated in the pathogenesis and maintenance of these conditions (Olantunji et al., 2010). First, self-report measures of disgust propensity have repeatedly been associated with self-report measures of these conditions (e.g., Olantanji and Cisler (2009)). Second, research has demonstrated that persons with elevated spider fears, BII phobia, and contamination fears report feelings of disgust when exposed to associated stimuli (e.g., Deacon and Olatunji (2007), Sawchuk et al. (2002), Tolin et al. (1997)). Third, self-reported disgust is related to avoidance of spiders, BII-related stimuli, and contamination-related stimuli (e.g., Deacon and Olatunji (2007), Olatunji et al. (2008a), Tsao and McKay (2004), Woody et al. (2005)). Fourth, studies have indicated that disgust plays a critical role in the cognitive biases exhibited by small animal, BII, and contamination-fearful individuals (e.g., Huijding and de Jong (2007), Sawchuk et al. (1999), Teachman et al. (2001), Tolin et al. (2004)).

These data suggest that disgust may function as a maintenance factor in contamination-related OCD, animal phobias, and BII phobia (Muris, 2006). Although speculative, the pattern of findings described above suggests several avenues by which this may occur. In accordance with Mowrer's two-factor model (Mowrer, 1960), disgust-related avoidance is likely to minimize exposure to the avoided stimuli and, consequently, deprive an individual of the opportunity to incorporate corrective information into his or her maladaptive disgust- or fear-related schemata (Muris, 2006). Thus, a child who actively avoids spiders would, theoretically, minimize his or her opportunities to learn, for example, that he or she will not be overwhelmed with disgust or panic when a spider is encountered. Second, as avoidance functions to minimize aversive emotional states (Barlow, 2002; Barlow et al., 2004), this method of coping is likely to be negatively reinforced (Mowrer, 1960). Third, the cognitive biases associated with disgust (e.g., sympathetic magic, primary and secondary disgust-related appraisals, and attentional, perceptual, and memory biases) may promote the persistence of these dysfunctional schemata and indirectly promote the utilization of avoidance.

In contrast to the disgust state, the propensity to experience disgust (i.e., trait disgust) appears to be a specific, genetically based vulnerability factor to the development of contamination-related OCD, animal phobias, and BII phobia (Muris, 2006). More specifically, on the basis of the results of mediational studies, Olatunji et al. (2010) suggest that disgust propensity may mediate the relationship between general vulnerabilities (e.g., negative affectivity, contamination-related cognitions, contamination fear) and the aforementioned anxiety disorders. In other words, mediational studies suggest that these higher-order factors contribute to the development of spider phobia, BII phobia, and contamination-related OCD via one's proclivity to experience disgust. According to the authors

(Olantunji et al., 2010), (a) disgust propensity may play a role in these conditions via interpretation biases, attentional biases, or dread of contagion, (b) anxiety sensitivity and difficulties in general emotional regulation may potentiate the relationship between disgust propensity and contamination and spider fears, and (c) parental disgust propensity may be implicated in the development of spider phobia and, pending further research, BII phobia and contamination-related OCD.

Animal Phobias

Although there is ample evidence from research with adults for a disgust conceptualization of animal phobias (e.g., Matchett and Davey's (1991) disease-avoidance model), there have been far fewer studies with pediatric samples. In a sample of school children aged 8–13 years in the Netherlands, Muris et al. (1999) found that disgust sensitivity as measured by the DSQ was significantly correlated with animal phobias, even when controlling for trait anxiety (r = 0.14). Muris et al. (2008b) also found that DS and DSQ scores were both significantly correlated with small animal phobias (mean r = 0.42) and spider phobia (mean r = 0.36) for boys and girls aged 9–13 years. Furthermore, these researchers found that the DS animals subscale in particular was specifically related to small animal and spider phobia. In a behavioral test, in which children were asked to select from clean or contaminated candy as a reward, the results were significantly correlated with small animal and spider phobia for girls only.

Muris et al. (2008a) demonstrated that fear to an unknown animal can be experimentally induced in children by providing disgust-related information about the animal. In this study, Muris and colleagues provided disgust-related information (e.g., "When a cuscus/quokka has to urinate or to relive himself, he just does it in the hole where he also sleeps" [p. 139]) and cleanliness-related information (e.g., "The cuscus/quokka lives in a hole which smells nice. This is because he decorates his bed with petals and flowers" [p. 139]) to Dutch school children about unknown Australian marsupials. The results indicated that disgust-related information induced both higher levels of disgust and fear in relation to these animals, while the cleanliness-related information decreased disgust and fear toward the animal. Another study by Muris et al. (2012) presented children with either disgust-eliciting specimens of the cuscus (e.g., excrements) or neutral specimens of the cuscus (e.g., piece of clean, well-combed fur). Children in the disgust specimen group exhibited an increase in fear toward the cuscus and a stronger inclination to interpret ambiguous situations involving the cuscus in a more negative way compared to children in the neutral specimen group. These two studies provide compelling evidence that disgust-related information increases fear of unknown animals.

With regard to disgust sensitivity and small animal phobias, research has primarily focused on spider phobia in particular (de Jong et al., 1997; de Jong & Muris, 2002). With a sample of 22 spider-phobic girls, de Jong et al. (1997) found that not only was disgust sensitivity significantly correlated with fear of spiders but also ratings of disgust decreased along with fear after successful treatment. Specifically, the authors found that spider-phobic girls had had higher disgust sensitivity and found spiders in particular more disgusting than did nonphobic controls. Additionally, they found that disgust associated specifically with spiders was reduced through treatment using eye movement desensitization and reprocessing (EMDR) as well as in vivo exposure. However, the level of disgust sensitivity, as measured by the DSQ (Rozin et al., 1984), remained unaffected by treatment targeting the spider phobia.

In a follow-up study, de Jong and Muris (2002) compared a sample of 18 spider-phobic girls to a group of 18 nonphobic girls on their ratings of disgust sensitivity as well as their ratings of the subjective likelihood of a spider to enter their private living space, spiders' tendency to approach and make physical contact, and the subjective probability of spiders doing physical harm. The results indicated that spider-phobic girls reported significantly higher levels of disgust sensitivity and found spiders more disgusting than

nonphobic girls. Notably, phobic girls in this study reported higher ratings concerning spiders' tendency to enter their living space and approach and make contact with them. The authors hypothesize that the combination of increased disgust sensitivity and cognitions related to increased likelihood of making physical contact leads to the development of spider phobia. It is interesting to note that the results indicated that the critical variable in distinguishing between the phobic and nonphobic girls in regression analyses was the perceived ability of spiders to contaminate a chocolate bar (i.e., response to the items: "How much would you like to eat your favourite chocolate bar after a spider has walked across the bar when it is still wrapped in its package?" and "How much would you like to eat your favourite chocolate bar after a spider has walked across the unpacked bar?" [de Jong et al., 1997, p. 560]). Cognitions regarding the likelihood for a spider to approach and make contact had no additional predictive value in this study, which is a strong evidence that spider phobia is most closely related to disgust sensitivity.

Obsessive-Compulsive Disorder

In addition to phobias, a growing body of research has indicated that there is a relationship between disgust sensitivity and OCD. Fear of contamination has been identified as one of the most common obsessive concerns among people who suffer with OCD (Foa & Kozak, 1995; Foa et al., 1995), and this preoccupation with avoiding contamination points to a plausible relationship between disgust sensitivity and OCD. Tolin et al. (2006) suggested that disgust may uniquely contribute to contamination-based OCD because feelings of disgust lead to phobic avoidance of certain stimuli that are relieved through compulsive behavior and the behavior is sustained through negative reinforcement.

There is ample empirical research linking disgust sensitivity and OCD symptoms in adult samples (Mancini et al., 2001; Schienle et al., 2003b; Thorpe et al., 2003). In particular, research has suggested that disgust sensitivity appears to be most strongly associated with washing and checking symptoms in OCD. Muris et al. (2000) found that obsessive-compulsive symptoms, especially cleaning concerns, were significantly related to disgust. Olatunji et al. (2005) also found that disgust sensitivity was a predictor of high levels of contamination fear.

Moretz and McKay (2008) investigated the relationship between OCD contamination symptoms, trait anxiety, and disgust sensitivity in a large sample of undergraduate students ($N = 740$). Using structural equation modeling, disgust sensitivity, as measured by the DS, was directly and positively associated with contamination fear and washing rituals. The relationship between disgust sensitivity and contamination and washing OCD symptoms was neither fully nor partially mediated by trait anxiety, which indicates that contamination-based OCD symptoms may be better conceptualized as resulting from increased disgust rather than fear.

To date, there has been very little research to date on the connection between OCD and disgust sensitivity in pediatric samples. In a sample of school children aged 8–13 years in the Netherlands, Muris et al. (1999) found that disgust sensitivity as measured by the DSQ was significantly correlated with OCD symptoms ($r = 0.30$), but this correlation lost significance when trait anxiety was held constant. In another nonclinical sample, Muris et al. (2008b) found that DS and DSQ scores were both significantly correlated with OCD symptoms for boys aged 9–13 years. For girls in the sample, DS score was significantly correlated with OCD symptoms, but the DSQ score was not significantly correlated. Furthermore, these researchers found that the DS hygiene subscale in particular was specifically related to OCD symptoms. In a behavioral test of disgust sensitivity, there was a significant correlation between disgust sensitivity and OCD symptoms for boys only. More recently, a study of the degree to which fear, incompleteness, and disgust are associated with the main symptom dimensions of OCD (aggressive, symmetry, contamination) conducted with a sample of youth with OCD found that while disgust was involved in all three OCD symptom dimensions, it was

most strongly linked to contamination symptoms (Cervin et al., 2020). Finally, Knowles et al. (2016) investigated the relationship between changes in disgust proneness and disorder-specific symptoms during residential treatment among youth aged 12–18 with OCD, anxiety, and mood disorders. They found that reductions in disgust were greatest among youth with primary OCD and that OCD symptoms, compared to other symptoms, were most strongly correlated with reductions in disgust proneness. These preliminary results are similar to findings in adult populations and indicate a link between disgust and OCD, but there is a clear need for more research utilizing clinical pediatric samples.

Blood-Injection-Injury Phobia

Discomfort upon exposure to blood, injury, and needles is a common phenomenon in childhood and adolescence. Research indicates that between one-quarter and one-half of children experience mild BII fears (Lapouse & Monk, 1959; Marks, 1988). For approximately 3% of children and adolescents, however, BII fears are severe and debilitating enough to warrant a clinical diagnosis (Marks, 1988; Miller et al., 1974). Research has revealed that BII phobia is closely related to disgust (de Jong & Merckelbach, 1998; Olatunji et al., 2005; Page, 1994, 2003; Sawchuk et al., 2002; Tolin et al., 1997).

Disgust reactions (i.e., state disgust) are believed to be centrally involved in BII phobia-related fainting (Page, 1994, 2003; Page & Tan, 2009). Upon presentation of BII stimuli, individuals exhibit a biphasic response characterized by an initial surge in sympathetic nervous system activity, rapidly followed by a drop in blood pressure and heart rate. If the drop in blood pressure is precipitous enough to impede cerebral blood flow, fainting and, to a lesser extent, seizures can occur (Bienvenu & Eaten, 1998; Graham et al., 1961; Marks, 1988; Page, 1994, 2003). Fear is likely responsible for the initial increase of sympathetic nervous system activity (Olatunji et al., 2008b; Page, 1994, 2003; Thyer & Curtis, 1985); the mechanism responsible for the shift into the latter phase of the diphasic response is hypothesized to be state disgust (Page, 1994, 2003; Page & Tan, 2009).

While the incidence of fainting among BII phobic children has not been reported, a significant minority of adolescents faint in response to BII stimuli (Kleinknecht & Lenz, 1989), and fainting in response to presentation of a "noxious" or "emotional" stimulus has been documented in children and adolescents (Driscoll et al., 1997). These findings, in conjunction with the early age of onset of BII phobia (Bienvenu & Eaten, 1998; Marks, 1988; Ost, 1992), current etiological theories of BII phobia (Olatunji et al., 2008a, 2006b; Page, 1994; Page & Tan, 2009), and modern adaptationist conceptualizations of fainting in response to BII-related stimuli (Bracha, 2004), suggest that fainting may directly influence the etiology and maintenance of the disorder in children.

Trait disgust has also been moderately to strongly correlated with BII fear, BII fainting, and BII avoidance (e.g., de Jong and Merckelbach (1998), Muris et al. (1999, 2008b), Olatunji et al. (2008, 2006a, b), Page (2003), Schienle et al. (2001)). For example, Muris and colleagues (1999) examined the relationship between trait disgust and BII phobia symptoms in nonclinical children and found that trait disgust was moderately correlated with BII phobia symptoms, even after controlling for levels of trait anxiety. In a more recent study, Muris et al. (2008b) found significant positive correlations between trait disgust and symptoms of BII phobia, which were not attenuated when controlling for neuroticism (i.e., the tendency to experience negative affect).

Finally, disgust-related cognitive processes are also speculated to be involved in the pathogenesis and maintenance of BII phobia (Olantunji et al., 2010; Page & Tan, 2009). As described above, the cognitive processing of disgust-related information is often biased by the laws of contagion and similarity (i.e., law of sympathetic magic; Rozin & Fallon, 1987; Teachman, 2006), pathological disgust reactions are characterized by disgust-related primary and secondary appraisals (Teachman, 2006), and disgust may be associated with unique attentional, perceptual,

and memory biases (Williams et al., 2009). Unfortunately, only limited research has investigated the relationships between these cognitive phenomena and BII phobia. Future research should attempt to continue to elucidate these associations and to further determine the extent to which these constructs are involved in childhood BII phobia specifically.

A Preliminary Model of Disgust in Childhood Anxiety Disorders

The available evidence suggests that disgust plays a role in several different anxiety problems that manifest in childhood. In light of the research conducted illustrating a connection between avoidance and disgust and the basic research on the development of disgust-related aversions, a preliminary model may be considered to guide future research.

Development of Disgust

As discussed earlier, infants show the capacity to express disgust reactions. However, perhaps more than other emotional states, disgust for specific objects is taught by caregivers and other environmental sources (Sawchuk, 2009). The most basic learning for disgust involves adverse reactions to food-related stimuli that would be deemed unpalatable, either due to risks of ingesting toxins for similar appearing foods (e.g., eating candy shaped like feces) or for culturally specific reasons (e.g., proscribing consumption of uncooked vegetables in some Chinese cultures). The underlying basis for how disgust is acquired has recently focused on evaluative conditioning, as discussed earlier (de Houwer et al., 2001). To summarize, the act of labeling an object, in conjunction with the modeled reactions of caregivers, produces a powerful learning experience that consolidates the emotional reaction and leaves it resistant to extinction.

It is interesting to note that disgust is unique in this regard. Other emotional states associated with psychopathological conditions do not show this kind of unambiguous direct connection between parental modeling and learning. For example, recent evidence suggests that many phobias arise without any direct experience with the phobic stimulus and that in some instances, conditions that learning theory would predict the onset of phobias instead show substantial approach behavior for the same stimulus (detailed in Menzies and Clarke (1995)).

While the parental modeling approach appears to effectively instruct children on disgust for food and objects resembling disgust-related stimuli, this only accounts for one facet of disgust. Recent research has suggested that the seven disgust elicitors comprise three larger categories, namely, core (which includes food and body products), animal reminder (such as body envelope violations and sex), and contamination (prominently featuring sympathetic magic). These domains, identified in psychometric evaluations of the disgust scale (Olatunji et al., 2007c), have unique behavioral, psychophysiological, and self-report correlates when examined with undergraduate and community samples (Olatunji et al., 2008b). How these disparate forms of disgust develop is not clear, although each has been found in multicultural evaluations (Olatunji et al., 2009).

Sawchuk (2009) suggests that older children and adolescents develop more sophisticated appraisal processing skills that, in conjunction with normal neural development, allows for greater distinctions among potentially disgust-evoking stimuli and situations that would pose risks for contamination and other harms. Accordingly, sympathetic magic and its associated laws of similarity and contagion have their roots in parental instruction but gain greater prominence in more elaborate situational appraisal that comes with cognitive development.

Internal Evaluation and Appraisal

As children develop greater appraisal processing skills, anxiety can be conferred by increased internal monitoring. Anxiety sensitivity has been shown to be a potent explanatory construct for a

wide range of anxiety states (Taylor, 1999). However, anxiety sensitivity derives from a broader expectancy model (Reiss, 1991). Whereas disgust is taught for a wide range of stimuli, experienced disgust has specific physiological consequences (i.e., nausea, lightheadedness, reduced blood pressure). According to Reiss, self-monitoring of internal states, particularly when monitoring for increased risk, is a constitutional attribute. Anxiety sensitivity can be reliably assessed in children and has been shown to predict several childhood anxiety disorders (Silverman & Weems, 1999). It has been proposed that a similar construct for disgust related to internal monitoring could predict avoidance reactions and anxiety states that are closely tied to disgust (Olantunji et al., 2010).

Summary and Future Directions

The research summarized here illustrates that disgust has recently been shown to play a prominent role in a wide range of anxiety problems. The vast majority of this research has focused on adult undergraduate, community, and clinical samples. While relatively little attention has been devoted to the role of disgust in childhood anxiety disorders, the early findings appear to suggest that there is a connection similar to that seen in adults. We propose here a preliminary model that would account for the development of disgust reactions in conjunction with anxiety problems. The model depends primarily on basic learning of disgust in conjunction with a proneness to monitor internal states and appraise changes as due to disgust in a manner similar to that for anxiety sensitivity and monitoring for potential harm. As disgust is resistant to extinction due to its roots in evaluative conditioning, interventions other than exposure may be warranted in order to alleviate these reactions as part of a comprehensive approach to treating childhood anxiety disorders.

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13 Problems in Emotion Regulation in Child and Adolescent Anxiety Disorders Section: Diagnostic Components of Child and Adolescent Anxiety Disorders

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Theoretical Foundations of Emotion Regulation in Anxiety Disorders

In the first edition of this chapter, over a decade ago, we noted that the field of psychology was in the midst of an emotion revolution, with much of that work specifically focused on the construct of emotion regulation (ER). Indeed, our understanding of the ways that ER is involved in youth psychopathology broadly, and anxiety specifically, has increased dramatically as a result of this work and has recently been summarized in narrative reviews and meta-analyses (e.g., Mathews et al. (2016), Sendzik et al. (2017), Schäfer et al. (2017)).

Despite the plethora of works examining ER in child psychopathology in the past decade (and prior), debates still exist regarding the conceptualization and operationalization of ER. In this chapter, we define ER as a set of processes required for the modification of emotional experiences based on contextual demands and in the service of one's goals (Thompson, 1994). ER involves an awareness of an emotional experience, the ability to appraise the context surrounding the emotional experience, and modification of emotional expression given social context demands. ER is part of a larger dynamic, biobehavioral system of self-regulation in which cognitive, behavioral, and physiological components are reciprocally related to one another and are influenced by environmental experiences (Blair et al., 2011; Fox & Calkins, 2003).

ER underlies healthy functioning across the life span, and difficulties in this developmental process have been linked to various forms of psychopathology. In this way, ER is a transdiagnostic process that underlies various forms of psychopathology, both internalizing and externalizing (Aldao et al., 2016). Although difficulties in ER are not specific to anxiety disorders, there are certain patterns of emotional arousal and ineffective emotion management that are associated with childhood anxiety disorders in particular and that are influenced by contextual variables such as parenting (Allen et al., 2016; Mathews et al., 2016; Schäfer et al., 2017; Tan et al., 2020; Whitehead & Suveg, 2016). Clinical scientists have attempted to translate these basic research findings into empirically supported interventions for child anxiety with mixed results (Kennedy et al., 2019; Suveg et al., 2018). In this

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chapter, we illustratively, though not exhaustively, review this literature. We conclude with a critical synthesis of the work and offer suggestions for future research in this area.

Biological Foundations of Emotion Regulation in Anxiety

Neurobiological and genetic factors are pivotal in considering the development of ER because their influence is present from birth. Although there is no single genetic marker for anxiety disorders, there are structural and functional abnormalities in neurobiological systems and patterns of reactivity that are associated with anxiety (e.g., for a review, see Strawn et al., 2021). Specifically, several major neurobiological systems are associated with the elicitation, experience, and regulation of emotions (e.g., amygdala, prefrontal cortex, vagal tone), and a growing body of literature has linked anxiety with abnormalities in such substrates (Blackford & Pine, 2012; Strawn et al., 2014).

The amygdala in particular plays an essential role in emotion management and arousal (Fox et al., 2015; Janak & Tye, 2015), and children with anxiety disorders have been shown to exhibit greater amygdala responses to fearful stimuli than nonanxious children (Williams et al., 2015). Frontal cortical regions of the brain that are involved in modulating amygdala activity are also highly involved in ER activity (Janak & Tye, 2015). For instance, youth with higher levels of anxiety and behavioral inhibition (a temperamental style discussed below) show increased prefrontal activation (Fu et al., 2017). Animal and human studies suggest that there may be a distinct fear circuitry system in the brain connecting the amygdala and prefrontal cortex that serves as a neural basis for anxiety disorders (Duvarci & Pare, 2014; Fox et al., 2015). In brief, this fear circuitry system involves key brain regions (e.g., amygdala, hippocampus, prefrontal cortex) that are implicated in threat perception, fear learning, and the experience and modulation of the fear response (see Duvarci and Pare (2014) for a more thorough explanation of this fear circuitry system). In addition to alterations in neural connectivity and activation, youth with anxiety show neurostructural abnormalities in brain regions involved in emotion regulation such as decreased gray matter volume in the amygdala, ventromedial prefrontal cortex, and hippocampus (for a review, see Strawn, Lu, Peris, Levine, & Walkup, 2021).

Research has also identified physiological processes implicated in both emotion regulation and anxiety. For example, vagal tone, a measure of the balance between the sympathetic and parasympathetic nervous systems, is considered a psychophysiological marker that underlies critical self-regulatory processes (see Holzman and Bridgett (2017) for a review). Low vagal tone is typically associated with ER deficits and difficulties managing emotionally arousing situations (Beauchaine & Bell, 2020). In contrast, high vagal tone has also emerged as a potential protective factor in the link between risk factors (e.g., behavioral inhibition, cognitive biases) and anxiety symptoms in children (Trent et al., 2020; Viana et al., 2017). Nonetheless, neurobiological and physiological factors alone are not sufficient to explain why some youth develop anxiety disorders and others do not. It is the interplay of these factors with other temperamental, cognitive, and environmental influences that accounts for a child's vulnerability to developing an anxiety disorder (Davis et al., 2017; Degnan et al., 2010).

Behavioral inhibition (BI), a temperament style characterized by fear, shyness, and avoidance of novel situations and people (Fox et al., 2005), has been identified as a robust risk factor for the development of anxiety disorders in youth (Sandstrom et al., 2020). Temperament is closely tied with children's emotion regulation abilities (Rothbart & Bates, 2006); behaviorally inhibited children tend to engage in avoidance and withdrawal to manage anxiety, which in turn maintains their heightened reactivity to fear and limits their opportunities to learn better emotion regulation strategies (Stifter et al., 2011). Importantly, not all children initially classified as inhibited remain inhibited across time (Tang et al., 2017), and a variety of intrinsic (e.g., neurobiological)

and extrinsic (e.g., parental, familial, life stress) factors likely contribute to the variability in outcomes (Lahat et al., 2011; Ryan & Ollendick, 2018). Research suggests that children displaying extreme levels of inhibition likely maintain their classification years later and are at the greatest risk of subsequent anxiety disorder development (Chronis-Tuscano et al., 2009; Vreeke et al., 2013). Previous research suggests that early temperamental risk could be moderated by parenting factors over time. As one example, overinvolved parenting may reduce opportunities for youth to experience novel, difficult situations and thus preclude them from developing a repertoire of effective ER strategies and the self-efficacy needed to enact them (Ollendick & Grills, 2016).

Cognitive Foundations of Emotion Regulation in Anxiety

Emotion regulation and cognitive processes are closely intertwined, and these domains can interact in ways that influence anxiety development and maintenance (Trent et al., 2020). For instance, the tendency to interpret ambiguous situations in a threatening manner is associated with anxiety in youth both concurrently and prospectively (Cannon & Weems, 2010; Dodd et al., 2012). Increases in negative emotion as a result of threatening interpretations may become increasingly difficult to manage and pose threats to effective ER. On the flip side, youth with ER difficulties may have difficulties generating and using cognitive strategies to effectively regulate emotional experiences. Recently, in a sample of 8–12-year-old children with anxiety disorders, Trent et al. (2020) found that child interpretation biases were associated with more severe anxiety symptoms but only in the context of poor vagal regulation (conceptualized as a physiological index of ER), suggesting a buffering effect of high vagal regulation. Further, the combination of poor vagal regulation and interpretation biases was associated with the most severe anxiety symptoms. This study documents the complex interplay of ER, cognitive processes, and even physiology, thus highlighting the value of multimethod data.

Youth with anxiety also show deficits in the cognitive strategies used to regulate emotional experiences in response to stressful negative events (i.e., cognitive ER). Cognitive strategies such as catastrophizing and rumination are considered maladaptive whereas positive reappraisal and refocusing are adaptive (Garnefski et al., 2007). Several studies have found that anxious youth use maladaptive cognitive ER more and adaptive cognitive ER strategies less than their nonanxious peers (Chan et al., 2016; Garnefski et al., 2002). For instance, in a sample of 9–11-year-old youth, those with anxiety disorders endorsed catastrophizing and rumination more and positive reappraisal and refocus less than did youth without disorders (Legerstee et al., 2010). Relatedly, another study by Suveg et al. (2010) found that youth with anxiety disorders engage in fewer problem-solving strategies overall when managing their emotions than nonanxious youth.

In part, the ER difficulties that anxious youth experience may be related to their low sense of self-efficacy in managing negative events. Several studies have found that anxious children have lower self-efficacy than nonanxious youth (Muris, 2002; Muris et al., 2009; Suveg & Zeman, 2004). Lower self-efficacy results in increased doubts regarding the ability to control emotional experiences and responses in arousing situations (Suveg & Zeman, 2004). Collectively, low self-efficacy in combination with poorer ER likely leads youth with anxiety disorders to avoid or give up in emotionally challenging situations, which further reinforces their cognitions regarding their abilities to handle future emotionally challenging situations. Although avoidance is effective in the short term by producing immediate reductions in anxiety, it prevents the child from learning to regulate emotional arousal and achieve a sense of mastery over the anxiety-provoking event. Counterproductively, this avoidance will serve to maintain a child's fears and may hinder him/her broadly, primarily through restricting social, academic, and other opportunities.

Environmental Foundations of Emotion Regulation in Anxiety

Environmental influences have been strongly implicated in the link between children's ER and anxiety. While there are a wide range of environmental influences (e.g., children's opportunity to observe and practice ER skills, children's exposure to emotionally charged scenarios, parent and peer responses to children's emotional displays, sociodemographic and cultural factors (Schäfer et al., 2017)), this chapter focuses on two that have received much support – parents and peers (Miller-Slough & Dunsmore, 2019).

One of the most prevalent ways parents and peers influence a youth's ER and anxiety is through a process called emotion socialization (for review, see Miller-Slough and Dunsmore (2016)). Emotion socialization is the mechanism through which others teach children appropriate ways to express and regulate their emotions (Eisenberg et al., 1998). Parents are thought to be the first socializers of their children's emotions, monitoring youth's exposure to emotional experiences and acting as filters of children's emotional environments (Denham et al., 2015). Parents who are less accepting of a child's emotional displays may reinforce a youth's inhibition of emotion, thus leading to fewer opportunities to learn successful coping strategies and therefore increase the risk of developing anxiety (Sarıtaş et al., 2013). In contrast, parents who engage in more supportive forms of socialization (e.g., validation of a child's emotions, calm and pleasant affect when engaging with the child) may buffer against a child's anxious affect (Oppenheimer et al., 2016). Parents of anxious children may also show low levels of emotional expression and flexibility as well as engage in maladaptive socialization techniques (e.g., high levels of negativity and intrusiveness) during emotional experiences with their child (Hudson et al., 2008; Van der Giessen & Bögels, 2018). Further, parents of anxious children are more likely to be suffering from anxiety themselves and might model anxious or avoidant behaviors when faced with an anxiety-provoking situation. This, in turn, may signal to children that the event is insurmountable and potentially dangerous (Becker & Ginsburg, 2011).

Peers also have a substantial impact on a child's ER and anxiety. Particularly as youth enter into adolescence, they spend more time with their peers than anyone else (Lerner & Steinberg, 2009). With increased autonomy and decreased parental supervision, friendships become more intimate and places of greater emotional support (Voile, 2010). When adolescents receive supportive socialization from their friends (e.g., validation, distraction) when experiencing intense emotional arousal, they are more likely to seek support again (Legerski et al., 2015), potentially buffering against the development of psychopathology (Rubin et al., 2008). However, poor quality friendships or a lack of friendships may confer risk for the development of anxiety disorders. Adolescents who experience emotion neglect from their peers may begin to feel isolated, decreasing the likelihood that they will continue to seek emotional support. This gives way to increased emotional suppression as well as risk for anxiety (Legerski et al., 2015). Further work has noted that adolescents who experienced more punitive socialization of their emotions by peers reported increases in somatic complaints over time, a common symptom of anxiety disorders (Parr et al., 2016). Taken together, it is likely that several parental, peer, and child factors interact to result in emotion dysregulation in youth with anxiety disorders.

When examining emotion regulation and anxiety disorders in youth, gender differences have been noted across emotion competencies. For example, a meta-analysis by Chaplin and Aldao (2013) demonstrated that middle childhood girls expressed significantly more positive emotions and internalizing emotions (i.e., sadness and anxiety) whereas boys expressed significantly more externalizing emotions (i.e., anger). In terms of anxiety, Bender et al. (2012) found emotion dysregulation to be more predictive of anxiety in girls relative to boys. Finally, Stone and colleagues (2019) found that co-distraction (vs. distraction alone) was effective at regulation of negative affect in anxious girls, but not in boys. Gender differences are also noted in

peer relationships. For example, girls are more likely to expect supportive socialization from their friends and less likely to anticipate unsupportive socialization when compared to boys (Klimes-Dougan et al., 2014). Girls with anger dysregulation may be at greater risk for peer victimization when compared to boys (Morelen et al., 2016).

Finally, some studies have suggested that socialization and child ER strategies may vary between cultures and other sociodemographic variables (Cole et al., 2006). With respect to socialization, for example, Western cultures tend to be more emotionally expressive and discuss emotions more freely when compared to Eastern cultures (Morelen et al., 2013). Additionally, current emotion socialization frameworks, typically grounded in Western culture, often place a greater emphasis on youth's autonomy (Friedlmeier et al., 2011). Despite this, the notion that ER is a risk factor for anxiety is a robust finding across cultures (McLaughlin et al., 2011). Nonetheless, in recent years, a burst of research in this area has yielded specific findings based on cultural background. For example, Varela et al. (2019) found that Latinx youth who endorsed greater anxiety exhibited poor emotional awareness. In Chinese samples, research suggests that Chinese adolescents are more likely than children in Western cultures to suppress their positive facial expressions in an attempt to maintain harmony (Deng et al., 2013). And finally, work by Folk et al. (2014) assessed predictors of anxiety in urban minority youth (77.5% Black) and found anger and sadness dysregulation as well as worry inhibition significantly predicted anxiety 2 years later. Taken together, predictors of anxiety and influences on emotion regulation are highly intertwined with cultural and sociodemographic factors.

See Fig. 13.1 for an illustrative conceptualization of the various pathways to the development of ER in youth with anxiety disorders. The figure, which was adapted from Suveg, Morelen, Brewer, and Thomassin (2010), is not exhaustive and highlights only some of the potential variables involved in ER in youth with anxiety disorders.

Assessment of Emotion Regulation in Childhood Anxiety

Experts agree that emotion regulation operates at physiological, behavioral, cognitive, and experiential substrates, and have thus called for integrated approaches to measuring child emotion regulation. Despite these calls, only 4.5% of published studies assess emotion regulation using multiple methods (Adrian et al., 2011). Rather than serving as an exhaustive review, the purpose of the following section is to illustrate various methodological approaches to measure ER in youth including questionnaires, experimental tasks and behavioral observation, ecological momentary assessment, and biological and neuroscience methods.

Questionnaires

Questionnaire methods range from youth self-report measures to caregiver and teacher reports, and they target the full spectrum of ER and related functions from negative emotionality or reactivity to the use of specific emotion regulation strategies. When asking youth to report on their emotional experiences, it is important to take into account potential developmental constraints. For example, youth may not possess the self-awareness necessary to make such reports, particularly when below the age of 5 years (Kazdin & Weisz, 2003). Obtaining ER data from youth themselves, when appropriate, is ideal given that emotional experiences are not always expressed outwardly; thus, only youth may be aware of and able to report on their internal emotional experiences.

Examples of such measures include the *Children's Emotion Management Scales* (CEMS; Zeman et al., 2001), which assess inhibition as well as dysregulation and ER coping. The *How I Feel* questionnaire (HIF; Walden et al., 2003) measures emotional arousal (i.e., frequency and intensity of emotion) and emotion control. The *Emotion Expression Scale for Children* (EESC; Penza-Clyve & Zeman, 2002) measures emotion awareness and willingness to express negative

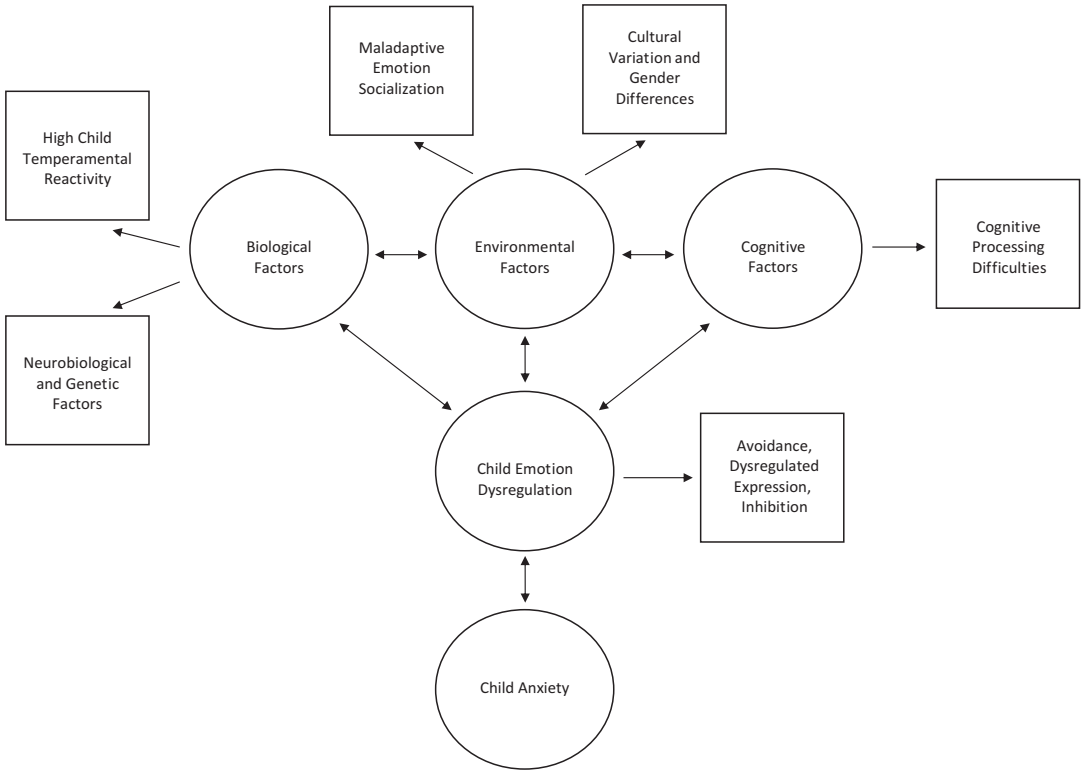

Fig. 13.1 Illustrative model depicting several of the major variables involved in child emotion dysregulation and anxiety disorders

emotion. Other questionnaires measure specific aspects of regulation such as the *Cognitive Emotion Regulation Questionnaire* (CERQ, ages 12 and older (Garnefski et al., 2001)) and the *Cognitive Emotion Regulation Questionnaire – kids version* (CERQ-k, ages 9–11 (Garnefski et al., 2007)), which measure nine cognitive ER strategies (e.g., self-blame, catastrophizing, positive reappraisal) that children and adolescents may use after the experience of negative life events.

Several instruments have been developed for completion by caregivers and teachers. The *Emotion Regulation Checklist* (ERC; Shields & Cicchetti, 1997), for example, is arguably the most commonly used measure assessing caregiver's perceptions of their child's ER abilities. Finally, some instruments have parallel youth and caregiver report to facilitate multireporter measurement. For example, the *Child and Adolescent Dispositions Scale* (CADS-P/CADS-Y; Lahey et al., 2010) includes a subscale measuring negative emotionality more broadly, and the *Regulation of Emotion Systems Survey* (RESS; De France & Hollenstein, 2017) assesses specific regulation strategy use (i.e., distraction, rumination, arousal control, reappraisal, engagement, and suppression).

Experimental Tasks and Behavioral Observation Methodology

A myriad of experimental laboratory tasks have been used to elicit emotion in youth samples. These tasks lend themselves to measuring task performance, affective and behavioral displays, and ER strategy use. The disappointing gift para-

digm (Saarni, 1984), for example, creates positive expectations within the child of receiving a desired reward. When this gift violates the youth's expectations, children are then expected to appropriately modulate their emotions and follow socially acceptable display rules. Coding techniques such as microanalytic coding and global coding have been suggested for facial expressions, tone of voice, emotions expressed, and intensity of emotion (e.g., Thomassin and Suveg (2014)). Other researches have utilized emotion discussions (e.g., asking a youth to talk about times when they felt discrete emotions), which are then coded for variables such as the strategy that the youth implemented when feeling the emotion and their affect during the discussion. Research using this paradigm with both typical and anxious populations has yielded interesting results (e.g., Hudson et al. (2008)). Tasks such as the Trier Social Stress Test have been widely used and can assess performance (e.g., see the ESPM observational coding scheme (Rith-Najarian et al., 2014)) as well as physiological arousal (Seddon et al., 2020; Thomassin et al., 2018). Finally, experimental tasks, such as the cognitive reappraisal task (McLaughlin et al., 2015), can instruct youth to apply specific regulation strategies and measure the impact of those strategies. Given the complexity of this task, it is typically used with older youth.

Ecological Momentary Assessment (EMA)

Since the last edition of this chapter, the EMA literature has grown considerably, for good reason. EMA of emotion and ER has much to offer, particularly by addressing potential threats to ecological validity found in laboratory studies. Further, EMA fits with the conceptualization of emotion and ER as transitory and dynamic constructs. A full review of EMA is beyond the scope of this section, but it should be noted that recent meta-analyses have shown that EMA is feasible with children as young as 7 years old and that some adaptations should be made for children younger than 7 years old (Heron et al., 2017). In addition, when combined with novel statistical approaches such as the Network Analysis (e.g., Pe et al. (2015)), EMA researchers can capitalize on the value of temporal emotion dynamics, a promising avenue for researchers wanting to study how emotion and ER unfold over time and in "real life."

Neuroscience Methodology

Researchers have implicated several biological systems in emotion processing such as the autonomic nervous system, hypothalamic-pituitary-adrenal (HPA) axis, amygdala, and lateral prefrontal cortex (LPFC). Common methods of assessment include vagal tone (Beauchaine & Bell, 2020), cortisol (e.g., Jentsch et al., (2019)), and imaging (e.g., fMRI (Dixon et al., 2017)). Affective neuroscience research in particular has blossomed in recent years. In one study, for example, the authors found that connectivity between the amygdala and the ventromedial PFC may be particularly relevant to the development of internalizing disorders in adolescence (Burghy et al., 2012). Further, research suggests that dysfunctional activation patterns during cognitive reappraisal, an ER strategy, can be identified in individuals with anxiety and mood disorders (Picó-Pérez et al., 2017). Although significant advances have been made, this area is still developing quickly, and additional research is warranted, particularly for youth and youth with anxiety disorders.

Overall, the literature on assessment of ER requires the continued use of multimethod and multireporter approaches to help increase our understanding of emotion assessment reliability and validity for youth. Further research is needed to develop and validate measures that allow us to accurately capture emotional variability across contexts, moment-to-moment changes in ER strategy use, and underlying biological systems associated with ER.

Emotion Regulation Considerations in the Treatment of Childhood Anxiety

Given the ER difficulties that youth with anxiety disorders display, investigators have begun testing the potential benefits of including ER content into treatment for youth with anxiety disorders (Kennedy et al., 2019; Suveg et al., 2018). For instance, given a robust body of literature supporting cognitive-behavioral therapy (CBT) for the treatment of anxiety disorders in youth (Comer et al., 2019), investigators have incorporated additional treatment components that address broad emotion-related deficits identified in youth with anxiety disorders (e.g., emotion-focused CBT (Suveg et al., 2018)). Emotion-focused CBT (ECBT) aims to improve emotion understanding and regulation across a variety of emotions that a child may have difficulty regulating. The first phase of ECBT focuses on identification of different emotions (e.g., anxiety, sadness, pride, anger, guilt, happiness) and teaches youth how to recognize the emotion in oneself and others (e.g., how they are feeling, how they know they are feeling that way, why they are feeling that way). Treatment exercises are designed to engage the youth in discussion and other activities that facilitate reflection on their emotional experiences. The second phase of treatment utilizes gradual exposure to anxiety-provoking situations, as used in traditional CBT, with additional exposures to situations that provoke other emotions (e.g., anger, sadness). A youth who typically has difficulty regulating anger would engage in an exposure task designed to elicit anger, to provide the youth with the opportunity, skills, and coaching to practice regulating anger.

Suveg et al. (2018) conducted a randomized trial comparing traditional CBT to ECBT using a sample of 92 children (ages 7–12 years) with a primary anxiety disorder diagnosis (generalized anxiety disorder, social phobia, or separation anxiety disorder). Both CBT and ECBT were effective in treating child anxiety symptoms, and both conditions showed similar improvements in emotion regulation and diagnostic and severity outcomes. Pretreatment emotion dysregulation did not moderate treatment outcomes. The results were somewhat surprising given preliminary work showing the superiority of ECBT over CBT in improving emotion regulation in youth with anxiety disorders (Suveg et al., 2009); nonetheless, CBT does include strategies that target emotion regulation (e.g., relaxation). Further, the use of a much larger sample size in the RCT, in comparison to prior work, may have allowed for a more rigorous test of hypotheses.

Given the robust body of literature highlighting ER deficits as central to many psychological disorders, including anxiety disorders, investigators have turned to transdiagnostic treatment approaches which aim to target proposed underlying transdiagnostic risks or mechanisms of pathology. As one example, the Unified Protocol (UP) is a transdiagnostic treatment approach that was originally developed for the treatment of emotional disorders in adults (UP; Barlow et al., 2011), with downward extensions later developed for adolescents (UP-A) and children (UP-C; Ehrenreich-May et al., 2018). UP focuses on core processes underlying a variety of emotional disorders, including the notion that individuals with emotional disorders experience high levels of negative emotion and high emotional reactivity, which lead to poor emotion regulation skills (see Chap. 9 for a discussion of transdiagnostic models of youth anxiety). A randomized controlled pilot trial examined the efficacy of UP-C in the treatment of anxiety in a sample of 47 youth, aged 7–13 years, in comparison to an established anxiety-focused treatment (Cool Kids; Rapee et al., 2006). Results provided preliminary evidence that UP-C may be as efficacious in treating anxiety as the established Cool Kids anxiety-focused treatment and may lead to even greater improvement in aspects of emotion regulation (Kennedy et al., 2019).

Taken together, these studies examine how inclusion of emotion regulation skills in treatment may impact treatment outcomes. Continued research is necessary to further our understanding of emotion regulation in youth with anxiety disorders, with the goal of optimizing existing treatment programs.

Summary and Future Directions

Research has identified various ways in which emotion dysregulation may be involved in the etiology and maintenance of anxiety disorders in youth. Some environmental and contextual factors have been studied quite extensively (e.g., emotion socialization), yet there continues to be a scarcity of research on the intersection of several contextual factors including how culture influences socialization, expression, and the use of ER strategies. The development of reliable and developmentally appropriate assessment tools remains limited, so continued work in this area is necessary. CBT continues to be effective in treating anxiety disorders, and CBT-based transdiagnostic approaches are showing promise in targeting potential underlying mechanisms of ADs – such as emotion dysregulation. Overall, continued work in this area will improve our understanding of ER in youth with anxiety disorders and facilitate the optimizing and tailoring of intervention programs for said youth.

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Emergent Personality Features in Adolescent Anxiety Disorders

14

Amanda Venta and Jaime L. Anderson

Introduction

Since the previous edition of this book was published in 2011 (Johnson et al., 2011), the scientific community has moved away from conceptualizing personality pathology *only* as discrete diagnostic entities arranged into clusters and toward dimensional, trait-based approaches that acknowledge issues of poor reliability, comorbidity, and lack of specificity in personality disorder (PD) diagnoses. Indeed, whereas the previous edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-4-TR; American Psychiatric Association [APA], 2000) relied exclusively on categorical classification of personality disorders (PDs), the latest edition maintains the categorical diagnoses of DSM-5-TR while adding an alternative, hybrid dimensional/categorical model (DSM-5; APA, 2013). Though this chapter will address broad personality features associated with anxiety disorders in addition to the overlap with clinically problematic PD, it is important to first address shifts in the conceptualization and diagnosis of psychopathology more broadly.

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Personality disorders in the DSM-5 are defined by pervasive and inflexible patterns of feeling and behavior that onset in adolescence or early adulthood and lead to significant distress or impairment (APA, 2013). Regarding traditional, categorical approaches to PD diagnosis, the DSM-5 includes ten PDs arranged into three clusters: Cluster A (odd-eccentric: paranoid, schizoid, and schizotypal PDs), Cluster B (dramatic-emotional: antisocial, borderline, histrionic, and narcissistic PDs), and Cluster C (anxious-fearful: avoidant, dependent, and obsessive-compulsive PDs). This system has significant limitations including that what initially seem like discrete diagnostic entities are likely to be comorbid with one another (e.g., Kotov et al. (2017)) and, even within diagnoses, high heterogeneity is evident (e.g., Zimmerman et al. (2015)). Relatedly, DSM diagnoses, in practice, often evidence low reliability and provide little recourse for subthreshold presentations (Wall et al., 2021). Finally, the DSM, particularly when it comes to PDs, has been heavily focused on adults with little consideration of personality pathology at other developmental stages.

In light of these criticisms, the scientific community has been moving toward dimensional models for capturing psychopathology related to personality and otherwise. As noted, the DSM-5 includes an alternative model for PD (AMPD) that conceptualizes PDs as a combination of functional impairment (Criterion A) along with

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behavioral expressions or traits of personality pathology (reflected in the model's Criterion B). The trait model included in Criterion B asserts that pathological personality traits fall within five empirically supported broad domains (negative affectivity, antagonism, detachment, disinhibition, and psychoticism), which roughly correspond to pathological variants of the five-factor model (FFM; APA, 2013). In addition, the most recent version of the International Classification of Diseases (ICD-11; WHO, 2018) adopted a new conceptualization of PDs that is dimensional in nature and characterizes personality pathology as pervasive and distressing/impairing disturbance in self- and interpersonal functioning. Though the core feature of PD diagnosis in the ICD-11 is functional impairment, this model also includes a dimensional trait model. Similar to the DSM-5, this model includes five empirically supported dimensional trait domains (i.e., negative affectivity, detachment, dissociality, disinhibition, and anankastia). Each model reflects growing knowledge in the field that psychopathology is likely best defined by dimensionally defined traits or symptoms, rather than categories defined by symptom counts.

Alongside this shift in the diagnosis of PD, the field has more broadly begun to steer away from reliance on categorical diagnoses. Though the DSM-5 remains the primary method of clinical diagnosis, the DSM model is in contrast to most psychopathology literature. Echoing these shifts in the field, in preparing this chapter, we make a deliberate move away from only discussing comorbidity between anxiety and PDs as categorically defined entities and additionally focus on how personality features, conceptualized in a dimensional, trait-based approach, relate to anxiety in adolescents. Indeed, we will argue that the delineation between PD and what was previously termed "Axis I" psychopathology is quite vague and that a focus on dimensional and hierarchical systems of psychopathology will better explain the overlap between these areas of dysfunction.

In order to lay the groundwork for the remainder of the chapter, we begin by describing contemporary views on the structure of psychopathology, with a particular focus on models that may prove most useful in understanding the overlap between anxiety and personality dysfunction. We then describe how these dimensional models have conceptualized anxiety psychopathology and focus on adolescents by reviewing empirical research linking anxiety psychopathology with personality features and disorders. Finally, we describe dimensional measures available for use in adolescents that are useful in examining anxiety and personality features simultaneously, before closing with a chapter summary.

Dimensional Conceptualizations of Psychopathology

The most prominent structural theories of psychopathology suggest that psychopathology is both dimensional and hierarchical. In other words, lower-order symptoms of psychopathology (e.g., distress, fear, impulsivity) are subsumed under broader higher-order domains (e.g., internalizing, externalizing). Though models of psychopathology have more recently been discussed largely in their application to adult psychopathology, early dimensional and hierarchical conceptualization of mental health symptoms was introduced in the child and adolescent literature. Achenbach (1966) identified two higher-order domains of psychopathology in children, labeled internalizing and externalizing, where internalizing dysfunction included symptoms such as worrying, fear, and depression and externalizing dysfunction included symptoms such as disobedience, lying, and destruction. These higher-order domains continue to be replicated in child/adolescent research (e.g., Achenbach et al. (1991), Blanco et al. (2015), Lahey et al. (2004), and Lahey et al. (2008)).

Since this early work, structural research on psychopathology has tended to focus more predominantly in the adult literature. Numerous studies have supported Achenbach's model and identified both internalizing and externalizing factors in adults as well (e.g., Carragher et al. (2014), Krueger and Markon (2006), and Krueger et al. (2005)). Broadly speaking, most models

define internalizing dysfunction with symptoms related to mood and anxiety and externalizing dysfunction with symptoms related to impulse control, antisocial behavior, and substance use. Later work has also commonly identified a third superspectrum in both adults and children, termed thought dysfunction or psychosis (e.g., Kotov et al. (2011a), Markon (2010), and Wolf et al. (1988)), with most hierarchical models of psychopathology including each of these three spectra at the highest order level. Notably, the exact hierarchy and structure of psychopathology vary between studies, with some suggesting an optimal five-factor structure in which externalizing is bifurcated at a higher order level and social detachment forms its own domain (e.g., Kotov et al. (2017), Wright and Simms (2015)) or in which somatic symptoms form their own superspectrum (e.g., Kotov et al. (2011b), Marek et al. (2020), and Sellbom (2017)). However, variation understandably occurs based on the symptoms measured or population studied, and the three higher-order domains of internalizing, externalizing, and thought dysfunction are the most consistent findings at the broadest level.

In addition to identifying the structure of psychopathology at the broadest level, a large body of research has also focused on the ways in which these domains break down at lower levels (e.g., Kotov et al. (2011a), Clark and Watson (1991), Kotov et al. (2011b), Krueger (1999a), Krueger et al. (2007), Markon (2010), Sellbom et al. (2008), Tellegen (1985), Tellegen et al. (1999), Watson (2005), Watson and Tellegen (1985), Wright et al. (2013)). For instance, most models of externalizing psychopathology bifurcate this domain into subfactors representing antagonism and disinhibition (e.g., Krueger et al. (2007)).

Most relevant to this chapter is the breakdown of the internalizing higher-order domain. Though a fair amount of work has modeled internalizing dysfunction as a unidimensional construct (e.g., Eaton et al. (2011), Fergusson et al. (2006), and Krueger et al. (1998)), there is substantial evidence to support that this domain is hierarchical. In other words, an overarching internalizing dimension accounts for what is shared between disorders such as anxiety and depression, but underlying symptoms/traits account for variation between them. Early work by Watson and Tellegen (1985) defined the nature of affective states, identifying two separate, but related, dimensions (i.e., positive affect and negative affect), wherein depressive symptoms are defined by low positive emotionality and anxiety symptoms are defined by high levels of negative affect. Following this, Clark and Watson (1991) introduced the tripartite model, which asserted that there were three affective/internalizing domains. These domains included physiological hyperarousal (specific to anxiety), anhedonia (specific to depression), and distress, wherein the latter domain explained the existing overlap between both anxiety and depressive disorders. This is consistent with later work on the structure of mood and anxiety, such as Sellbom et al. (2008) study identifying three similar domains representing fear, distress, and low positive emotionality. Most reliably, however, the internalizing superspectrum is found to bifurcate into two factors representing fear and distress, where distress includes dysfunction such as depression and generalized anxiety and fear includes dysfunction such as panic disorder and phobias (e.g., Eaton et al. (2013), Krueger and Markon (2006)).

One of the most prominent (and growing) contemporary models of psychopathology comes from the Hierarchical Taxonomy of Psychopathology (HiTOP) consortium (Kotov et al., 2017). This consortium of psychopathology experts was formed to consolidate the research on dimensional systems and move the field forward in the application of such models. Previous efforts have been limited by individual researchers or research groups working fairly independently to move this field forward (Kotov, 2016). The HiTOP consortium provides a framework for the field to work together in better applying clinical science to clinical practice. Though the model is fluid and is intended to change with the addition of new empirical evidence, the current system includes six psychopathology "spectra," termed internalizing, disinhibited externalizing, antagonistic externalizing, detachment, psychoticism, and somatoform. These spectra are intended to provide

coverage of most areas of personality and psychopathology, subsumed under one superspectrum representing a general factor of psychopathology (Kotov et al., 2017). Of course, most relevant here is the internalizing domain, which includes subfactors of sexual problems, eating pathology, fear, distress, and mania (which also cross-loads onto thought disorder).

In the HiTOP model (and most other dimensional models), symptoms of anxiety fairly exclusively exist in two sub-domains (fear and distress), with or without the inclusion of additional subfactors. Consistent with previous literature, the HiTOP fear subfactor includes social phobia, agoraphobia, specific phobia, social anxiety, panic disorder, and obsessive-compulsive disorder, whereas the distress subfactor includes major depression, dysthymia, generalized anxiety, post-traumatic stress disorder, and borderline PD (Kotov et al., 2017). Therefore, there is a fairly reliable breakdown of anxiety disorders into the fear and distress domains.

Generally speaking, PDs are more difficult to place in a particular domain or sub-domains. Though previous iterations of the DSM have relegated PDs to a separate axis entirely from that of other disorders, the reality is that personality pathology is not so easily separated. Numerous personality and psychopathology experts have asserted that personality and psychopathology are inherently intertwined (e.g., Krueger and Tackett (2003), Lengel et al. (2016), Tackett and Mullins-Sweatt (2021), Widiger et al. (1999), and Widiger et al. (2019), among others). Many have argued that personality and psychopathology may even have a causal relationship (e.g., Klein et al. (2011), Tackett (2006), Tackett and Mullins-Sweatt (2021), Widiger and Smith (2008)), which we explore throughout this chapter, or that personality provides the structural framework for other areas of psychopathology (Watson et al., 2016). Indeed, Kotov et al. (2017) acknowledge the integral role of personality in establishing models of psychopathology, including in the development of the HiTOP model.

In keeping with evidence that personality and psychopathology are overlapping, most structural work on personality would suggest that both normal and pathological personality traits exist across domains of psychopathology. For instance, FFM neuroticism and ICD-11/DSM-5 negative affectivity fall in a broad internalizing domain—likely crossing between both fear and distress. Further, externalizing personality bifurcates into domains generally representing antagonism and disinhibition across personality models. Of course, some personality traits are likely more relevant to anxiety than others. Personality traits—both normal and pathological—have been linked to anxiety in previous work (e.g., Clark et al. (1994), Kotov et al. (2010), Widiger et al. (1999), and Widiger et al. (1999)), which will be reviewed throughout this chapter. For instance, trait neuroticism is strongly tied to anxiety disorders (Bagby et al., 2017; Goldstein et al., 2018; Jeronimus et al., 2016), and some have argued that it may even be the common feature across or even predisposing factor for the development of internalizing dysfunction (e.g., Griffith et al. (2010), Tackett and Lahey (2017)). Although the relationship between personality and psychopathology is complex, most contemporary models that include both anxiety and PDs at minimum show overlapping placement (e.g., Wright and Simms (2015)), such as placement of both generalized anxiety disorder (GAD) and borderline PD (BPD) under the same subfactor in HiTOP (i.e., distress; Kotov et al., 2017).

The sections that follow will discuss findings from previous research related to diagnostic comorbidity and personality correlates of anxiety disorders in both adult and child/adolescent populations. However, it is also important to keep in mind when reviewing this work that separating personality from other areas of psychopathology is likely an impossible task. Most measures used to capture these constructs are not free from influence of the other, and perhaps should not be, given the inherent link between personality and psychopathology. Further, most individuals included in diagnostic research are not "pure" cases of any type of psychopathology, and studies that do screen for diagnostic purity are limited in their application to natural settings in which comorbidity runs abound. As discussed in more

detail throughout the remainder of this chapter, these relationships are complex, and contemporary models may provide a better framework for understanding the ways in which personality and anxiety coexist.

Anxiety and Personality

Importance of Comorbidity The previous iteration of this chapter made a strong argument for considering comorbidity between personality and anxiety disorders. Indeed, Johnson et al. (2011) argued that consideration of comorbidity is important because (a) personality psychopathology may influence treatment progress and outcome for clients with anxiety symptomatology and (b) the presence of maladaptive personality features or PD can influence the course, manifestation, and outcome of anxiety disorders/symptoms and vice versa. For example, PD diagnosis has been identified as a predictor of poor response to both psychological and pharmacological interventions for people with anxiety disorders (e.g., Reich and Green (1991))—highlighting the need to utilize instruments in clinical practice that address anxiety and personality features simultaneously.

In youth, relations between personality and psychopathology are perhaps more complex than in adults because they reflect developmental timing effects as well as diagnostic comorbidity. Tackett (2006) reviews four models explaining links between personality and psychopathology in development. (1) The complication or scar model posits that the development of, for example, an anxiety disorder will change the individual's premorbid personality. (2) The pathoplasty or exacerbation model suggests that, in contrast, premorbid personality may influence the "course, severity, presentation, or prognosis" of another disorder, like an anxiety disorder. (3) The vulnerability or predisposition model hypothesizes that premorbid personality traits put a child at risk of developing a particular constellation of pathological symptoms, like those represented in the anxiety disorders. (4) Finally, the spectrum model suggests that personality and other forms of psychopathology are manifestations of the same continuum/continua. The research linking anxiety and personality pathology in youth has not clearly converged on any one of these models. We will refer back to these models throughout this section to illustrate that point.

Anxiety and PD in Adults While our aim in organizing this chapter is to highlight dimensional conceptualizations of psychopathology regarding PD and other symptomatologies—adolescent anxiety in our case—the reality is that much extant literature examining links between personality and anxiety have relied on traditional, categorical conceptualizations of PD. This work has been foundational to the dimensional research taking place today. Thus, we have elected to include research linking anxiety with both PD and personality features in this section. We will begin by reviewing evidence linking PD diagnoses to anxiety.

Building upon early work supporting a link between anxiety and PD, Sanderson et al. (1994) assessed a large sample of adults seeking outpatient care for an anxiety disorder with the aim of examining prevalence rates of PD across people with anxiety disorders as a whole and within specific anxiety disorder categories. On a structured clinical interview (i.e., structured clinical interview for DSM-3/Axis II disorders, SCID-II), PD was evident in more than a third (35%) of the sample, with most of those disorders (27%) reflecting Cluster C (anxious-fearful) PDs. Indeed, avoidant PD, characterized by "a pattern of social inhibition, feelings of inadequacy, and hypersensitivity" (APA, 2013), and obsessive-compulsive PD, "a pattern of preoccupation with orderliness, perfectionism, and control" (APA, 2013), were the most prevalent PD diagnoses in their sample. The authors were careful to note, however, that the link between Cluster C PDs and anxiety disorders is not unique, citing that 64% of patients with depressive disorders also met criteria for a Cluster C PD (Sanderson et al., 1992). Instead, they suggest that the presence of Cluster C psychopathology predisposes subsequent

development of internalizing psychopathology broadly construed (in line with Tackett's (2006) description of the vulnerability/predisposition model).

Regarding anxiety disorders, participants with social phobia and generalized anxiety disorder (GAD) in Sanderson's study (1994) were the most likely to meet diagnostic criteria for a comorbid PD, occurring in 61% and 49% of those clients, respectively. The authors speculate that these two anxiety disorders, like depressive disorders, have "pervasive effects on personality" (pg. 171), perhaps explaining the particularly strong link to PD among clients with those two disorders. Regarding GAD specifically, they argue that perhaps this disorder is better conceptualized as a PD than an anxiety disorder due to the lifelong and chronic course. This argument calls to mind Tackett's (2006) description of the spectrum model as well as the HiTOP model, suggesting that perhaps GAD lies on a continuum with various forms of personality pathology. In contrast, individuals with specific phobia were less likely to be diagnosed with a PD (12%).

While this study was conducted in adults (and found no relation between the presence of anxiety-PD comorbidity and age), it set the stage for future research to be undertaken with adolescents by demonstrating the sheer prevalence of personality pathology in anxious clients. Sanderson et al. (1994) also lay the groundwork for the dimensional conceptualizations of psychopathology we have already reviewed and the research linking dimensional conceptualizations of maladaptive personality to anxiety disorder that we will review in subsequent sections, by putting forth an argument (and data) that blurs the lines between anxiety and PD (i.e., suggesting that GAD be conceptualized as a PD). Further, they note that the prevalence rates of PD in their sample differ from other studies, even those that used similar samples and assessment instruments, suggesting that lack of reliability in PD diagnosis may be to blame. It is important to note that both in Sanderson and colleagues' (1994) work and in a seven-year longitudinal study conducted by Ansell et al. (2011), anxiety disorders were not exclusively associated with Cluster C PDs, instead demonstrating comorbidity with Cluster A (e.g., schizotypal) and Cluster B (e.g., borderline) personality pathology as well.

Anxiety and PD in Adolescents Turning our focus to youth, much about relations between anxiety and personality pathology can be learned from the longitudinal Children in the Community Study which followed nearly 1000 youth across 10 years (Cohen & Cohen, 1996). In a subset of more than 700 youth, Goodwin et al. (2005) reported that the prevalence of panic attacks, a symptom and correlate of numerous anxiety disorders, when subjects were, on average, 13 years old, was associated with higher rates of PD 10 years later, even after controlling for demographic variables, adolescent PD, and other comorbidities. Panic attacks increased the odds of a future Cluster A personality diagnosis most steeply but also increased risk for Cluster B and Cluster C diagnoses. The authors speculate that adolescent panic attacks could act as a risk factor for subsequent PD diagnosis (indicative of Tackett's (2006) vulnerability model) or could reflect a "prodromal stage of the onset of a personality disorder" (p. 231), suggesting a spectrum model is at play. Alternatively, they suggest that panic attacks may actually lead to the development of PD, in particular avoidant PD, due to the adversity of experiencing panic attacks in social settings (suggesting a complication or scar model; Tackett, 2006).

Further, Kasen et al. (1999) also utilized data from the Children in the Community Study to examine how anxiety pathology (among other forms of psychopathology) in youth ages 9–16 years (N = 551) related to PD over the next 10 years. Approximately, 15% of their sample had experienced an anxiety disorder by the age of 18 years, and the presence of an anxiety disorder increased the odds of a PD in young adulthood. Specifically, anxiety disorder (i.e., separation anxiety disorder and social phobia) increased the odds of Cluster A PD fivefold and Cluster C personality fourfold. Effects were exacerbated when PD was also present in youth, though predictive effects persisted even after controlling for youth

PD. In line with a vulnerability or predisposition model moving from anxiety to personality pathology, the authors posit that the presence of either of the two anxiety disorders considered in their study may deter and restrict social involvement, reinforcing social avoidance and arresting social development until it emerges as "traitlike pathology" (p. 1533) reflected in Cluster A and C PDs.

Other longitudinal researches also confirm links between anxiety and maladaptive personality in youth. For instance, Lewinsohn et al. (1997) examined the prevalence of anxiety disorders, among other forms of psychopathology, in almost 300 adolescents (ages 14–18) and again at age 24 years. In this study, anxiety disorders in adolescence were among the diagnostic categories most closely associated with later personality pathology. Indeed, anxiety in adolescence was associated with increased risk for avoidant, borderline, dependent, histrionic, paranoid, schizoid, and schizotypal PDs. Even after adjusting for demographic variables, depression, and other psychopathologies, anxiety remained associated with avoidant, borderline, dependent, schizoid, and schizotypal PDs—more than any other form of psychopathology considered (i.e., major depressive disorder, disruptive behavior, and substance use). The strongest associations were reported between anxiety and schizotypal and schizoid PDs. The findings of this study and others (Bernstein et al., 1996; Rey et al., 1995) speak clearly to a link between anxiety psychopathology in adolescence and personality pathology but should not necessarily be interpreted as evidence of causality/directionality. Indeed, longitudinal data from Johnson et al. (1999), also based on the Children in the Community Study, linked PD in adolescence to anxiety (and other) disorders in youth suggesting bidirectional links between these two diagnostic categories. Consistent with a pathoplasty or exacerbation model, PD in adolescence, in some instances, was associated with increased severity of psychopathology in young adulthood, as reflected in suicidal behavior.

Concurrent research, which examines correlations between personality and anxiety disorders at one point in time, also highlights comorbidity between personality and anxiety disorders in adolescents. Indeed, a study of inpatient adolescents with BPD (reflecting instability in interpersonal relationships, self-image, and affect as well as impulsivity; APA, 2013) indicated that 63% of the BPD group also met diagnostic criteria for an anxiety disorder—actually exceeding the rate of depressive disorders in their sample (61%; Sharp et al., 2012). Similarly, Chanen et al. (2007) found that the presence of any anxiety disorder was significantly associated with BPD diagnosis in a sample of psychiatric outpatients ages 15–18 years. Importantly, though, anxiety disorder was also associated with other PDs, such that the prevalence of anxiety in the BPD group (45.7%) was significantly higher than in the other PD group (36.4%), but the prevalence in the other PD group was significantly higher than in the no PD group (18.6%). This work echoes much of the aforementioned longitudinal research showing that anxiety is associated with personality pathology in general, rather than one specific form of anxiety disorder predicting one specific form of personality pathology.

Negative Emotionality The Dunedin Multidisciplinary Health and Development Study (Silva, 1990), a longitudinal study beginning in age three with assessments throughout adolescence and young adulthood, has provided valuable longitudinal data on the relation between anxiety and personality pathology when conceptualized dimensionally. Their findings have been instrumental in identifying negative emotionality, a personality dimension similar to neuroticism reflecting a propensity to experience and react to negative emotions, as a correlate of anxiety.

In nearly 900 participants, Krueger et al. (1996) examined personality pathology dimensionally, utilizing the Multidimensional Personality Questionnaire (MPQ), among 18-year-old participants, in relation to anxiety disorders (among other forms of psychopathology) determined by structured interview conducted when participants were 15 years old and also at 18 years of age. Their concurrent data revealed that individuals (aged 18) who were diagnosed with an anxiety disorder experienced

lower agency and communion scores and higher negative emotionality scores on the MPQ. Similarly, anxiety symptoms at age 15 were associated with lower agency, lower communication, and greater negative emotionality on the MPQ at 18 years of age. However, the authors suggested that many of the relations between personality and anxiety observed in their work are best explained by comorbidity because they disappeared when examining participants with "pure anxiety" (i.e., anxiety disorder and no other forms of psychopathology). One facet of negative emotionality on the MPQ, stress reaction, however, retained a relation to "pure anxiety." The authors suggested that perhaps this aspect of negative emotionality "may contribute to determining the precise form that maladaptation takes" (p. 310), with the stress reaction facet pointing in the direction of internalizing disorder and aggression (another facet of negative emotionality) predicting externalizing disorder.

Krueger (1999a, b), also utilizing data from the Dunedin study, demonstrated that the links between anxiety and personality pathology are also bidirectional. Indeed, this second study indicated that personality traits in adolescence are associated with anxiety disorder in young adults—again featuring negative emotionality prominently. In particular, high negative emotionality in late adolescence was associated with anxiety, as well as other forms of psychopathology, at age 21 years, even after controlling for other psychopathologies in adolescence. Beyond the Dunedin sample, several other studies have confirmed links between negative emotionality (or neuroticism) and anxiety pathology in adolescence (see Tackett (2006)).

Behavioral Inhibition Behavioral inhibition, while not truly a personality trait, is a temperamental dimension that has been repeatedly associated with anxiety symptoms and disorders in youth and therefore bears some discussion. The initial definition of behavioral inhibition by Kagan et al. (1984) centered on the tendency to withdraw or show reluctance or fear in new situations. In Tackett's (2006) taxonomy, behavioral inhibition reflects high neuroticism and low extraversion. As we saw in the previous section, high neuroticism (or negative emotionality) has been repeatedly associated with internalizing psychopathology, generally, and anxiety pathology, specifically, in adolescents. Extraversion, reflecting the quantity and intensity of an individuals' interpersonal interactions and positive emotions, has likewise been associated with anxiety disorders repeatedly in adult samples (Brandes & Bienvenu, 2006). In this section, we review the corollary of extraversion among youth—behavioral inhibition—in relation to anxiety disorders in youth.

In children, many studies have linked behavioral inhibition with increased likelihood of developing an anxiety disorder (see Oosterlaan (2001) for a review) and suggested that temperamental over-inhibition, consistent with a vulnerability or predisposition framework, acts as an etiological factor for later anxiety disorder. Several studies have also linked behavioral inhibition with anxiety in adolescent age groups. Oldehinkel et al. (2004), for example, examined more than 2200 10- to 12-year-olds living in the Netherlands and participating in a prospective, longitudinal study. Utilizing continuous rating scales of psychopathology and temperament, they linked decreased surgency (which can be thought of as increased behavioral inhibition) and other personality traits with increased likelihood of internalizing symptoms. They posited that while degree of surgency influenced the likelihood of an adolescent developing internalizing (low surgency) versus externalizing problems (high surgency), negative affectivity explained the severity of maladaptive functioning overall.

Though ample research, like Oldehinkel et al. (2004), has linked behavioral inhibition in childhood to a number of pathological outcomes, most notably in the internalizing domain, it is one temperamental domain in which there is some evidence of specificity with anxiety disorder. That is, Hirshfeld-Becker et al. (2008) summarize decades of research saying "Prospective longitudinal studies of children with BI [behavioral inhibition] from five different high-risk and community samples have found that in early and

middle childhood and adolescence, inhibited children have elevated rates of anxiety disorders" (p. 361). Further, they review studies indicating that behavioral inhibition is specifically associated with risk for social anxiety in adolescence (with evidence of this association in childhood as well), suggesting a more specific relation between these two domains of pathology than has been evidenced in the other research reviewed in this section.

Measurement of Psychopathology

To end this chapter, we will briefly discuss the ways in which psychopathology is measured in adolescents, with a particular focus on instruments that include an assessment of both anxiety and personality psychopathology. As discussed throughout the course of this chapter, the differentiation between anxiety disorder and PD is not completely clear, and the role one plays in the development of the other remains undecided. Measures that assess anxiety are likely to tap into some level of personality dysfunction and vice versa; however, measures that explicitly assess both personality dysfunction and anxiety symptoms may be optimal.

Two measures that explicitly include coverage of both anxiety and personality dysfunction are the Personality Assessment Inventory-Adolescent (PAI-A; Morey, 2007) and Minnesota Multiphasic Personality Inventory-Adolescent/Adolescent-Restructured Form (MMPI-A/MMPI-A-RF; Archer et al., 2016; Butcher et al., 1992). These measures each have a fair amount of stand-alone empirical support but also benefit by being adapted from their adult equivalent measures, which are widely used and supported in clinical practice as well as heavily researched. The PAI-A, appropriate for adolescents ages 12–18, includes scales reflective of generalized anxiety, phobias, trauma, and obsessive-compulsive symptoms, with independent empirical support of their construct validity (Vanwoerden et al., 2018). In addition, this measure includes specific evaluation of both borderline and antisocial PD. The PAI (Morey, 1991) versions of these scales have had substantial empirical support (e.g., De Moor et al. (2009), Jackson and Trull (2001), Stein et al. (2007), and Walters (2007)). Furthermore, research has demonstrated the utility of the PAI more broadly in assessing PD (Bradley et al., 2007; Oltmanns et al., 2016), including from a DSM-5 AMPD perspective (Busch et al., 2017; Hopwood et al., 2013). Indeed, although focused on the adult version of the instrument, this research has demonstrated conceptually expected overlap between anxiety symptoms and personality psychopathology. Therefore, scales on the PAI-A are likely to provide excellent coverage of anxiety problems along with some of the most common and problematic symptoms of personality dysfunction.

The MMPI-A similarly includes several scales to assess the anxiety-related problems. Perhaps most compelling is that this measure includes five Personality Psychopathology-Five (PSY-5) scales, which were derived to assess five broad pathological traits (neuroticism/negative emotionality, introversion/low positive emotions, disconstraint, psychoticism, and aggressiveness). In their adult version on the MMPI-2-RF (Tellegen & Ben-Porath, 2008/2011), research has shown strong convergence between these scales and both the DSM-5 and ICD-11 trait models (e.g., Anderson et al. (2013), Sellbom et al. (2020)). The more recent MMPI-A-RF also includes revised PSY-5 scales. Furthermore, it was restructured similarly to the MMPI-2-RF, which not only made psychometric improvements but also purposefully organized the instrument that converges with hierarchical and dimensional models of psychopathology (Sellbom, 2017; Sellbom, 2019). Indeed, similar to the tripartite model of depression and anxiety (Clark & Watson, 1991), internalizing psychopathology divides into scales representing fear, distress, and low positive emotionality (Sellbom et al., 2008). Not surprisingly, scales representing symptoms of anxiety have shown strong correlations with relevant pathological personality traits (Anderson et al., 2015; Anderson & Sellbom, 2021; Tarescavage & Menton, 2020). Though much of this work is focused on the adult version of the instrument, it is likely that the adolescent version of these

scales would show similar relationships. Indeed, the MMPI-A-RF is likely to provide optimal coverage of both anxiety and personality psychopathology in a manner consistent with contemporary movements in the field.

Chapter Summary

In this chapter, we make a deliberate move away from discussing comorbidity between anxiety and PDs *only* as categorically defined and instead add recent research regarding how personality features, conceptualized in a dimensional, trait-based approach, relate to anxiety in adolescents. This move reflects a broader shift in the science of PD, away from categorical approaches and toward dimensional models that better capture the overlap between PD categories and other forms of psychopathology. We discussed dimensional conceptualizations of psychopathology, and we reviewed longitudinal and cross-sectional empirical research linking anxiety psychopathology with personality features and diagnoses. Finally, we discussed measures that can be used with adolescents to examine anxiety and personality features simultaneously, recognizing the reality that these forms of pathology are not as distinct as we once believed.

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15 Family Components of Child and Adolescent Anxiety Disorders

Amanda Palo and Abigail Candelari

The relationship between the parenting environment and the development and maintenance of anxiety disorders has received substantial scientific attention for the past four decades (Last et al., 1987). The present chapter outlines the current state of knowledge regarding family factors and their relationship to childhood anxiety, starting with historical context and a summary of traditional theoretical models. Finally, a review of the progress made by more recent literature is presented.

Childhood anxiety disorders have unique temperamental underpinnings (Caspi et al., 1995; Crawford et al., 2011). For example, biologically based differences in emotional reactivity predict childhood internalizing symptoms (Caspi et al., 1995; Eisenberg et al., 2017), and having a difficult temperamental profile (i.e., slow adaptability, high affective intensity, and negative emotionality (Bates, 1980)) has been found to predict onset of anxiety symptoms (Miner & Clarke-Stewart, 2008). Yet, not all children with difficult temperaments develop internalizing pathology, underscoring the need to study other layers of risk, including family factors and the family environment.

Studies assessing the prevalence of anxiety disorders among families reveal up to seven times higher rates of anxiety disorders among children of clinically anxious parents, compared to families in which no family members have problematic anxiety symptoms (e.g., Biederman et al. (1991), Last et al. (1987), and Turner et al. (1987)). These results have been replicated in both small and large samples, and findings have remained consistent over time as genetic study methodology advances (Telman et al., 2018). Although these studies provide useful insight on the heritability of anxiety, they do not explain the specific relative contributions (i.e., amount of variance) of genetic and environmental factors or the mechanisms by which the family environment may maintain or exacerbate anxiety. Taken together, etiological models of anxiety must consider other transdiagnostic factors that contribute to risk.

Given the universally central role of the family environment among children (Henderson & Berla, 1994), researchers have studied family factors that may elucidate the development of child anxiety for over four decades. In the following sections, we summarize the findings of this literature, including problematic parenting behaviors and temperamental vulnerabilities that may contribute to onset of anxiety among youth.

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Review of Literature

The parenting environment has a robust role in the development of childhood internalizing symptoms (Cummings et al., 2003; Jaffee et al., 2002). A review of landmark studies in the 1990s (Wood et al., 2003) and more recent reviews exploring the parenting environment of clinically anxious youth have consistently identified parental overcontrol and modeling of anxious behaviors as key in the development and maintenance of childhood anxiety symptoms (McLeod et al., 2007; Ollendick & Benoit, 2012).

Maternal Overcontrol

Maternal overcontrol (also known as overprotection, intrusiveness, overinvolvement, or psychological control in the literature) is characterized by excessive regulation of the activities of youth, intrusive parental overprotection, and intrusive influence on youths' decision-making. Maternal overcontrol also includes influencing children's natural emotional reactions with instructions on how to feel or what to think in situations (especially situations characterized by difficult emotions; Barber (1996) and Barber et al. (2012)). Compared to mothers of nonanxious children, mothers of clinically anxious children demonstrate more overcontrolling behaviors, solicit children's ideas less, and are less likely to accept children's opinions (Moore et al., 2004; Siqueland et al., 1996; Whaley et al., 1999).

Maternal overcontrol is problematic in the context of childhood anxiety because when parents encourage reliance on adults for information on how to feel and what to do in difficult situations, perceived mastery over children's own environments is gradually diminished. Lack of mastery over the environment is linked to a cognitive bias for interpreting everyday events as out of their control (Chorpita & Barlow, 1998), which is associated with cognitive biases relevant in anxiety disorders. Research suggests that when children are in environments that allow them to navigate their own decisions, including in challenging situations, opportunities to self-regulate and cope are increased, which facilitates development of autonomy (Ollendick & Grills, 2016). Learning to self-regulate in the context of experiencing difficult emotions facilitates worldviews in which conflicts are solvable and challenges can be overcome. Finally, environments that teach the value in attempting to problem-solve can provide the opportunity for increased perceived mastery over situations (including difficult ones), thereby encouraging children to approach opportunities to problem-solve, rather than avoid them.

A recent population-based study found that among preschool-aged behaviorally inhibited children, parent's mental health, harsh discipline, and overcontrolling parenting practices were significantly associated with the likelihood of having an anxiety disorder by age 5 years, with maternal overcontrol the strongest predictor of these three (Bayer et al., 2019). In this longitudinal investigation, approximately half of behaviorally inhibited youth developed a clinical level of anxiety by the age of six (Bayer et al., 2019).

Traditionally in the literature, constructs including parental overcontrol, overintrusiveness, overinvolvement, and overprotection were grouped together as one construct (McLeod et al., 2007; van der Bruggen et al., 2008). More recently, evidence suggests that the specific type of controlling parental behavior matters. Psychological control refers to parenting techniques including guilt or shaming in response to the child not behaving according to parental expectations (Barber & Harmon, 2002). Consistent with traditional (behavioral) conceptualizations of maternal overcontrol, psychological overcontrol appears to reduce perceived mastery, potentially leading to perceived helplessness and lack of mastery over the environment (perspectives known to be associated with internalizing symptoms (Garber & Flynn, 2001)). Pinquart (2017) conducted a meta-analysis of 1015 studies, of which 344 included assessments of behavioral overcontrol and 163 included psychological control. Results indicated that behavioral control was associated with lower internalizing symptoms, while psychological control was related to increased internalizing

symptoms with very small to small effect sizes. Of note, baseline child anxiety predicted increases in psychological control and declines in warmth, providing evidence for bidirectional influences within the parent-child relationship.

Neglectful and authoritarian parenting practices (each characterized by low parental warmth (Maccoby & Martin, 1983)) were associated with elevated levels of internalizing symptoms, while permissive parenting was not significantly related (Pinquart, 2017). The authors hypothesize that low parental warmth may explain the increases in internalizing symptoms, and given lack of any observed deficits in parental warmth in permissive parenting, it is possible that the negative effects of lack of parental behavioral control may be compensated by positive effects of parental warmth.

Parental Modeling of Anxious Behaviors

The cognitive model of anxiety posits that cognitive misinterpretations lead to an exacerbation of anxiety symptoms via disrupted or inaccurate thinking patterns, and a large body of work has shown that cognitive risk factors for anxiety aggregate within families (Biedel & Tuner, 1997; Last et al., 1987). Fortunately, children can learn to regulate their own thoughts – however, this depends largely on learning experiences, which typically occur in the presence of parents. Several lines of research in parenting and anxiety have suggested that parents' own modeling of anxious behaviors increases the likelihood of children cognitively misappraising a situation. This is problematic, given that anxious children are already prone to cognitive biases which overestimate the actual level of danger in a given situation. These cognitive biases are related to subsequent anxiety manifestations (Chorpita et al., 1996; Micco & Ehrenreich, 2008).

For example, Gerull and Rapee (2002) found that toddlers showed greater fear and avoidance of an aversive stimulus when mothers showed a negative reaction. After seeing their mother's reaction, avoidance was observed up to 10 minutes following exposure to the negatively paired stimulus. Although cross-sectional in nature, this study demonstrated that a mother's affective response toward novel stimuli has a clear impact on her infant's subsequent behavior toward that stimulus. These findings have been replicated in similar experimental designs showing that maternal avoidance of distressing stimuli (e.g., spiders) moderates the relationship between fear of certain stimuli in mothers and children (Askew et al., 2014; Lebowitz et al., 2015).

Another experiment examining maternal anxiety and maternal emotion regulation during a distressing task where mothers listened to an audio recording of a child in distress pleading for help found that displays of maternal anxiety predicted ineffective maternal emotion regulation during the exposure task, which in turn predicted greater maternal accommodation and higher child anxiety (Kerns et al., 2017). This finding suggests that displays of ineffective emotion regulation may mediate the relationship between maternal and child anxieties.

Temperament and Parenting

Temperament refers to heritable and moderately stable traits that serve as the "building blocks" for adult personality (Auerbach et al., 2008; Rothbart 1981). Temperament is a robust predictor of later personality traits (e.g., impulsivity, extraversion (Rothbart et al. 2000a, b)), even after accounting for gender and socioeconomic status. Infant temperament demonstrates moderate stability and continuity into middle childhood (Carey & McDevitt, 1978; Rothbart et al., 2000a, b), and its role in the emergence of anxiety symptoms has been of considerable scientific interest for decades (Goldsmith & Campos, 1982).

Behavioral inhibition (BI) refers to a temperamental trait characterized by fear and apprehension in novel situations (Degnan et al., 2008). BI has been shown to predict anxiety symptom severity over time (Mian et al., 2011) as well as anxiety disorders in general (Biederman et al., 2001; Turner et al., 1996; van Brakel et al., 2006) and particularly social anxiety disorder

(Chronis-Tuscano et al., 2009; Muris et al., 2011). The parenting environment is thought to interact with temperamental risk factors like behavioral inhibition and level of emotional reactivity. Children high in temperamental traits such as frustration and impulsivity, yet low in effortful control, are more vulnerable to the adverse effects of negative parenting and elicit parental responses that reinforce such traits (Kiff et al., 2011). Research has also found that among children with temperamental profiles characterized by high reactivity and negative emotionality, adaptive behavioral development depends, in part, on their experiences with caregivers (Wachs, 2000). For instance, children with high negative emotionality are more likely to exhibit elevated anxiety symptoms if their mothers react with disproportionately high sensitivity to the child's behaviors (Davis et al., 2015). Likewise, parental overprotection and overcontrolling behaviors are associated with increased internalizing problems (Bayer et al., 2019; McLeod et al., 2007), particularly among youth high in behavioral inhibition. Manassis and Bradley (1994) proposed a theoretical model in which temperament and parent-child attachment both equally confer risk for the development of childhood anxiety, but the level of risk is greater for children who have both BI and an insecure attachment bond with the caregiver. Unfortunately, the relationship among these and other risk factors remains poorly understood.

Notable limitations of this body of literature include the absence of data on the directionality of the relationships and overlap between constructs. It is likely that factors unique to each child, such as temperament, personality, and anxiety expressed to the parent, shape parenting behaviors and ultimately the attachment relationship (Hudson et al., 2009; Moore et al., 2004; Whaley et al., 1999). One mechanism of how parenting may contribute to child internalizing problems is lack of opportunities to face and overcome fears, and parents of shy/inhibited children likely mean well when they attempt to shelter their child from the potential for failure. In addition, it is important to consider the extent to which BI, difficulties with insecure attachment, and anxiety are separate constructs. To illustrate, BI is associated with chronic and excessive arousal and avoidance, and an insecure attachment is associated with frustration intolerance, difficulty being soothed, and distress when faced with novel situations (Manassis, 2001) – all characteristics of anxiety disorders.

In light of these challenges and limitations, temperament and parent/child attachment bonds remain important constructs to consider when evaluating risk level for anxiety. Childhood behavioral inhibition and signs of an insecure attachment signal future risk for an anxiety disorder. Indeed, there is emerging evidence that children with BI respond to early intervention strategies aimed at reduction of anxiety symptoms (Rapee et al., 2005) and that improving the quality of the parent-child attachment relationship may also be effective in minimizing internalizing anxiety symptoms (Choate et al., 2005; Siqueland et al., 2005).

The literature to date focusing on the link between parenting and child anxiety has provided important insights and advanced our theoretical understanding of this relationship, and modern multimodal studies have advanced our understanding of the transactional nature of child and parent behaviors. Still, this literature base has a number of important limitations (Lawrence et al., 2019; McLeod et al., 2011). First, studies vary significantly in the operationalization of parenting constructs studied, which has made it difficult to compare results across studies. In addition, relatively little attention has been paid to the relationship between parenting behaviors and the development of specific anxiety disorders, as opposed to more general measures of anxiety. Research in this area can help identify risk factors for specific anxiety disorders in youth and can inform prevention and treatment interventions. Further, there is a long-standing focus on the behavior of mothers within the research base, such that comparatively little is known about the importance of fathers' behaviors when it comes to the development of child and adolescent anxiety disorders. In terms of identifying causal links, the literature base would benefit from increased use of experimental studies, especially more

longitudinal experimental designs (McLeod et al., 2011). Importantly, there has also been difficulty assessing developmental considerations related to the appropriateness of specific parenting behaviors based on the age of the child (e.g., more parental control and involvement may function differently with preschoolers as compared to adolescents), and studies have focused heavily on adolescents. The childhood anxiety literature has traditionally focused heavily on middle childhood to adolescence because anxiety commonly emerges during the teenage years; however, there is currently a particular need to assess parental behaviors that promote adaptive emotion regulation during the early childhood years (i.e., teaching language for expression of emotions, emotion coaching (Roben et al., 2013)). Since the first edition of this text, the literature has moved to address some of these limitations; what follows is a discussion of the role of fathers in the development of child anxiety disorders, the association between parenting behaviors and the development of specific anxiety disorders, and discussion of challenging parenting behavior, a relatively new construct.

Fathers and Child Anxiety Disorders

Historically, the vast majority of the research examining parenting and child anxiety symptoms has focused on mothers (Bogels & Phares, 2008; Teetsel et al., 2014). In the last decade, there have been increased efforts to include fathers in these studies, as previously very little was known about the role they play in the development of child anxiety disorders. Interestingly, one meta-analysis found that the association between parenting behaviors and child anxiety symptoms was stronger for fathers than mothers (Moller et al., 2016). In contrast, a previous meta-analysis by McLeod et al. (2007) found that parent's gender did not moderate the relationship between parenting and child anxiety symptoms.

Research suggests that fathers of anxious children demonstrate more controlling and less helpful behavior toward their children (Bogels & Phares, 2008). Additional studies have focused on fathers' overcontrolling behaviors, with mixed findings. Specifically, some studies suggest that paternal overcontrol (but not maternal overcontrol) is associated with increased anxiety in infants (Moller et al., 2015), middle-aged children (Pereira et al., 2014), and adolescents, with this association being stronger among older adolescents in particular (Verhoeven et al., 2012). In contrast, others have found no association between paternal anxiety or paternal parenting behaviors and child social anxiety symptoms (Bogels et al., 2001). For instance, Verhoeven et al. (2012) found that among 8- to 12-year-old children, paternal overcontrol did not significantly predict child anxiety symptoms, whereas maternal overcontrol did.

Others have examined the parenting behaviors of anxious fathers in particular to determine the extent to which they engage in parenting behaviors that are associated with child anxiety. Teetsel et al. (2014) found that among a sample of non-anxious children, fathers with a DSM-IV anxiety diagnosis demonstrated more controlling behaviors (e.g., intrusive and unsolicited help, completing the task for the child, over-instructing the child) than anxious mothers during a difficult parent-child laboratory task. In contrast, anxious fathers demonstrated less reinforcement of the child's dependence on his/her parent and utilized less punishment than anxious mothers. Of note, these researchers found no difference between the levels of autonomy-granting behaviors, warmth, hostility, and anxious behavior between anxious mothers and fathers during the interaction task.

Another study examining the parenting behaviors of anxious parents of 10- to 15-month-old infants found that fathers with social anxiety disorder reported more overinvolvement and less challenging parent behavior (i.e., behavior that encourages the child to go outside his/her comfort zone (Moller et al., 2015)). Others have found that fathers' (but not mothers') PTSD symptoms predicted whether their children developed PTSD following a natural disaster (Kilic et al., 2003). In another study, paternal somatization negatively predicted children's self-reported anxiety symptoms following treatment

(Crawford & Manassis, 2001). Taken together, this evidence suggests that anxious fathers may engage in behaviors which could impact child anxiety development.

Parental expressions of anxiety as well as encouragement have also been examined for mothers and fathers. In a study by Moller and colleagues (2014), 10- to 15-month-old infants were randomly assigned to complete the visual cliff task with either their mother or their father. Results indicated that expressed anxiety from fathers, but not mothers, was related to increased expressions of anxiety and avoidance for infants. Of note, this association was moderated by infant anxious temperament; specifically, fathers' expressed anxiety was more strongly associated with infant avoidance and anxiety when infants were temperamentally anxious.

There has also been interest in looking at the transactional relationship between parents in relation to the development of child anxiety. To do this, one study utilized the actor-partner interdependence model, which takes into account the notion that parents' relationships with one another are interdependent and transactional, with each parents' anxiety influencing not only their own parenting behaviors but also the parenting behaviors of their partner (Gibler et al., 2018). Parents completed self-report measures of anxiety and parenting behaviors, and their 12- to 30-month-old infant participated in a laboratory task assessing anxiety risk. Results indicated that although there was no direct association between parent anxiety and child anxiety, paternal anxiety was indirectly associated with child anxiety risk via its influence on maternal encouragement of independence. Specifically, paternal anxiety was associated with decreased maternal encouragement of independence, which in turn was related to child anxiety risk.

In recent years, the increasing inclusion of fathers in child anxiety research has empirically highlighted the important role that fathers play in the development of child anxiety symptoms. Although results to date are somewhat mixed, it is clear that continued investigation of fathers' roles, as well as further examination of potential mediators and moderators, is warranted.

The Role of Parenting in Specific Anxiety Disorders

Social Anxiety Disorder

In the last decade, research has increasingly examined parenting influences on the development of specific anxiety disorders in children and adolescents. A variety of studies have examined parenting and social anxiety disorder in youth, with results highlighting a number of potentially relevant parenting factors. For example, there is evidence that parents of socially anxious children demonstrate more overinvolvement and controlling behaviors during tasks with their child (Asbrand et al., 2017; Greco & Morris, 2002). Mothers of children with more social anxiety symptoms were less flexible and less responsive to their child's needs during a puzzle task than mothers of healthy control children, whose behavior was more responsive to their child's needs (e.g., increasing maternal involvement in the task if the child requested it (Asbrand et al., 2017)). Another study found that the specific combination of maternal overprotection, paternal rejection, and paternal lower emotional warmth was uniquely related to social phobia among adolescents (Knappe et al., 2012). Further, among parents with social anxiety disorder, parenting behaviors including overcontrol, low levels of warmth, and transfer of threat information via parental modeling are more common, and these behavioral tendencies are theorized to increase child social anxiety symptoms by reducing opportunities to learn and practice effective social skills, increasing child avoidance of social situations, and reducing children's self-efficacy (Garcia et al., 2021).

Some studies have examined moderators and mediators of the relationship between parenting and social anxiety symptoms in children. In a study involving 9- to 12-year-olds who completed an origami task with both of their parents, Morris and Oosterhoff (2016) found that increased maternal verbal instruction during the task was associated with lower levels of child social anxiety symptoms. In contrast, increased paternal verbal instruction was associated with

higher social anxiety for male children and lower social anxiety for female children. This study also found that children with higher levels of social anxiety symptoms had fathers who made more critical statements and mothers who more frequently physically took over the task. Another study found an indirect effect of psychological control on child social anxiety; specifically, among mothers (but not fathers), higher anxiety about their daughters' well-being was associated with more use of psychological control, which in turn was related to higher levels of child social anxiety symptoms (Bynion et al., 2017). In addition, Gomez-Ortiz and colleagues (2019) found that parenting practices including low levels of affection and communication, humor, reduced autonomy promotion, and increased psychological control predicted negative self-esteem among children, which predicted social anxiety symptoms.

Studies utilizing experimental designs have increasingly been conducted. One study presented a community sample of 8- to 12-year-old Dutch children with vignettes depicting ambiguous social situations in which the parent responded either anxiously or confidently (Bogels et al., 2011). Children were then asked to rate their level of social anxiety versus confidence in the fictional situation. Results indicated that among more socially anxious children, the father's response in the vignette influenced the children's level of confidence more than the mother's vignette response. This finding was not consistent among subclinical youth. Among children with no or low levels of social anxiety, the mother's response in the vignette relative to the father's response influenced the child's response more. In another study, researchers manipulated infants' mothers' response style (i.e., confident or socially anxious) when interacting with a stranger (de Rosnay et al., 2006). Results indicated that behaviorally inhibited infants responded with more socially anxious behavior toward the stranger when their mother also demonstrated socially anxious behavior toward the stranger.

Overall, the literature on parenting influences and social anxiety disorder in children has highlighted several important parenting behaviors, as well as a number of moderators and mediators which warrant further examination.

Generalized Anxiety Disorder

A number of studies have also examined parenting practices in relation to generalized anxiety disorder (GAD) and/or worry among children. Parenting practices that have been found to be related to increased levels of worry in children and adolescents include increased levels of rejection (Brown & Whiteside, 2008; Hale et al., 2006; Muris et al., 2000), anxious rearing behaviors (Muris, 2002; Muris et al., 2000), parental control (Muris, 2002), and parental alienation (Hale et al., 2006). With respect to GAD specifically, Muris and Merckelbach (1998) found that among 8- to 12-year-old children, both parental control and anxious child-rearing practices were associated with GAD symptoms. Similar results were found by Morris and Oosterhoff (2016), who found that observed measures of parental rejection (i.e., denying reassurance) and control (i.e., physical takeovers during an origami task) were associated with increased levels of GAD symptoms among children. In contrast, Wilson et al. (2011) found no significant associations between self- and child-reported parenting behavior and child worry.

There is much discussion about the direction of effects between children and parents when it comes to the development of anxiety symptoms. One study attempted to examine this and found evidence supporting the notion that children evoke different parenting practices depending on the level of anxiety they experience (Wijsbroek et al., 2011). Specifically, this study found that adolescents with high levels of self-reported GAD and separation anxiety disorder symptoms at the first time point reported increases in parental control over time.

Overall, the literature to date examining parenting practices and their relation to GAD in youth has highlighted many of the same parenting practices which have been implicated in the development of other anxiety disorders, as well as anxiety symptoms more generally.

Challenging Parenting Behavior

Challenging parenting behavior represents a relatively new construct within the parenting and anxiety literature. This construct builds upon theoretical work related to the potentially differing roles that mothers and fathers may play in parenting. Paquette (2004) postulated that fathers "seem to have a tendency to surprise children, to destabilize them momentarily, and to encourage them take 'risks,' thus enabling children to learn to be brave in unfamiliar situations and to stand up for themselves" (p. 212). Challenging parenting behavior (CPB) is defined as parenting behavior that "promotes assertiveness, taking chances, and overcoming limits" (Majdandzic et al., 2016, pp. 424), with examples of CPB including rough and tumble play, tickling, and encouraging the child to push their limits physically or socio-emotionally.

Several studies have examined the relationship between CPB and childhood anxiety, finding some evidence for a relationship between maternal and paternal CPB and lower levels of anxiety in preschool-aged children (Lazarus et al., 2016; Majdandzic et al., 2018b). Another study found that among preschool-aged children, having at least one parent with high CPB predicted fewer anxiety symptoms, even when the co-parent demonstrated lower levels of CPB (Majdandzic et al., 2018a). However, Majdandzic and colleagues (2014) found a difference in the relationship between mothers' and fathers' CPB and child social anxiety symptoms, with fathers' CPB negatively predicting observed social anxiety symptoms in their 4-year-old children and mothers' CPB predicting higher observed social anxiety symptoms in their child.

One study has examined CPB retrospectively in a sample of undergraduate college students. Undergraduates completed a retrospective measure of their perception of their parents' CPB from ages 7 to 12, as well as a measure of current social anxiety symptoms (Lazarus et al., 2018). An exploratory factor analysis identified three constructs comprising CPB, including parental encouragement of social assertion, parental encouragement to engage in new situations, and intentional teasing. Results indicated that mothers' and fathers' encouragement of social assertion and engagement in new situations was associated with lower levels of social anxiety symptoms in early adulthood. Further, higher levels of paternal intentional teasing predicted higher levels of adult social anxiety symptoms. Another study examined CPB in emerging adulthood (i.e., ages 18–25) and found that higher paternal social CPB was associated with lower levels of social anxiety symptoms (Smout et al., 2020).

CPB has been examined in early childhood as well as emerging adulthood and has some early support as a potential protective parenting factor when it comes to the development of child and adolescent anxiety. Aspects of CPB, including encouragement of social assertion and encouragement to engage in new situations, may serve to reduce youth avoidance of anxiety-provoking situations, which would theoretically buffer against the development or maintenance of anxiety symptoms. Given findings to date, additional research focused on CPB may provide further insight into how to protect against the development of anxiety symptoms in youth.

Parenting and Childhood Anxiety Prevention and Intervention

Intervention and prevention studies can also shed light on parenting factors that impact the development and maintenance of child anxiety. In particular, some studies have explicitly targeted parenting practices as a means of reducing child anxiety symptoms, while others have measured parenting practices to determine whether treatment has had an impact on these. Although a full exploration of child anxiety prevention and intervention literature is beyond the scope of this chapter, the following section discusses this literature as it pertains to parenting behaviors.

Many studies have examined whether parental involvement in CBT for youth anxiety disorders yields additional benefit beyond child-focused treatments alone, with mixed results overall. Some studies have suggested that there is no

significant benefit to including parents in treatment compared to child-focused CBT (Breinholst et al., 2012; Peris et al., 2021; Thulin et al., 2014), while others have found that parent's involvement is associated with improved outcomes (Manassis et al., 2014; Sun et al., 2018). Silverman et al. (2021) shed additional light on this issue. In this study, families with a child meeting criteria for an anxiety disorder were randomly assigned to one of three treatment groups: individual child CBT, CBT with parent's involvement focused on reinforcement training (i.e., teaching parents to not allow their child to avoid anxiety-provoking situations, CBT + reinforcement), or CBT with parent involvement focused on improving the parent-child relationship (i.e., improving acceptance and reducing psychological control, CBT + relationship). Parents randomized to the CBT + reinforcement treatment had lower self-reported ratings of negative reinforcement (i.e., allowing their child to avoid anxiety-provoking situations) at post-treatment compared to parents in the CBT + relationship or child-focused CBT conditions, suggesting treatment specificity. In other words, simply involving the parent in treatment did not significantly reduce negative reinforcement; rather, this was only found when the parent-focused treatment specifically targeted this component. At post-treatment, results indicated no significant difference between the three treatment conditions based on parent's report of child anxiety; however, children randomized to one of the two parent-focused treatment conditions had lower self-reported anxiety scores at post-treatment. In addition, at the 12-month follow-up, parent's reports of child anxiety symptoms were significantly lower for children in the CBT + relationship condition. Further, lower levels of parent's negative reinforcement at post-treatment were significantly associated with lower levels of parent-reported child anxiety symptoms. Lastly, reductions in parents' negative reinforcement were associated with reductions in parents' use of psychological control, which partially mediated anxiety reduction. Overall, conclusions from this study suggest that parent involvement in treatment for child anxiety disorders is beneficial, particularly when treatment specifically helps parents reduce children's avoidance of anxiety-provoking stimuli.

Similarly, in acknowledging that parental involvement in youth CBT for anxiety can be defined in a number of ways, a meta-analysis by Manassis et al. (2014) sought to compare child anxiety outcomes across three groups: child-focused CBT with limited parental involvement, CBT with family involvement focused on contingency management (CM) or transfer of control (TC) from therapist to parent, and CBT with family involvement with low emphasis on CM or TC. Results indicated that while all three forms of treatment led to reductions in child anxiety symptoms, those who received CBT with family involvement with a strong emphasis on CM and/or TC continued to experience increased rates of anxiety disorder remission during the period of time between post-treatment and 1-year follow-up, compared with children in the other two intervention groups, whose gains were simply maintained. These results further demonstrate that more clearly defining the specific focus of parent-based components of CBT for child anxiety is important when attempting to evaluate whether parent involvement yields additional benefit beyond child-focused CBT alone.

Others have attempted to investigate the direction of effects between children and parents or how parents and children may impact change in one another as a result of treatment. One study by Settipani et al. (2013) assessed child anxiety symptoms as well as parent variables, including maternal anxiety, maternal psychological control, family affective involvement, and family behavioral control among children ages 7–14 who completed CBT treatment for anxiety. Results suggested that decreases in child anxiety, as rated by mothers, led to decreases in maternal anxiety. In addition, decreases in maternal psychological control and family affective involvement from pre- to post-treatment preceded decreases in clinician-rated child anxiety from the post-treatment to follow-up period. Taken together, results suggest a bidirectional influence between parents and children during the treatment process.

In addition to the treatment literature, the literature regarding prevention programs for youth anxiety disorders has provided insight into the role parenting behaviors may play in the development of child anxiety disorders. In particular, a program developed by Ginsburg (2009) has shown promise in preventing the development of child anxiety disorders in children of anxious parents. The program, Coping and Promoting Strength (CAPS) Program, specifically targets malleable anxiety risk factors in children (i.e., anxiety symptoms, maladaptive cognitions, and poor coping/problem-solving skills) and parents (anxious modeling, anxiety-enhancing parenting practices such as overcontrol, and criticism/family conflict). The program is delivered across 6–8 weekly sessions and includes parents alone for the first two sessions, though any family member can join for the remaining sessions. Interventions include CBT strategies targeting anxiety, cognitive restructuring, building communication and problem-solving skills, and contingency management. Participants in the pilot study, which compared CAPS to a wait-list control group, included 40 nonanxious children, ages 7–12, and their family, where one parent met criteria for an anxiety disorder. Results indicated that 30% of the children in the wait-list control group developed an anxiety disorder by the 1-year follow-up assessment, while none of the 20 children who received CAPS developed an anxiety disorder (2009).

Ginsburg et al. (2015) later conducted a randomized controlled trial comparing CAPS to an information-monitoring control condition, in which families received a pamphlet about anxiety disorders and treatment. Participants included nonanxious children, ages 6–13, from families in which one parent had an anxiety disorder diagnosis. Results indicated that across the 1-year study period, rates of anxiety disorder diagnosis were 5% in the CAPS condition and 31% in the information-monitoring control condition. In addition, children who received CAPS both had significantly lower anxiety scores at the post-treatment assessment, as well as at the 6- and 12-month follow-up time points, compared to the control group. Interestingly, results also suggested that baseline child anxiety symptoms moderated CAPS treatment effects, with children with higher levels of anxiety benefitting more from the intervention than those with lower baseline anxiety levels. Further, parental anxious modeling and global parental distress mediated effects on outcomes among children who received CAPS. Specifically, CAPS led to reductions in parental anxious modeling and global parent distress, which led to reduced anxiety symptoms among youth. Notably, results suggested that both child maladaptive cognitions and parent anxiety did not serve as moderators of treatment outcome. Given these results, the authors argue that interventions and/or prevention programs targeting parent anxious modeling as well as parent distress may be beneficial in preventing the development of anxiety disorders in children.

Taken together, the results of recent prevention and intervention studies addressing the link between parenting behaviors and child anxiety disorders suggest several areas of potential promise. Although the larger literature base has mixed results in terms of whether parent involvement in CBT for youth anxiety improves outcomes beyond those gained from child-focused CBT, recent literature suggests that when interventions specifically target parenting practices associated with child anxiety development, results are more promising. Specifically, parent-focused interventions targeting improving contingency management, reducing parent psychological control, and reducing anxious parental modeling may increase effectiveness of CBT treatment for youth anxiety.

Summary and Future Directions

The field of child anxiety and parenting is currently making exciting progress. We have expanded our understanding of the specificity of traditional theoretical models, such as maternal anxiety as a risk factor for child anxiety, and increased our understanding of new risk factors and influences, such as fathers' role in childhood anxiety disorders.

Although many questions remain, recent research in this area continues to point toward parenting practices as a key research focus. The parenting and anxiety literature will benefit from studies which increase the breadth of experimental and intervention designs including parents, particularly fathers, who have been understudied in the current literature. As with the majority of studies in the field of psychology, recent studies would benefit from replication in naturalistic study settings. Additionally, future studies should work to further increase our understanding of moderators and mediators impacting the relationship between parenting and child anxiety development.

Another focus of the literature moving forward should be directionality of change, namely, the possibility that heightened child anxiety states may actually elicit parental overcontrol and anxious behavioral modeling. The reciprocal influence of child and parental traits has become part of the standard child anxiety model (e.g., Rapee (2001)); however, few experimental designs have tested the reciprocal nature of such traits. Such focus on these traits will continue to inform childhood anxiety interventions, increasing the efficacy of our current gold standard treatments.

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Part III

Specific Phobias in Children and Adolescents

16

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Introduction

Specific phobias (SD) are intense fears of certain objects, animals, situations, or environments. While not as severe as other more pervasive anxiety disorders (e.g., generalized anxiety disorder, obsessive-compulsive disorder), a specific phobia can be a serious impediment to a child's successful development and can carry significant long-term psychological and social effects, usually into adulthood (Davis, 2009; Davis et al., 2009b). Even so, fear itself is important, normal, and highly adaptive (Davis, 2009). The experience of fear often is healthy and keeps us safe (e.g., looking both ways before crossing the street and exercising caution around strange dogs). The emergence of fear roughly coincides with increasing cognitive-developmental gains and is a sign of cognitive maturation. Early concrete thinking is associated with fears of highly specific stimuli (e.g., dogs or bees) while later gains in abstract and social thought lead to more abstract and intangible fears (e.g., the "boogeyman" or public embarrassment; Davis (2009), Gullone (2000) and Muris et al. (2002)). For example, animal fears have an onset around 7 years of age, followed by increasingly abstract situational and social fears in the teenage years (Davis et al., 2009a; Öst, 1987a). While these fears typically arise and subside, presumably alleviated by increased instruction and exposure to the feared stimulus, not all childhood fears are just a "phase" or transitory in nature (Ollendick et al., 2009a).

Phenomenology

Some seemingly developmentally appropriate fears persist despite the best efforts of parents, other caregivers, and family doctors, and are unusually frequent, intense, and distressing, leading to a disruption of the child's life. In order to be diagnosed with this kind of problematic and persistent fear, a child must have the fear for at

Author Notes: The terms "child" and "children" are used throughout and usually meant to include adolescents unless otherwise noted.

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least 6 months with accompanying problematic avoidance or distress (i.e., interference), along with physiological symptoms (APA, 2013). Such symptoms are said to constitute a "specific phobia" that can be further classified into one of several types: animal (i.e., both animals and insects), natural environment (e.g., the dark or heights), blood-injection-injury (e.g., receiving an injection or seeing blood), situational (e.g., small enclosed spaces or flying in an airplane), or other (e.g., loud noises, clowns, costumed characters, vomit, and fears that do not fit the previous types; APA, 2013).

Those having a specific phobia are thought to experience an unusually strong, pathological emotional response of a neural fear network of memories and prepotent responses (Davis & Ollendick, 2005; Lang, 1979; Note: this is different than neural circuitry—for a review see Chap. 5). From this information-processing model, a specific phobia is a psychopathological combination of physiology, behavior, and cognition. With exposure to cues associated with the feared stimulus, children with specific phobias typically experience activation of the autonomic nervous system (e.g., increased heart rate), usually attempt to engage in avoidance behavior (e.g., running away), and think catastrophic thoughts (e.g., "the dog is going to bite me," "the lightning will strike our house and burn it down"; Davis and Ollendick (2005)). When all three components of the emotional response appear, synchronous responding occurs; however, desynchronous or partial responses can occur as well (i.e., incomplete or partial activation of the fear network resulting in a partial response or only a response in one or two components; Hodgson and Rachman (1974), Rachman and Hodgson (1974)). Given this, a clinician's treatment goal is to alter this fear network of memories and responses (e.g., learning histories, conditioning experiences, stimulus characteristics) and through therapy create new, adaptive, memories which will compete with the previous psychopathological information (Bouton, 2004; Davis, 2009). This type of corrective learning experience also tends to be context specific so clinicians must plan for treatment generalization to combat the spontaneous recovery of fear (Bouton, 2004).

Several developmental adaptations to the typical diagnostic criteria must also be considered. Children may not be able to fully articulate their fears or cognitions and may not realize their fear or their response when exposed is extreme (Davis et al., 2009b; APA, 2013). A child may also become clingy, cry, or possibly even become aggressive when exposure is forced or escape prevented (APA, 2013; Davis & Ollendick, 2014). Finally and as noted above, to avoid misdiagnosing the typical developmental progression of fears as clinically significant specific phobias, a child must also have the fear for at least 6 months.

Unfortunately, relatively little research has focused on the phenomenology of specific phobias in children and adolescents. From what is known, it appears that specific phobias affect children from a variety of racial, ethnic, and socioeconomic backgrounds (Oar et al., 2019; Ollendick et al., 2010). Also, it appears that animal and natural environment type specific phobias are the most common (Last et al., 1992; Milne et al., 1995; Ollendick et al., 2009b, 2010; Silverman et al., 1999), with phobias of dogs, insects, heights, the dark, and storms being common. Children with specific phobias differ by type too. Ollendick et al. (2010) found that children with natural environment phobias were more impaired than those with animal phobias in their somatic and anxious symptoms, depressive symptoms, and life satisfaction (i.e., a measure of quality of life). Moreover, on the Child Behavior Checklist (Achenbach, 1991), they were rated as being more withdrawn, having more somatic complaints, being more anxious/depressed, and having more social problems than children with animal phobias. Even so, no differences emerged between the two groups of children on socioeconomic variables, demographic variables, family variables, severity of the specific phobias themselves, or ratings of coping or dangerousness of their feared stimuli (Ollendick et al., 2010).

Comorbidity also appears to be the rule for children with specific phobias in both community and clinical samples. Comorbidity rates tend to vary greatly, however, with approximately half of all children with specific phobias having another comorbid specific phobia in community samples (25% may have another disorder; Costello et al. (2004)). This rate is comparable to clinical samples, although the rates vary considerably. For example, Öst et al. (2001) found 42% of children were comorbid with at least one other disorder, Last et al. (1992) found 50% were comorbid, Silverman et al. (1999) found 72% were comorbid, and Ollendick et al. (2009b) found 95% of their sample were comorbid—half with at least another specific phobia. Comorbidity appears to be characterized by other specific phobias or other anxiety disorders; however, other comorbid internalizing and externalizing disorders have been observed as well (e.g., attention-deficit/hyperactivity disorder and oppositional defiant disorder; Ollendick et al., 2010). Overall, the most common comorbid diagnoses appear to be other specific phobias, and then, in varying order depending on the study, generalized anxiety disorder, social phobia, separation anxiety disorder, attention-deficit/hyperactivity disorder, and major depression (Ollendick et al., 2009b, 2010; Öst et al., 2001). To date, only one study has reported on comorbidity differences by type of specific phobia: Ollendick et al. (2010) found higher rates of generalized anxiety disorder and separation anxiety disorder in children having a natural environment type phobia compared to an animal type phobia. Comorbidity with other more severe disorders is also common (e.g., autism spectrum disorder; Davis et al. (2014)). Practitioners should be slow and cautious when applying assessment and therapy techniques developed for typically developing children with those who may be atypically developing (e.g., autism spectrum disorder) without modifications or proper training (Davis, 2013; Davis et al., 2014; Hagopian et al., 2017; Moree & Davis, 2010; Muskett et al., 2019).

Epidemiology

Overall, anxiety disorders are the most commonly occurring group of psychological disorders, and of the anxiety disorders, specific phobia is the most prevalent with a 12-month prevalence rate of 8.7% and a lifetime prevalence rate of 12.5% (Kessler et al., 2005a, b). In children, approximately 5% of community samples and 10% of clinical samples have fears persistent and intense enough to be deemed specific phobias (APA, 2013; Ollendick et al., 1997). Higher rates have been reported, however, with some studies suggesting 17.6% of parent-reported childhood fears are severe enough to be specific phobias (Muris & Merckelbach, 2000) and 22.8% of child-reported fears may be phobic disorders (Muris et al., 2000). Further, among adolescents, lifetime prevalence has been found to be 19.3% (Merikangas et al., 2010). In addition, while the mean age of onset has been suggested to be 9–10 years (Stinson et al., 2007), there is wide variability depending on the type of fear, ranging in emergence from early childhood to early adulthood (Öst, 1987a). Unfortunately, the toll exacted by specific phobia on the health-care system and those with the fear has been great with those having specific phobias accessing medical care at higher rates than those with obsessive-compulsive disorder, and second only to panic disorder (Deacon et al., 2008). Specific phobias are also associated with poor outcomes of internalizing disorders and severe mental disorders throughout a person's life span (de Vries et al., 2019). Even so, fewer than 10% of adults ever seek treatment for specific phobia, and most have had their fear for an average of 20 years, presumably because of the degree of accommodation in daily life and overall avoidance (Stinson et al., 2007). Additionally, fewer than 30% of youth receive treatment for specific phobia (Ollendick et al., 2018). The lack of treatment-seeking is even more concerning when the evidence for quick, efficacious outcomes related to the treatment of specific phobia is considered (see Davis and Ollendick (2005), Davis et al. (2011), and Öst and Ollendick (2017)).

Etiology

The exact causes of specific phobias are still not well understood; likely there are myriad causes that act alone or in combination to bring about a specific phobia depending on the characteristics of the individual (Davis, 2009). Four common pathways are recognized, however, and grouped into three associative accounts (classical conditioning, modeling, and transmission of negative information) and one other pathway (the nonassociative account; Nebel-Schwam and Davis (2013), Poulton and Menzies (2002), Rachman (1977, 2002)). Classically conditioned phobias are acquired through direct contact with the stimulus (e.g., a snake bites a child). Phobias acquired through modeling involve seeing another individual behave afraid (e.g., a parent acts very afraid of snakes in front of the child). The transmission of negative information serves to impart fear through the retelling of scary stories, catastrophic beliefs about the stimulus, and the like (e.g., a parent tells a child to only play inside their yard because snakes are everywhere and will bite you). Finally, the nonassociative account attempts to capture those fears that seem to have more of a biological or genetic predisposition (Rachman, 2002), though often individuals who have difficulty in recalling the exact origin of their fear are relegated to this category (e.g., "I don't know; I've always been afraid of snakes"). Even so, additional consideration is necessary as many individuals experience associative events and do not develop a specific phobia (e.g., many people have been bitten by dogs but do not develop a phobia). While any one path may cause a specific phobia, it is likely that associative experiences increase over time until interacting with an individual's own unique nonassociative vulnerability (Nebel-Schwalm & Davis, 2013; Ollendick & King, 1991; Ollendick et al., 2002). As a result, the answer may be summarized as it is simply a matter of determining how much associative experience is necessary for an individual to develop a specific phobia given his or her unique inborn diatheses and competing corrective experiences (Marks, 2002). Additionally, the increased use of imaging techniques and studies specifically focused on youth and aspects of anxiety and fear may provide a richer understanding. For example, understanding the relationships between structures of the brain and symptoms such as anxious arousal and anxious apprehension in youth may begin to move our understanding further (Castagna et al., 2018).

Evidence-Based Assessment

With the rise of evidence-based practice, and empirically supported treatments in particular, a detailed and thorough assessment prior to commencing treatment has become essential to the provision of clinical services. While a thorough description of the assessment process is beyond the scope of this chapter (see Ollendick et al. (2004), Silverman and Ollendick (2005), and Etkin et al. (2021) for reviews), a clinician choosing an evidence-based treatment should carefully consider the assessments used in the studies upon which the evidence has been built so an accurate and compatible diagnosis can be made (i.e., using the same assessment techniques as the evidence to know if a patient does have a disorder similar to that in a particular randomized trial and therefore possibly amenable to that treatment). In addition, a comprehensive assessment should allow for a detailed diagnostic assessment of childhood disorders (including comorbid conditions) and it should include direct examination of the phobic response (i.e., psychophysiology, behavior, and cognition; Davis and Ollendick (2005), Ollendick et al. (2009a)). The assessment should be multi-method and multi-informant: use of a variety of techniques and respondents to be sure an accurate diagnostic picture emerges across different situations. Instruments and interviews typically recommended for this type of assessment include the Anxiety Disorders Interview Schedule for *DSM-IV* Child/Parent version (ADIS-IV-C/P; diagnostic interview; Silverman and Albano (1996), and its DSM-5 revision, Albano and Silverman (in press)), the Multidimensional Anxiety Scale for Children 2nd Edition (MASC-2; anxiety self-report measure; March (2013)), the Fear Survey Schedule

for Children-Revised (FSSC-R; fear self-report measure; Ollendick (1983)), and the Child Behavior Checklist (CBCL; broadband parent-report measure; Achenbach (1991)), among others. Phobia-specific questionnaires can be considered for inclusion as well (e.g., questionnaires about particular stimuli like spiders). Behavioral avoidance tasks (BATs) should be considered for inclusion by clinicians because of the unique psychophysiological, behavioral, and cognitive information they can offer (Castagna et al., 2017; Davis et al., 2009b, 2012b, 2013; Ollendick et al., 2009a), as well as family interaction characteristics (Ollendick et al., 2012). While these behavioral avoidance tasks may be difficult to arrange (e.g., getting, storing, and caring for stimuli or arranging for offsite visits), especially for private practitioners with limited resources, help, and space, the incorporation of BATs into the assessment process has been strongly encouraged as it provides valuable information about how the child will respond during an actual encounter with the stimulus or situation (Davis et al., 2009b). Ideally, a comprehensive pretreatment assessment will provide enough information to determine a diagnosis of specific phobia, identify any comorbid diagnoses which may require additional treatment or need to be considered during treatment for the phobia (e.g., separation anxiety disorder in addition to a specific phobia of the dark), and plan the steps of a gradual, hierarchical exposure (typically in vivo).

Treatment

Empirically Supported Treatments

Currently, clinicians seeking to treat child and adolescent fears have a variety of well-researched techniques available in their clinical armamentarium. These options have come from decades of study leading to the identification of several treatments for child anxiety and fear (e.g., applied behavior analyses [ABA], behavior therapy [BT], and cognitive-behavioral therapy [CBT]). Following a brief review of the established treatments for child specific phobia, an emphasis will be placed on the newer, empirically supported, intensive CBT called "One-Session Treatment" (OST; Davis et al., 2012b, 2019; Öst, 1987b, 1989; Ollendick et al., 2009b; Zlomke & Davis, 2008). Currently, there are four major types of empirically supported treatment for child specific phobia: systematic desensitization, reinforced practice (also called contingency management), modeling and participant modeling, and CBT (Davis, 2009; Davis et al., 2011; Davis & Ollendick, 2005; Seligman & Ollendick, 2012). Given this, it is no surprise then that the most widely used treatment components for children with anxiety have been exposure, relaxation, cognitive restructuring, modeling, psychoeducation, and reinforcement (Chorpita & Daleiden, 2009; Farrell et al., 2019).

Systematic Desensitization (SD)

Systematic desensitization is one of the earliest and most influential child treatments for specific phobia, though its underlying theory and use have been increasingly challenged and criticized (Davis, 2009; Ollendick et al., 2009a). According to Wolpe (1958), SD works through a process of reciprocal inhibition—the notion that one cannot experience two competing emotions simultaneously. The goal is to work toward extinguishing the classically conditioned fear response by weakening the ability of the conditioned stimulus to elicit the conditioned response (e.g., a dog no longer elicits a fear response). A necessary component, then, becomes exposure to the feared stimulus while an emotion other than fear is experienced. Typically, the exposure in this approach has been imaginal, not in vivo. This is accomplished by carefully constructing a graduated imaginal fear hierarchy with the child's input and then inducing an incompatible emotion in the child during each step of the exposure. Wolpe (1958) recommends any appetitive behavior—for example, humor or eating—but progressive muscle relaxation (PMR) has come to be the primary technique of choice. Treatment pro-

gresses by initially developing the graduated fear hierarchy and then instructing the child in PMR until mastery is achieved. Several scripts for PMR exist (e.g., see Ollendick and Cerny (1981)), but they all involve training the child to progress through various muscle groups by briefly tensing and relaxing them (Ollendick et al., 2004). Importantly, for this treatment to be effective, the child should not actually experience high levels of fear, but rather the associative strength of the conditioned stimulus and response should be weakened by not feeling afraid during exposure (Davis, 2009; Davis & Ollendick, 2005). While initially it was one of the treatments of choice for specific phobia, enthusiasm for SD in research has waned over the past several decades as the field has moved toward fewer distractions from exposure (e.g., relaxation training).

Reinforced Practice (RP)

Based upon operant conditioning and ABA principles, a clinician using RP attempts to reinforce successive steps toward feared stimuli, thereby overcoming avoidance behavior (Davis & Ollendick, 2005). Reinforced practice requires the clinician to again devise a detailed fear hierarchy, but also to conduct a functional assessment to determine the maintaining functions of the avoidance (including any secondary gains) and a reinforcer survey to create an array of reinforcers to apply contingently upon completion of the various steps in the hierarchy. This treatment progresses by successively reinforcing approach behavior during in vivo exposure. Once successful approach behavior is shaped for a step, various steps can be chained if appropriate, and the schedule of reinforcement can be thinned with the overall goal being to fade it out completely (Davis & Ollendick, 2005; Ollendick et al., 2009a). As a result, the technique makes use of reinforcement, shaping, extinction, and verbal feedback regarding performance (Davis & Ollendick, 2005) and it has become an important standalone technique or an essential component of other treatment packages for specific phobia.

Modeling and Participant Modeling (PM)

Modeling is based on social learning theory with treatment progressing by having a model (usually the clinician) demonstrate the successful completion of steps in the fear hierarchy to the child (Davis & Ollendick, 2005). Originally called contact desensitization (Ritter, 1965, 1968), participant modeling carries this procedure further by actually incorporating the child into the exposure by having the clinician successfully model the completion of a particular step in the fear hierarchy and then involve the child in completing the modeled step (Davis, 2009; Davis & Ollendick, 2005; Ollendick et al., 2009a). The child can be incorporated using a number of techniques depending upon the child's ability to negotiate the steps: the clinician may simply provide verbal instruction on the completion of the step or may go as far as to engage in physical contact ranging from simply standing beside the child while holding hands to using hand-over-hand assistance in close proximity to the feared stimulus to help the child voluntarily complete the step (i.e., as opposed to compulsory hand-over-hand procedures seen in three-step prompting; Miltenberger (2001)).

Cognitive-Behavioral Therapy (CBT)

Cognitive-behavioral therapy is a combination treatment that employs graduated hierarchical exposure along with any or all of a number of the preceding behavioral techniques and cognitive techniques to address behavioral avoidance as well as catastrophic cognitions, attentional biases, cognitive distortions, and maladaptive automatic thoughts (Beck, 1993; Beck & Clark, 1997; Davis & Ollendick, 2005; Kendall, 1993). As a result, CBT makes use of behavioral interventions such as reinforcement, relaxation, and modeling, but also incorporates techniques to identify and counter cognitive biases and distortions which have theoretically come to be part of stable, pathological psychological structures which direct avoidance behavior and biased or

catastrophic thought (i.e., schemas; Beck (1993), Davis and Ollendick (2005), Farrell et al. (2019), Kendall (1993), Seligman and Ollendick (2012)).

One-Session Treatment (OST)

Over the past 10–15 years, there has been significant interest in the development and use of one variant of CBT for specific phobia: one-session treatment (OST; Davis et al., 2009b, 2012b, 2019; Öst, 1987b, 1989; Zlomke & Davis, 2008). One-session treatment is a unique combination of several of the child anxiety treatments previously discussed into a single, massed 3-hour session of in vivo exposure (Davis et al., 2009, b, 2012b, c, 2019; Ollendick & Davis, 2013; Zlomke & Davis, 2008). Further, OST has been deemed an empirically supported treatment and the use of OST with children has merited well-established status given the studies completed to date (see Davis et al. (2019) and Farrell et al. (2019)). The efficacy of OST has been previously supported by three large randomized clinical trials (Ollendick et al. 2009b, 2015; Öst et al. 2001), two crossover studies (Muris et al., 1997, 1998), and numerous case studies (e.g., Davis et al. (2007), and Muskett et al. (2019)). In addition, large effect sizes have been found for pre- to post-treatment differences on subjective units of distress (SUDS; $d = 1.91$), BATs ($d = 1.40$) and self-report measures of fear ($d = 1.43$) for children receiving OST (Zlomke & Davis, 2008).

Overall Description One-session treatment is a 3-hour, massed cognitive-behavioral intervention during which the child is gradually exposed to increasingly more fear-evoking stimuli or situations (Davis et al., 2009b, 2012b, c, 2019). The treatment session incorporates several empirically supported treatment components while progressing at a pace jointly determined by the clinician and child. OST makes use of graduated hierarchical in vivo exposure, PM, cognitive challenges, reinforcement, psychoeducation, and skills training (Davis et al., 2009b, 2012c, 2019; Zlomke & Davis, 2008). This combination treatment has also been found to be well-tolerated by children, with the large majority of children being satisfied with the outcome (82.1%) and reporting treatment occurred at a good pace (89.3%) and with no children reporting treatment progressed too quickly (Svensson et al., 2002). They also reported that their fear levels were manageable during the session.

A successful OST session has its beginnings in the assessment of the child's specific phobia. An important part of the assessment process is a functional and cognitive assessment of the child's phobia during which the fear hierarchy is created, maintaining variables are explored, and distorted beliefs and catastrophic cognitions are elicited from the child and catalogued by the clinician (for a detailed description of the functional assessment see Davis et al. (2009b, 2012c)). This functional assessment portion typically requires 45 minutes to complete and can be supplemented by additional information or confirmation from parents/caregivers at the conclusion of the assessment (Davis et al., 2009b, 2012c, 2019). At the conclusion of the functional assessment, the clinician also provides the rationale for the upcoming exposure session and attempts to assess the child's motivation for treatment. Briefly, the rationale includes a description of the exposures to come, termed "behavioral experiments," reassurances that nothing will be done to the child without first discussing it with the child, and that the goal is not to shock, surprise, or further traumatize the child, but rather the clinician and child will act as a team working together to overcome the child's fear (Davis et al., 2009b, 2012c). An informal assessment of the child's motivation is also important as the clinician explains that the child will have to experience some fear during the behavioral experiments (ideally a mild to moderate amount), but that it is the clinician's responsibility to ensure these are exposures that the child will be able to handle and that if the child remains in the situation instead of avoiding it that the fear will subside or at least be greatly reduced (Davis et al., 2009b, 2012c). Ideally, the functional assessment session is conducted far enough in advance to allow for the necessary preparations for the exposure session (e.g., arranging for relevant stimuli or situations; Davis et al. (2009b, 2012c)).

Treatment Components and Implementation One-session treatment proceeds at an irregular pace over the 3 hours of exposure and sessions can vary from child to child—even when the same phobia is involved (Davis et al., 2009b, 2012b). There is no standard formula for structuring an OST session, other than generally proceeding at the child's pace—with frequent clinician encouragement—and attempting to make the session as engaging and fun as possible (successful sessions with younger children may even take the form of a turn-taking game suggesting behavioral experiments and then attempting them or other play-related activities (Davis et al., 2009b; Kershaw et al., 2017). Initially, it can seem unwieldy for the clinician to have to incorporate cognitive challenges, PM, psychoeducation, skills training, and reinforcement at the same time; however, exposure (i.e., behavioral experiments) sets the stage for using the various other techniques as necessary to assist with allaying fear or educating the child (Davis et al., 2009b, 2012c). Behavioral experiments generally progress in a three-step fashion: first, the clinician and/or child suggest and discuss a possible exposure; second, the clinician models the proposed experiment; third, the child attempts the modeled step, with the assistance of the therapist, and success or failure is discussed (Davis et al., 2009b, 2012c; Zlomke & Davis, 2008). The other components of OST simply act as tools in a clinician's toolkit to address different pitfalls, distortions, or deficits during treatment (Davis et al., 2009b). After agreeing on a behavioral experiment, information on the distorted, and sometimes catastrophic cognitions obtained from the functional assessment are used to prompt the child as to what he or she predicts will happen (e.g., "do you think the dog is going to bite you if you get closer?") and then to discuss what really did occur following the experiment (Davis et al., 2009b, 2012c). Reinforcement is used throughout to encourage attempts, praise success, and prompt further discussion; while psychoeducation about the feared stimulus or situation (e.g., how to tell a "mean" dog from a "nice" dog) serves to remedy lulls in session progress while waiting for fear to habituate during a step while at the same time keeping the session focused on exposure to the stimulus (Davis et al., 2009b, 2012c, 2019). Finally, participant modeling can be used to break down seemingly large steps into smaller, more manageable steps while also enhancing clinician support for the encounter (e.g., actually touching a dog may be a roadblock and participant modeling allows that large step to be further broken into touching the clinician while the clinician touches the dog and so forth). Further, participant modeling allows the clinician to remediate any skills deficits through active instruction in interacting with stimulus or situation (e.g., how to approach and pet a dog without intimidating or scaring it; Davis et al. (2009b, 2012c)). As a result, within the broader framework of the behavioral experiments, OST flexibly incorporates these various other treatment components fluidly (see Table 16.1 for illustration of a partial dog phobia treatment step-by-step description).

Potential Impediments to Treatment Success

A number of factors may unfortunately contribute to treatment failure or backsliding following gains. In the four larger scale trials of CBT (i.e., not just OST) for specific phobia in children to date (Ollendick et al., 2009b, 2015; Öst et al., 2001; Silverman et al., 1999), which also targeted other anxiety disorders than specific phobias), a mixed picture of treatment response appears. Across all four trials, age does not seem to be related to treatment outcome, and in the two studies examining it, diagnostic comorbidity did not seem to impact the results (Ollendick et al., 2009a). In two of the three OST trials, girls were found to respond better to treatment, and Öst et al. (2001) found better outcomes for animal-type phobias. Child and parent reports of depression and anxiety were found to be related to treatment failure of Silverman et al. (1999); however, the other studies do not report differences for such effects or data were not specifically obtained on these variables (Ollendick et al., 2009a). In contrast, child comorbid disorders were found to not interfere with OST for specific phobias (Ryan et al., 2017). Though unexamined in these trials,

Table 16.1 Hypothetical example of the progression of treatment for a child with a dog phobia

A. First Dog (approximately 1–1.5 hours of the massed session)
(1) Talk about dogs; introduce idea of bringing a dog into the room; negotiate details of first exposure and assess the child's predictions of what will happen.
(2) A small dog is brought into the room (e.g., a West Highland Terrier) leashed by an assistant who holds the leash close and tight at the opposite end of the room from the child and clinician. The clinician praises progress and encourages the child to watch the dog. They discuss how the dog's behavior is similar or dissimilar to expectations and cognitions discussed earlier.
(3) The clinician suggests moving closer. The child declines and details are discussed. The interim is used to discuss educational elements regarding dogs (e.g., Do you know how to tell a mean dog from a nice dog? How can we tell if that is a mean or nice dog?). The clinician again suggests moving closer. The child and clinician move 3 feet closer to the dog and discuss/challenge cognitions and predictions.
(4) The clinician again suggests moving closer; however, before details can be negotiated, the child simply begins moving forward and the therapist replies, "I'll just stop when you do then; you're doing great!" The child and clinician move 4 more feet closer to the dog and discuss/challenge cognitions and predictions.
(5) The child agrees to allow the dog 2 more feet of freedom on its retractable leash.
(6) The child agrees to allow the clinician to touch the dog. Predictions of what will happen are assessed before and discussed following.
(7) The clinician uses participant modeling to have the child come in closer proximity while the clinician pets the dog.
(8) The clinician shapes the response with praise and participant modeling until the child is independently petting the leashed dog.
(9) The child realizes how close she is to the dog's teeth and recoils slightly.
(10) The clinician assesses the catastrophic thought (i.e., "it will bite me"), asks the child for a prediction of what will happen if she pets the dog's head, and with permission demonstrates how the dog dislikes having the clinician's hand in its mouth. The child is then encouraged to do the same and performance is discussed.
(11) Etc.
B. Similar procedures would occur with the second and third dogs (a medium and large dog respectively) taking up the remaining 1.5 hours or until sufficient behavioral experiments have been conducted and overlearned until the child exhibits little or no fear.

Note: Treatment occurs at an uneven pace and differs considerably from child to child, even for the same phobic stimulus. This example was constructed with the catastrophic fear being associated with the size of the dog and it knocking the child over and biting him or her. Reprinted from *Cognitive and Behavioral Practice,* 16, Davis, Ollendick, and Öst, Intensive Treatment of Specific Phobias in Children and Adolescents, 294–303, 2009, with permission from Elsevier.

anecdotally, family variables that were initially etiological may also continue to play a role by hampering treatment. For example, two refractory cases familiar to the authors involved separate boys with specific phobias of dogs who responded quite well to treatment (i.e., both were able to interact with dogs of various sizes on and off leashes by the end of treatment), but also had mothers who reported significant specific phobias of dogs as well. Both children, interestingly, astutely noted during the functional assessment that a significant component to their fear was the modeling and negative information provided by their mothers. Unfortunately, the mothers were not willing to undergo treatment of their own phobias of dogs and in each case the child's progress was noted by clinicians to suffer. OST may also be impacted by parenting behaviors, such as overprotection (Capriola-Hall et al., 2020). Additionally, refractory cases may be caused by the functional assessment not revealing relevant phobic cognitions or by not incorporating relevant phobic stimuli (Ollendick & Davis, 2013).

In response to a lack of research addressing the effectiveness of OST in some children, a large-scale, noninferiority effectiveness trial of OST compared to multisession CBT, the Alleviating Specific Phobias Experienced by Children Trial (or ASPECT), is currently being conducted in the United Kingdom (Wright et al., 2018). Projected to become the largest randomized control trial of specific phobias in children,

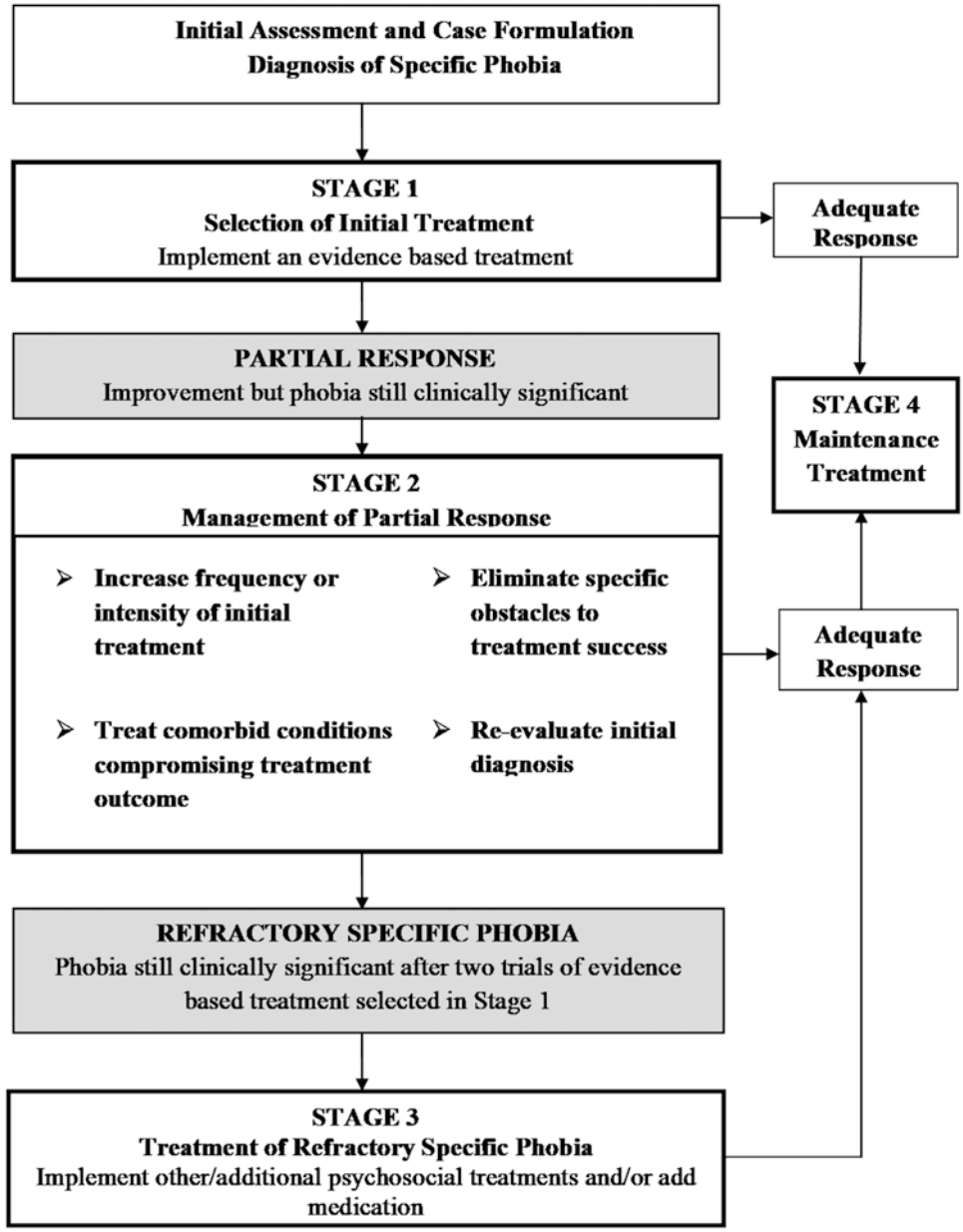

Fig. 16.1 Treatment algorithm for children with specific phobia. (Used with permission of Springer Publishing Company, LLC, from Phobias (pp. 171–200), Cognitive Behavior Therapy for Children: Treating Complex and Refractory Cases, 2009; permission conveyed through Copyright Clearance Center, Inc.)

Wright et al. (2018) will examine OST's effectiveness and the application of treatment research to community clinicians. Numerous outcome measures are being used, including BATs and the ADIS-IV C/P, as well as a 6-month follow-up with participants and cost-effectiveness. The Wright et al. (2018) randomized controlled trial should shed light on the effectiveness of OST by community practitioners.

Subsequently, the issue becomes what to do when treatment is not completely effective or other obstacles to treatment success arise. Overall, a four-stage procedure is recommended for treating children's specific phobias and addressing refractory cases (Ollendick et al., 2009a; see Fig. 16.1). First, and following an initial assessment, one of the preceding evidence-based treatments should be selected and

implemented. If, following implementation, only a partial response is achieved from that intervention, a variety of options exist including additional assessment, increasing treatment frequency or intensity, and/or addressing other impediments to treatment or comorbid conditions. After at least two attempts to administer the selected evidence-based intervention, stage three may be reached in which another evidence-based treatment should be considered and administered. Following success at any of these stages, one should also look toward the maintenance and generalization of treatment gains (i.e., stage four; Ollendick et al. (2009a)).

Summary

Given specific phobias tend to be prevalent, start early, and persist for decades, it remains surprising to us that so few children and families take advantage of one of the many evidence-based treatments available. There are likely many reasons so few seek help; however, in part this disservice is likely due to continued difficulty with the dissemination of evidence-based practices to the community of practitioners and the public at large (Ollendick & Davis, 2004) which has plagued the field for decades. Even so, clinicians currently have a variety of evidence-based treatments at their disposal which have very good support: SD, RP, PM, and CBT. In particular, OST seems a unique and promising choice given its seeming resistance to interference from comorbid conditions, success across a broad range of ages and developmental capabilities (e.g., Davis et al. (2007), Muskett et al. (2019), and Ollendick et al. (2021)), and its relatively streamlined, brief, and cost-effective format (Davis et al., 2009b; Öst & Ollendick, 2017). As a result, OST may be an initial quick and successful experience with CBT for children and families while teaching many of the techniques for other CBT procedures to be used with comorbid conditions.

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Separation Anxiety Disorder in Children and Adolescents

17

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Symptom Presentation

The core feature of separation anxiety disorder (SAD) is developmentally inappropriate and excessive anxiety about separation from attachment figures. Youth with SAD experience distress when separating or anticipating separation from attachment figures, worry about harm coming to or losing major attachment figures, and/or worry about experiencing an untoward event (e.g., kidnapping) that results in separation from an attachment figure (American Psychiatric Association, 2013). Youth may also resist leaving home due to fear of separation, show fear of or reluctance about being alone at home alone, and insist on sleeping near an attachment figure. Less commonly, they experience nightmares involving the theme of separation (e.g., Allen et al., 2010c; Cooper-Vince et al., 2014). Youth with SAD may be described as "clingy," follow caregivers around at home, and cry or tantrum in an effort to avoid separation. Also, youth may frequently "check in" with caregivers (e.g., by texting, calling to them from another room). Because youth with SAD often experience intense discomfort when apart from attachment figures, they may refrain from engaging in age-appropriate social activities (e.g., sleepovers, play dates). To meet criteria for diagnosis according to the DSM-5 (APA, 2013), symptoms must persist for at least 4 weeks and cause clinically significant distress or impairments in functioning.

Prevalence and Course

The mean lifetime prevalence estimates of SAD have ranged from 4% to 5% in preadolescent and adult samples (e.g., Copeland et al., 2014; Kessler et al., 2005; Silove et al., 2015). Relative to other anxiety disorders, SAD typically onsets early (mean = 6–7 years old; Kessler et al., 2005; Shear et al., 2006) and the prevalence rate decreases with age (e.g., Copeland et al., 2014). Some studies have shown higher prevalence rates among girls than boys (Silove et al., 2015; Shear et al., 2006) and others have found no difference (e.g., Copeland et al., 2014). Among clinic-referred youth with anxiety disorders, non-White youth have been significantly more likely than White youth to meet criteria for comorbid SAD and social phobia (Kendall & Peterman, 2015). There is some evidence that separation anxiety disproportionately affects youth from low-income families (e.g., Vine et al., 2012) and countries (e.g., Silove et al., 2015).

Separation anxiety in infants and toddlers is developmentally typical and likely adaptive; it peaks at 15–18 months and wanes slowly through

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4 years of age (e.g., Battaglia et al., 2016; Sroufe, 1997). Parental unemployment, maternal depression, and tobacco exposure in pregnancy have been uniquely associated with high separation anxiety at 1.5 years that increases through 6 years of age (Battaglia et al., 2016). Although the majority of cases remit before adulthood (e.g., Foley et al., 2004), SAD warrants intervention to reduce impairments in functioning that could interfere with development (e.g., Foley et al., 2008) and to prevent the onset of secondary disorders (e.g., Cummings et al., 2014). Elevated separation anxiety in preschool that increases over time has predicted greater internalizing symptoms, worse academic achievement, and poorer physical health throughout middle childhood and preadolescence (Battaglia et al., 2017).

Clinical Features

SAD is among the most common disorders diagnosed in youth who present with school refusal (e.g., Egger et al., 2003) and as many as 75% of children with SAD exhibit some form of school avoidance (Last et al., 1987). SAD is highly comorbid with other anxiety disorders (e.g., Shear et al., 2006). It has generally been associated with later anxiety disorders, including panic disorder (e.g., Kossowsky et al., 2013) – with which it appears to share a genetic diathesis (Roberson-Nay et al., 2012). Studies have also identified SAD as a risk factor for the development of disruptive behavior disorders, mood disorders, and substance use problems (e.g., Silove et al., 2015; Brückl et al., 2007), but findings are mixed (Kossowsky et al., 2013).

More than 90% of youth with SAD experience at least one sleep-related problem (e.g., Alfano et al., 2007). SAD is associated with greater number and severity of somatic complaints (Crawley et al., 2014), and approximately 30–50% of youth with SAD complain of physical symptoms upon separating (Allen et al., 2010c). Indeed, experimental research has documented that youth with SAD exhibit exaggerated physiological responses to separation relative to youth with other anxiety disorders and/or youth with no anxiety disorder (e.g., Kossowsky et al., 2012).

In line with cognitive theories of fear and anxiety (e.g., Kendall, 1985), there is evidence of general and content-specific interpretation bias in youth with SAD; when presented with ambiguous scenarios related to the threat of separation, self-reported separation anxiety has predicted youths' negative interpretations (e.g., Klein et al., 2019). Also, there is some evidence that children with fear (versus distress) disorders, including SAD, exhibit an attention bias toward threat (i.e., angry faces relative to neutral faces) (e.g., Waters et al., 2014). Youth with separation anxiety commonly present with broader emotion regulation difficulties (e.g., with goal-directed behavior), which may predict increases in separation anxiety over time (e.g., Schneider et al., 2018). Although insecure attachment has also been considered a vulnerability for the development of anxiety disorders, few studies have investigated attachment security in relation to separation anxiety specifically (e.g., Colonnesi et al., 2011).

Family Factors

Twin studies have documented a shared environmental effect on SAD (e.g., Scaini et al., 2012). Along with other anxiety disorders, SAD has been associated with parental overcontrol, particularly over-involvement and low levels of autonomy granting (e.g., Hughes et al., 2008); decreased latency to rescue children from situations that cause distress (e.g., Aschenbrand & Kendall, 2012); and elevated psychological control or coercive, passive-aggressive, and intrusive strategies for manipulating youths' thoughts, feelings, and activities (e.g., Settipani et al., 2013). Consistent with the possibility that parental overcontrol has a causal influence, Kiel et al. (2016) found that extreme observer ratings of maternal encouragement to approach novelty (reflecting either very protective or intrusive behavior) were related to increases in toddlers' separation anxiety from 2 to 3 years old.

Parents of youth with SAD may also model anxious thoughts (e.g., threatening interpretations of ambiguous situations) and avoidance

behavior for children (e.g., Barrett et al., 1996). Relative to parents of children without anxiety disorders, they report more negative expectations of their child's skill and coping ability (e.g., Micco & Ehrenreich, 2008). Parents' negative beliefs about their child's disposition, coping ability, and potential for success have been linked to children's low expectations for coping and relatively high levels of anxiety (Herren et al., 2013; Wheatcroft & Creswell, 2007).

Parents often accommodate youths' separation anxiety; for example, by sleeping in the child's bed, modifying their schedules to avoid leaving the child with other caregivers, providing repeated reassurance when separated, and even seeking part-time employment at the child's school to avoid separation (e.g., Benito et al., 2015). Family accommodation, which is directly associated with symptom severity (Iniesta-Sepulveda et al., 2021), is thought to maintain or exacerbate anxiety by interfering with the habituation or violation of expectancies that would occur with exposure to anxiety triggers and by decreasing motivation for change (e.g., Caporino, 2020). Of the anxiety disorders, separation anxiety has shown the strongest relationship to family accommodation (e.g., Lebowitz et al., 2013). Both have been linked to relatively low levels of salivary oxytocin, which is implicated in the regulation of anxiety and close interpersonal behavior (Lebowitz et al., 2016, 2017).

Families may experience significant burden associated with caring for youth with SAD, particularly when engaging in high levels of accommodation (e.g., Thompson-Hollands et al., 2014). Also, mothers of children with SAD have exhibited lower levels of parenting self-efficacy than mothers of children with social anxiety disorder, and lower levels of parenting self-efficacy and satisfaction than mothers of children without a disorder (Herren et al., 2013).

Assessment and Diagnosis

Differential diagnosis An important consideration for differential diagnosis is whether the core fear leading to youths' attempts to avoid separation is the fear that they will not be reunited with attachment figures. Youth may resist separation for reasons other than fear of permanent separation; for example, children with social anxiety disorder may resist separating from caregivers who speak on their behalf in public, children with OCD may resist separating from caregivers who accommodate compulsions, and children with generalized anxiety disorder (GAD) may resist separating from caregivers who reassure them of safety. Also, worry about harm befalling caregivers (without a clear focus on the permanent separation that could ensue) may reflect GAD or OCD and has not discriminated well between youth with high and low levels of separation anxiety (Cooper-Vince et al., 2014).

Behaviors exhibited by youth with SAD (e.g., repeated reassurance-seeking) may raise concern about possible OCD. Youth with separation anxiety sometimes engage in elaborate "goodbye" routines, which serve to delay separation, and are distinct from compulsions. Youth with OCD are more likely to engage in rituals with intent to prevent some feared outcome (e.g., harm befalling parents) and typically present with multiple OCD symptoms that change over time (e.g., Rettew et al., 1992).

A common challenge is determining when multiple diagnoses are appropriate. Although youth with SAD may defy commands to separate or tantrum to avoid separation, an ODD diagnosis should only be considered when there is persistent oppositional behavior unrelated to anticipation or occurrence of separation. In youth who present with GAD, important considerations for diagnosing comorbid SAD are whether concerns about separation occur consistently and cause distress and impairment independent of worry across other domains. The DSM-5 offers additional guidance in differentiating SAD from other disorders (APA, 2013).

Cultural context Culture may influence symptom presentation; relative to non-Hispanic White youth, Hispanic and Asian youth with SAD may be more likely to present with somatic complaints (e.g., headaches, stomachaches; Gee, 2004; Pina

& Silverman, 2004). Because the extent to which youth are expected to tolerate separation varies by culture, it is important to view a child's behavior in the context of demands and opportunities to separate from parents (APA, 2013). For example, many families do not expect children to sleep apart from caregivers; so, bedsharing would not be considered a symptom of SAD. Additionally, SAD should be distinguished from the value that collectivistic cultures place on interdependence among family members (e.g., Triandis, 2018). Parenting practices reflecting high levels of control may be normative and adaptive in some cultural contexts (e.g., Mexican American; Varela & Hensley-Maloney, 2009).

Assessment in school-aged children and adolescents There are many reliable and valid parent- and self-report measures that could be used to assess separation anxiety in school-aged youth (see Table 17.1 for descriptions and psychometric properties). The Revised Children's Anxiety and Depression Scale (Chorpita et al., 2005), the Screen for Child Anxiety Related Emotional Disorders-Revised (Birmaher et al., 1997, 1999), the Spence Children's Anxiety Scale (SCAS; Spence, 1998; Nauta et al., 2004), and the Multidimensional Anxiety Scale (March et al., 1997; March, 2012) have parallel parent- and child-report forms and yield separate scores for separation anxiety among other types of anxiety. A 30% reduction on the Separation Anxiety/Panic scale of the parent-report MASC from pre- to post-treatment can be used as a benchmark for evaluating remission (Palitz et al., 2018).

Disorder-specific measures (summarized in Table 17.1) include parent- and child-report forms of the 12-item Separation Anxiety Avoidance Inventory (Schneider & In-Albon, 2005), which has demonstrated reliability and validity (In-Albon et al., 2013). The 20-item self-report Children's Separation Anxiety Scale (Méndez et al., 2014) has been validated using a large, community sample and yields scores for worry about separation, distress from separation, opposition to separation, and calm at separation (i.e., self-confidence that is distinct from the absence of fear). The 34-item Separation Anxiety Assessment Scale (Eisen & Schaefer, 2007) can inform treatment planning, though published reports of psychometric properties are needed. The Separation Anxiety Daily Diary assesses the frequency of anxiety-provoking and nonanxiety-provoking separations, along with associated thoughts, feelings, behaviors, and corresponding parental reactions by parent (Allen et al., 2010a) and child report (Allen et al., 2010b).

Elevated scores on the 18-item Childhood Anxiety Sensitivity Index (Silverman et al., 1991), which measures fears of anxiety sensations and beliefs that they have harmful consequences, have been useful in identifying youth with separation anxiety who are also prone to panic disorder (e.g., Kearney et al., 1997). The Child Anxiety Impact Scale (Langley et al., 2014) and the Child Anxiety Life Interference Scale (Lyneham et al., 2013) can be used to measure impairment across anxiety disorders, with the latter including an assessment of the impact on caregivers.

Commonly used (semi-)structured diagnostic interviews, such as the Anxiety Disorders Interview Schedule for DSM (Silverman & Albano, 1996), the Schedule for Affective Disorders and Schizophrenia for School-Aged Children (K-SADS; Kaufman et al., 1997), and the Diagnostic Interview Schedule for Children (Shaffer et al., 2000), include SAD modules. Modifications may be required to bring these interviews into line with the DSM-5, though changes to SAD criteria from DSM-IV to DSM-5 were minimal apart from allowing for adult onset (APA, 1994, 2013). The Pediatric Anxiety Rating Scale (RUPP, 2002) is a briefer, clinician-rated measure of anxiety symptoms across diagnoses with cutoff scores that can be used to assess the progress of individual patients against the standard of outcomes reported in clinical trials (Caporino et al., 2013).

Assessment in early childhood Although SAD may onset as early as preschool age, it must be differentiated from age-appropriate fear of separating from a caregiver. The use of normed assessments that yield separation anxiety scores,

Table 17.1 Parent- and child-report measures of separation anxiety: description and psychometric properties

Assessment	Age range	Informants	Items and response scale	Scales and psychometric properties
Anxiety measures with separation anxiety subscale				
Multidimensional Anxiety Scale for Children (MASC, March et al., 1997; MASC 2, March, 2012)	8–19 years	Parent, child	9 items for Separation/Panic on MASC (39 items total) and Separation Anxiety/Phobias on MASC 2 (50 items total); 0–3 scale	Original MASC yields scores for Separation/Panic, Physical Symptoms, Harm Avoidance, and Social Anxiety as well as Total Anxiety MASC 2 yields additional scores: GAD Index, Obsessions and Compulsions, Inconsistency Index (response style), Anxiety Probability Score (chance of having at least one anxiety disorder) MASC Separation/Panic scale renamed Separation Anxiety/Phobias on MASC 2 ("SAD scale" below) Support for MASC four-factor model (e.g., Baldwin & Dadds, 2007) and MASC 2 five-factor model, which excluded GAD Index due to item overlap (March, 2012) Norms from clinical and nonclinical samples available (Etkin et al., 2021a, b; March, 2012) SAD scale shows Cronbach's alphas >.65 for child report and >.70 for parent report (e.g., Baldwin & Dadds, 2007; March, 2012; Villabø et al., 2012) SAD scale test-retest reliability $r = .70$ for parent report and .55 for child report (Baldwin & Dadds); ICC's (across raters) above .80 for 3-week and 3-month intervals (March et al., 1997) Parent- and child-report MASC each predict presence and severity of SAD in youth, with fair prediction power in youth and fair to good prediction power in adolescents (e.g., Wei et al., 2014) SAD scale has convergent and divergent validity for parent and child versions (Baldwin & Dadds, 2007; March, 2012; Muris et al., 2002) SAD scale is sensitive to treatment effects (e.g., Evans et al., 2017; Palitz et al., 2018) Parent-child agreement for SAD scale: $r = .30–.40$ (e.g., Baldwin & Dadds, 2007; Villabø et al., 2012), corrected $r = .54$ (March, 2012)

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Table 17.1 (continued)

Preschool Anxiety Scale (Spence et al.), *Preschool Anxiety Scale-Revised* (Edwards et al., 2010)	2–6 years	Parent	5 items for SAD on PAS-R (28 total); 0–4 response scale	Yields scores for Separation Anxiety, Social Anxiety, Generalized Anxiety, OCD, and Physical Injury fears (based on results from exploratory and confirmatory factor analyses; Spence et al., 2001) Developed with feedback from parents and experts (Spence et al., 2001) Some independently replicated evidence of construct validity (Etkin et al., 2021b) Norms from nonclinical sample available Cronbach's alpha generally >.70 for SAD scale (e.g., Edwards et al., 2010) 12-month test-retest reliability: $r \geq .60$ for SAD scale (Edwards et al., 2010) SAD subscale predicted DSM diagnosis of separation anxiety disorder (Edwards et al., 2010)
Revised Children's Anxiety and Depression Scale (RCADS; Chorpita et al., 2000, 2005)	8–18 years	Parent, child	7 items for SAD (47 total)	Yields scores for Separation Anxiety, Social Phobia, Panic Disorder, GAD, OCD, and Major Depression (supported by results of confirmatory factor analysis) Cronbach's alpha of .78 for child-report SAD scale and .87 for parent-report SAD scale Child-report SAD scale cutoff of 5 showed sensitivity of .73 and a specificity of .69 for the prediction of separation anxiety disorder Parent-report SAD scale cutoff of 4 showed sensitivity of .92 and a specificity of .73, Convergent and divergent validity established for child-report SAD scale and for parent-report total score Parent and child scores showed small, significant associations (Chorpita et al., 2005; Ebesutani et al., 2010)

Screen for Child Anxiety Related Emotion Disorders-Revised (SCARED-R; Birmaher et al., 1997, 1999)	6–18 years	Parent, child	8 items for SAD (66 total); 0–2 scale	Yields scores for Separation Anxiety, Panic/Somatic Symptoms, General Anxiety, Social Phobia, School Phobia (supported by results of confirmatory analyses) Norms from clinical and nonclinical samples available for self-report (Etkin et al., 2021a, b) SAD scale has Cronbach's alphas >.70 for child report and around .80 for parent report (Runyon et al., 2018) 40-day test-retest reliability was moderate to high: ICC of .59 for child-report SAD scale and .85 for parent-report SAD scale (Behrens et al., 2019) Cutoff score of 5 on child-report SAD scale had .76 sensitivity and .80 specificity for identifying SAD in treatment-seeking sample (Birmaher et al., 1997) Cutoff score of 8 on parent-report SAD scale had .84 sensitivity and .85 specificity in treatment-seeking sample (Van Meter et al., 2018) Convergent and divergent validity established for child- and parent-report SAD scale (e.g., Monga et al., 2000; Muris et al., 2002) Child- and parent-report SAD scale is sensitive to treatment effects (e.g., Monga et al., 2015; Muris et al., 2002) Parent-child agreement: $r = .45$ for SAD subscale (Birmaher et al., 1997)

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Table 17.1 (continued)

Spence Children's Anxiety Scale (SCAS; Spence, 1998; Nauta et al., 2004)	8–15 years	Parent, child	6 items for SAD (38 total, +6 filler items for child version); 0–3 scale	Yields scores for Separation Anxiety, Panic and Agoraphobia, Social Phobia, GAD, OCD, and Physical Injury Fears (supported by results of confirmatory factor analysis; Orgiles et al., 2016) Norms from clinical and nonclinical samples available for self-report Child-report SAD subscale had Cronbach's alpha of .70 in a meta-analysis (Orgiles et al., 2016) Parent report SAD subscale had Cronbach's alpha of .74 in nonclinical and .76 in clinical samples (Nauta et al., 2004) Test-retest reliability: $r > .75$ for child report and >.80 for parent-report SAD scale at 2-week and 3-month intervals in community samples (e.g., Arendt et al., 2014) Six-month test-retest reliability: $r = .57$ child-reported SAD in community sample 8–12 years old (Spence, 1998) Optimal SAD scale cutoff scores for each reporter (child = 6.5, mother = 8.5, father = 6.5) identified youth with SAD, with sensitivity values of at .70–.78 and corresponding specificity values of .62–.75 (Reardon et al., 2019) SAD subscale shows convergent and divergent validity (e.g., Essau et al., 2002) Parent- and child-report SAD subscale has shown sensitivity to treatment effects (e.g., Evans et al., 2017) Relatively high parent-child agreement on SAD subscale (e.g., $r = .74$; Brown-Jacobsen et al., 2011)
Youth Anxiety Measure for DSM-5 (Muris et al., 2017a, b)	8–18 years	Child and parent	6 items for SAD (50 total); 0–3 response scale	Part I (28 items) assesses major anxiety disorders and Part 2 (22 items) assesses specific phobias and agoraphobia Developed with expert feedback Cronbach's alpha ≥.80 for child-report SAD subscale across clinical and nonclinical samples Cronbach's alpha of .84 for parent-report SAD subscale in clinical sample Convergent and divergent validity for total score and groups of subscales Parent-child agreement for SAD subscale: $r = .73$ (Muris et al., 2017a, b)
Disorder-specific measures				

Children's Separation Anxiety Scale (CSAS; Méndez et al., 2014)	8–11 years	Child	20	Yields scores for worry about separation, distress from separation, opposition to separation, and calm at separation (based on results of exploratory and confirmatory factor analyses) Validated with large samples of schoolchildren ($N = 1908$; $N = 6016$) in Spain Cronbach's alpha of .88 for total scale, >.70 for every subscale Four-week test-retest reliability: $r = .83$ for total score and >.65 for every subscale Showed convergent and divergent validity Cutoff score of 68 showed good sensitivity and specificity for identifying youth with SAD (Méndez et al., 2014)
Separation Anxiety Avoidance Inventory (SAAI; Schneider & In-Albon, 2005)	4–18 years	Child and parent	12	Yields total score and 2 subscale scores, for "going to school, to bed alone" and "being or going home alone when no-one is there" (based on results of exploratory and confirmatory factor analyses) Cronbach's alphas ≥.80 for child report and ≥.75 for parent report Four-week test-retest reliability: $r > .80$ for parent report across school and clinical samples; .80 for child report in school sample and .60 for child report in clinical sample Child-report form showed convergent and divergent validity Children with SAD scored significantly higher on child-report form than children with other anxiety disorders and schoolchildren Parent- and child-report forms both showed sensitivity to treatment change Parent-child agreement: r ranged from .33 to .63 across samples (In-Albon et al., 2013)
Separation Anxiety Assessment Scale (Eisen & Schaefer, 2007)	N/A	Child	34; 1–4 response scale	Items assess fear of being alone, fear of abandonment, fear of physical illness, worry about calamitous events, and dependence on safety signals May inform treatment planning Preliminary support for the factor structure, reliability, validity, and clinical utility of the SAAS has been described (e.g., Eisen et al., 2011) but findings not peer-reviewed

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Table 17.1 (continued)

Separation Anxiety Daily Diary (SADD; Allen et al., 2010a)	7–14 years	Child and parent	Daily Diary Entry	Assesses the frequency of anxiety-provoking and nonanxiety-provoking separations, along with associated thoughts, feelings, behaviors, and corresponding parental reactions Content informed by a literature review and parent interviews Compliance was acceptable for parent version Mothers of youth with SAD reported more anxious and fewer nonanxious separations on the daily diary than mothers of children with other anxiety disorders and healthy children Substantial improvement in the prediction of diagnostic group membership was shown when SADD items assessing child symptoms were added to information gathered from a separation anxiety symptom questionnaire Child version discriminated youth with SAD from healthy youth but not youth with other anxiety disorders (Allen et al., 2010a, b)

Note. Except for the MASC, these measures are all available to use at no cost

such as the Preschool Anxiety Scale (ages 2–6 years; Spence et al., 2001), as well as structured diagnostic interviews, such as the Preschool Age Psychiatric Assessment (PAPA, ages 2–5 years; Egger et al., 2006), may assist with accurate diagnosis. Using machine learning tools, Carpenter et al. (2016) developed a method for using the PAPA to quantify risk for SAD with accuracy >96% while limiting burden associated with assessment. The Child Anxiety Life Interference Scale-Preschool Version (Gilbertson et al., 2017) can be used to assess the impact of symptoms on the child and caregiver(s). Finally, the Dyadic Parent-Child Interaction Coding System II (DPICS-II; Eyberg et al., 1994), a validated system for coding observations during child- and parent-directed interactions, has been modified for use with young children with separation anxiety and can be used at intake and to monitor progress in treatment (Pincus et al., 2006). For youth of all ages, less formal observations (e.g., of child responses to prompts to separate for intake interviews) can corroborate other assessment data but may not be representative of behavior outside of the clinic setting.

Informant discrepancies Informant discrepancies in reports of psychopathology in youth are typical and may reflect contextual variations in displays of mental health concerns, reporting bias, and/or measurement error (de los Reyes et al., 2015). There is evidence of incremental validity of cross-informants reports of separation anxiety; for example, adding parent reports to child self-reports (on the MASC) has increased prediction of youths' anxiety disorder diagnoses (Villabø et al., 2012). Parents of youth with SAD may be better at judging impairment whereas youth are more likely to report distress (Allen et al., 2010c).

Psychological Treatment

Cognitive-behavioral therapy Given high rates of comorbidity, CBT studies have targeted SAD along with GAD and social anxiety disorder. Protocols for school-aged youth have typically included some combination of psychoeducation about anxiety; training in relaxation, cognitive restructuring/coping skills, and problem-solving; exposure to anxiety-provoking situations; and relapse prevention (e.g., Kendall & Hedtke, 2006). In efficacy trials, approximately 60–80% of youth show meaningful symptom reduction (response) and 50–70% achieve remission (the absence of the principal diagnosis following treatment) (Kendall & Peterman, 2015). CBT protocols modified to target anxiety disorders in early childhood, such as the Being Brave Program (Hirshfeld-Becker et al., 2010), have shown similar response rates. Research has suggested that most CBT-related symptom improvement happens after exposure is introduced, with cognitive restructuring also contributing substantially to gains made by school-aged youth (e.g., Peris et al., 2015). CBT protocols that emphasize exposure over anxiety management appear to produce larger effects (Whiteside et al., 2020).

Several studies have reported findings specific to SAD. For example, Hudson et al. (2015) evaluated the family-based CBT program Cool Kids (Lyneham et al., 2003; Rapee et al., 2006) delivered in group format to youth 6–18 years old (N = 842) with a principal DSM-IV diagnosis of an anxiety disorder. The remission rate for SAD was 42.2% at post-treatment and 56% at 3- to 12-month follow-up, though the protocol was deemed most efficacious for youth with principal GAD or OCD. The Child-Adolescent Anxiety Multimodal Study (CAMS; Walkup et al., 2008) was a six-site, randomized controlled trial that examined the relative efficacy of CBT (Coping Cat; Kendall & Hedtke, 2006), sertraline, their combination, and pill placebo for the treatment of SAD, social phobia, and GAD in youth 7–17 years old (N = 488). CBT and sertraline each reduced anxiety severity and their combination had a superior response rate. Although combined treatment was most efficacious across all anxiety disorders, the effect sizes relative to monotherapies were the largest for youth with principal SAD (Cohen's d = −0.91 to −0.98) compared to other principal anxiety disorders

(Cohen's d = −0.16 to −0.69; Compton et al., 2014). Also, active treatments (CBT, sertraline, their combination) yielded significantly greater reductions in parent-reported separation-related sleep difficulties than pill placebo, with the greatest reductions reported by parents of youth whose active treatment included sertraline (Caporino et al., 2017). Acute treatment responders in CAMS were less likely to exhibit chronic anxiety across a 4-year period beginning 4–12 years after randomization (Ginsburg et al., 2018).

Disorder-specific protocols for SAD in youth have been developed (e.g., Eisen et al., 2008). In a waitlist-controlled trial that sampled youth 5–7 years old (N = 43), 76.19% of children who were randomized to a 16-session family-based CBT protocol that included parental cognition as a treatment target no longer met criteria for SAD at post-treatment (Schneider et al., 2011). The same protocol was compared to individual CBT in youth 8–13 years old (N = 64), and both programs showed medium to large effects across measures at post-treatment, with no significant group differences in remission rates at 4-week or 1-year follow-up (Schneider et al., 2013).

Family involvement in CBT The majority of youth CBT manuals incorporate caregiver sessions (e.g., to promote the generalization of skills learned in session to outside settings; Howard et al., 2000). In addition to facilitating within-session exposure tasks involving separation, parents may be taught contingency management strategies for encouraging between-session exposure. Family-based treatment may also target parental overcontrol, rejection/criticism, anxious cognitive style and modeling, and accommodation (Caporino, 2020). Although meta-analyses have reported limited evidence that CBT with family involvement has added benefit over individual or group CBT for youth without family involvement (e.g., Peris et al., 2021), treatment-related decreases in parental overcontrol and family accommodation have been significantly associated with treatment outcomes (e.g., Kagan et al., 2016; Settipani et al., 2013). Also, family-based CBT appears to be more efficacious than individual and family-based CBT when parents have clinical levels of anxiety (e.g., Kendall et al., 2010). Recently, a standalone parent-based treatment targeting family accommodation (Lebowitz & Omer, 2013) was found noninferior to standard CBT based on ratings provided by independent evaluators, parents, and children (Lebowitz et al., 2020).

Parent-child interaction therapy Parent-child interaction therapy (PCIT; Eyberg, 1988) is an intervention based on both social learning theory and attachment theory. PCIT incorporates child-directed interaction to strengthen the parent-child attachment as a foundation for parent-directed interaction within a behavioral framework. Although PCIT was initially used to treat externalizing problems in early childhood, it has been adapted to treat SAD and other common anxiety disorders (e.g., Puliafico et al., 2013). Pilot research and an unpublished RCT have suggested that PCIT is efficacious in the treatment of SAD only when it incorporates a focus on exposure (i.e., "bravery-directed interactions"; e.g., Pincus et al., 2008; Carpenter et al., 2014). The extent to which exposure (versus the synergy of exposure and PCIT) explains symptom improvement is unclear.

Cognitive-behavioral and attachment-based family therapy Attachment-based family therapy was developed to target adolescent depression (e.g., Diamond et al., 2002) and has been integrated with CBT to target SAD, social anxiety disorder, and GAD in adolescents (Siqueland et al., 2005). In addition to including all elements of standard CBT, the treatment targets parental beliefs about anxiety, overprotection, and psychological control to help the adolescent negotiate autonomy and make parent-child attachment bonds more flexible. Pilot research has established feasibility but adequately powered tests of efficacy are needed (Siqueland et al., 2005).

Formats of delivery Research on nonstandard formats of treatment delivery may inform efforts to improve access to CBT for SAD. Group CBT may be more cost-effective than individual CBT

and reduce the average time to intervention. Studies that have directly compared group to individual CBT for anxiety in youth have generally not found significant differences in outcomes (e.g., Liber et al., 2008; Wergeland et al., 2014), though individual CBT appears to be associated with larger effects than group CBT (e.g., in waitlist-controlled trials; Reynolds et al., 2012). A waitlist-controlled trial of intensive 1-week group CBT in a summer camp setting for school-aged females with SAD ($N = 29$) found remission rates of 43% at post-treatment and 61% at 6-week follow-up (Santucci & Ehrenreich-May, 2013). Intensive treatment in this setting may be more time-efficient and accessible to families for whom travel to weekly sessions would not be feasible, and provides opportunities for exposure to situations (e.g., sleepovers) that could not be replicated during a standard clinic visit.

Like group CBT, computer-assisted CBT may reduce the cost of treatment by reducing the time burden on clinicians. Camp Cope-A-Lot (Khanna & Kendall, 2008), a computer-assisted adaptation of the Coping Cat (Kendall & Hedtke, 2006) that requires clinician time for exposure sessions only, has demonstrated efficacy in youth with SAD, social phobia, and/or GAD; in an RCT powered to detect moderate to large effects, there were no significant differences in outcomes between Camp Cope-A-Lot and individual CBT (Khanna & Kendall, 2010). Camp Cope-A-Lot used by CBT-naïve clinicians was also found superior to treatment as usual delivered in community mental health centers (Storch et al., 2015). The internet-based BRAVE program has been found superior to a waitlist control in the treatment of DSM-IV anxiety disorders (including OCD and PTSD) in children and adolescents (March et al., 2009) and equivalent to clinic-based CBT in adolescents (with power to detect medium effects; e.g., Spence et al., 2011) – though the program may not be effective with adolescents in routine clinical care settings (e.g., Waite et al., 2019). There is some evidence that the presence of SAD predicts relatively favorable outcomes of BRAVE-Online, as reported by parents and children (Spence et al., 2020). Other computer-based CBT programs targeting anxiety in school-aged children and adolescents have been found superior to waitlist controls (e.g., Vigerland et al., 2016; Wuthrich et al., 2012). There is preliminary support for the efficacy of online parent-focused CBT in reducing anxiety symptoms in youth 3–6 years old (Donovan & March, 2014; Morgan et al., 2016).

Webcam-delivered CBT, which retains the real-time clinician interaction of clinic-based treatment, has potential to increase access to evidence-based care when logistical constraints (e.g., time, distance from clinic, a pandemic) interfere with pursuing or continuing clinic-based sessions. A pilot study of real-time videoconferencing CBT for SAD, social anxiety disorder, and/or GAD in youth ($N = 11$) established its feasibility, acceptability, and preliminary efficacy (Carpenter et al., 2018). A large-scale, federally funded study comparing the effectiveness of web-based to in-person CBT for anxiety disorders in youth ages 3–18 is currently underway.

Psychopharmacological Treatment

Selective serotonin reuptake inhibitors The American Academy of Child and Adolescent Psychiatry recommends selective serotonin reuptake inhibitors (SSRIs) or selective norepinephrine reuptake inhibitors (SNRIs) for treating anxiety disorders in children and adolescents, as these medications are generally well tolerated and safe (Connolly & Bernstein, 2007). However, studies sampling youth with separation anxiety have yielded mixed findings depending on the medication administered. In the CAMS (Walkup et al., 2008), combined CBT and sertraline yielded a higher response rate (80.7%) among youth with SAD, GAD, and/or social phobia compared to CBT alone (59.7%) and sertraline alone (54.9%). There were no significant differences between the monotherapies, which were each more efficacious than pill placebo. An RCT that sampled 125 youth with these same disorders showed that 8 weeks of a flexible dose of fluvoxamine was significantly more efficacious than placebo (Walkup et al., 2001). Birmaher et al. (2003) found fluoxetine to

be superior to placebo in the treatment of social phobia and GAD, but there were no significant group differences in clinical response among youth with SAD.

Selective norepinephrine reuptake inhibitors Compared to SSRIs, SNRIs have smaller effects and yield less rapid improvement in youth anxiety but are less likely to produce adverse events (e.g., activation) than SSRIs (Mills & Strawn, 2020; Strawn et al., 2015; Strawn et al., 2018). Only one RCT of SNRI medication evaluated efficacy for reducing anxiety in youth with SAD, along with other anxiety disorders (Geller et al., 2007). Youth with attention deficit hyperactivity disorder (ADHD) and comorbid anxiety disorders receiving atomoxetine showed improvement in ADHD and anxiety symptoms after 12 weeks of treatment compared to those in the placebo group (Geller et al., 2007).

Other medication classes A pilot, randomized, placebo-controlled trial of guanfacine, an adrenergic receptor agonist, in the treatment of SAD, GAD, and social anxiety disorder demonstrated safety and tolerability (Strawn et al., 2017) but adequately powered tests of efficacy are needed. Tricyclic antidepressants are generally not recommended for treating SAD. In an RCT that sampled youth with SAD who did not respond to brief behavioral intervention, there were no significant differences in symptom improvement between imipramine and pill placebo treatment conditions (Klein et al., 1992). Further, tricyclic antidepressants are generally not tolerated as well as SSRIs and SNRIs and require higher levels of monitoring (Strawn et al., 2021). Although benzodiazepines (e.g., alprazolam, clonazepam) are tolerable and effective for treating short-term anxiety in procedural settings (Kuang et al., 2017), they have not demonstrated benefit in the treatment of chronic SAD (e.g., Graae et al., 1994).

Summary

SAD is characterized by excessive anxiety upon separation or anticipation of separation from major attachment figures (APA, 2013) and is associated with impairments in functioning as well as heightened risk for developing subsequent anxiety disorders. SAD is most common in early childhood and may be accompanied by somatic complaints, sleep problems, and/or school avoidance. Parents of youth with SAD may have negative expectations for their child's ability to cope with anxiety and may be quick to rescue their children from distress or accommodate symptoms, experiencing substantial burden as a result. A multi-informant approach to the assessment of SAD is recommended and there are well-validated measures of SAD symptoms in youth of all ages. Research has established the efficacy of CBT and SSRI medication (e.g., sertraline and fluvoxamine) in the treatment of SAD, with their combination yielding the highest response rate. Group CBT and computer-assisted CBT also have empirical support and may be particularly cost-effective, improving access to evidence-based care for SAD. Preliminary research has suggested that webcam-delivered and intensive CBT are also promising formats of treatment delivery.

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The Treatment of Generalized Anxiety Disorder in Youth

18

Carl F. Weems and R. Enrique Varela

This chapter reviews the literature on the treatment of generalized anxiety disorder (GAD) in youth. We first discuss what GAD is, present key phenomenology, and make assessment recommendations. We next review the extant empirical data on treatment efficacy drawing heavily upon conclusions from several recent meta-analyses and focus on cognitive behavioral therapy (CBT) techniques and procedures as they have the most empirical support (Silverman et al., 2008; Wang et al., 2017; Warwick et al., 2017). In this treatment study review, we focus on findings in terms of GAD treatment specifically. However, most, if not all, treatment studies to date have included other anxiety disorders in the samples, for example, separation anxiety disorder and social anxiety disorder, and so specific conclusions about GAD are limited by that fact. We make conclusions about the general efficacy of CBT for GAD and then draw conclusions about treatment efficacy in terms of format (e.g., group versus individual), and discuss any differential effects for ethnicity, age, and sex as well as other predictors of outcome that have been reported. We conclude the chapter with some "hands-on" advice—how does one actually do CBT for GAD, with some suggestions for developmental modifications to the "how to" for younger children.

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Generalized Anxiety Disorder: Key Features

The Diagnostic and Statistical Manual of Mental Disorders-5 (American Psychiatric Association [APA], 2013) provides criteria to make an anxiety disorder diagnosis and differential diagnostic criteria that distinguish among the anxiety disorders. Generalized anxiety disorder is characterized by excessive anxiety and worry about a number of events or activities. While worry can be normal (Borkovec et al., 1991; Mathews, 1990), the worries experienced in GAD interfere with the child's life preventing them from, for example, going to or doing well in school and interfering with friendships, etc. Children may worry about their school performance, their social relationships, and their health or the health of others. These children may seek constant reassurance and approval from others to help alleviate their worry. Most specifically impairing for youth with GAD appears to be the intensity of their worries (Weems et al., 2000). These worries may disrupt family routines (e.g., bedtime, going to school, travel).

To be diagnosed with GAD according to DSM-5 criteria (APA, 2013) a child must exhibit excessive anxiety. Moreover, the child or youth

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must worry for more days than not for at least 6 months about a number of events or activities and the child must find it difficult to control the worry. At least one of the following physical symptoms must accompany the anxiety or worry: restlessness, being easily fatigued, difficulty concentrating, irritability, muscle tension, or sleep disturbance. The anxiety, worry, or physical symptoms cause significant distress or impairment in an area or areas of functioning (e.g., social or occupational). The source of the disturbance is not due to physiological effects of a substance or another medical condition, and the symptoms are not better explained by another mental disorder (e.g., negative evaluation in social anxiety disorder) (APA, 2013).

Worry has been and continues to be a central component of the DSM definition of generalized anxiety disorder in children. In DSM-IIIR (American Psychiatric Association, 1987) unrealistic or excessive worry was a major clinical feature and diagnostic criterion of Overanxious Disorder (OAD). The subsequent version, DSM-IV (American Psychiatric Association, 1994) eliminated OAD and subsumed it under generalized anxiety disorder (GAD), but nonetheless maintained this criterion and added difficulty in controlling the worry as a separate criterion. The DSM-5 maintained these worry-related criteria (APA, 2013). Worry then is a central feature of GAD with clinical significance for youth with the disorder (Perrin & Last, 1997; Weems et al., 2000; Songco et al., 2020). Youth with GAD also have more somatic symptoms such as restlessness, stomachaches, blushing, palpitations, and muscle tension than youth with other anxiety disorders (Ginsburg et al., 2006), and research suggests youth with GAD may also have relatively more sleep problems (Alfano et al., 2007).

Like all the anxiety disorders, GAD is highly comorbid with other anxiety disorders in samples of clinic-referred anxious youth (e.g., Weems et al., 1998) and also in general population samples (see Costello et al., 2004). GAD may also be comorbid with other disorders. Across studies, anxiety disorder comorbidity estimates with ADHD have ranged from 0% to 21%, with conduct disorder and oppositional defiant disorder from 3% to 13% and with depression from 1% to 20% (Costello et al., 2004). Developmentally, GAD symptoms are most likely to become prominent around age 10–12 years but can be evident in children as young as 6 years (Costello et al., 2004; Weems, 2008); however, the developmental expression of GAD symptoms may vary based on other conditions such as Autism Spectrum Disorder (Varela et al., 2020).

Assessment

We suggest using a multimethod (e.g., parent and child reports) multitrait (e.g., DSM-based diagnostic interview and worry checklist) assessment (Weems & Stickle, 2005) to identify if treatment is warranted. In our work, we have used the Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Versions [(ADIS for DSM-IV: C/P; Silverman & Albano, 1996) and its previous edition (ADIS for DSM-III-R C/P; Silverman & Nelles, 1988)] to make diagnostic decisions. The Anxiety and Related Disorders Interview Schedule for DSM-5, Child and Parent Versions (Albano & Silverman, in press; Silverman & Albano, in press), has been updated for clinical practice and in research trials to provide for differential diagnosis. This new version is based on the DSM-5 (American Psychiatric Association, 2013), allows the ruling out alternative diagnoses, and presents psychiatric disorders. The ADIS-5 provides quantifiable data concerning symptoms, severity, etiology, and course of disorders. These data can be useful for case conceptualization, for pre-, mid-, or post-treatment evaluations for tracking clinical course and response, and for research purposes. The ADIS has been the subject of several reliability and validity studies (e.g., Silverman & Nelles, 1988; Rapee et al., 1994) each demonstrating good estimates of reliability and validity for childhood anxiety disorders. Silverman et al. (2001) found the ADIS for DSM-IV to have kappas ranging from 0.80 to 0.92 for 2–3 week test-retest reliability for separation anxiety disorder, social phobia, specific phobia, and generalized

anxiety disorder. The ADIS has also been used in most randomized treatment studies for GAD and related anxiety disorders in youth (see Silverman et al., 2008).

In addition to a diagnostic interview, we suggest assessing children's worries with a checklist or worry interview. For example, Perrin and Last (1997) developed a 31-item worry scale based on DSM-III-R criteria for overanxious disorder, avoidant disorder, separation anxiety disorder, and social phobia. Chorpita et al. (1997) have adapted the Penn State Worry Questionnaire for use with children (PSWQ-C). Using a community sample (n = 199), Chorpita et al. (1997) examined the psychometric properties of this 16-item instrument and found good internal consistency as well as convergent and discriminant validity. Vasey et al. (1994) have developed a vignette-based interview strategy to provide a developmental examination of the process of children's worries. Case vignettes were used to provide a context for assessing children's ability to conceive of threatening possibilities, and the frequency of worrisome thoughts for each of three hypothetical vignettes is computed.

For a very brief assessment, we recommend the "GAD-7" which is just seven questions based in part on the DSM-IV criteria for GAD and reflects the frequency of symptoms during the preceding 2-week period, with these options: "not at all," "several days," "over half the days," and "nearly every day." Data suggest the measure can be validly and usefully employed with youth samples to identify GAD (see Mossman et al., 2017).

We have used the Worry Interview for Children (WIC; Silverman et al., 1995) in our research (Weems et al., 2000). The WIC is a semi-structured interview and was designed to assess children's worries in 14 areas: School, Performance, Classmates, Friends, War, Disasters, Money, Health, Future Events, Personal Harm, Little Things, Appearance, Family, and Other worries not covered by previous categories. For each worry reported, the child is asked to rate how much (i.e., intensity) they worried about the item on a five-point scale (0 = none, 1 = a little bit, 2 = some, 3 = a lot, and 4 = very very much). Further, children are asked to rate how often (i.e., frequency) they worried about the item (0 = none, 1 = some, and 2 = a lot). The interview has good reliability and validity. For example, test-retest reliability of the WIC for the total number of worries was found to be (r = 0.75) and for the total number of areas of worry was (r = 0.78), and the interview scores discriminate anxious children from non-anxious children and discriminate youth with GAD from those with other anxiety disorders (see Silverman et al., 1995; Weems et al., 2000).

Cognitive Behavioral Therapy for GAD in Youth

Cognitive-Behavioral Therapy (CBT) is a psychosocial treatment that emphasizes the role of cognitions and behavioral learning in the development, maintenance, and amelioration of emotional problems. Cognitive behavioral therapy has several characteristics from the cognitive tradition (e.g., Beck, 1976) as well as from the behavioral tradition (Skinner, 1953; Wolpe, 1958). Cognitive-Behavior Therapy is time-limited and the typical number of sessions children receive varies from around 10 to 16. While CBT is conceptualized as a collaborative effort between the therapist and the client, it is relatively more structured and therapist-directed than other therapies (e.g., client-centered therapy, play therapy, psychoanalysis). CBT is based on an educational model with the goal being to help clients unlearn their unwanted reactions and to learn new ways of reacting. Homework is also a central feature of CBT for childhood anxiety disorders.

Cognitive therapy is based on the idea that our thoughts influence our feelings and behaviors and has its roots in the work of Aaron Beck and others in the cognitive tradition (Beck, 1976; Lang, 1977). Behavior therapy or behavior modification is the treatment of behavioral and emotional disorders through the reinforcement of desired behavior and suppression of undesirable behavior. The behavioral techniques have their roots in the experimental work of Ivan Pavlov (respondent tradition) and B. F. Skinner (operant

tradition) as well as the applied work of Joseph Wolpe and Nathan Azrin (see Kazdin, 1978, 2001). Contingency management and reinforcement strategies, for example, follow from the operant conditioning paradigm while systematic desensitization follows from the respondent paradigm. These traditions (cognitive and behavioral) have been largely integrated in current CBT treatment manuals for childhood anxiety (Barrett, 1998; Kendall, 1994; Silverman, Kurtines, Ginsburg, Weems, Lumpkin, & Carmichael, 1999a; Silverman, Kurtines, Ginsburg, Weems, Rabian, & Serafini, 1999b). Specific techniques are discussed further below and are outlined in Table 18.1.

Anxiety disorders such as GAD in childhood and adolescence are highly prevalent and can cause intense psychosocial impairment (Langley et al., 2004; Silverman & Treffers, 2001). For example, children with GAD often have difficulty studying for and taking tests, poor school attendance, intense somatic symptoms, and school refusal (Pina et al., 2002; Weems et al., 2000). As noted, the literature also shows that children also diagnosed with GAD experience more sleep-related problems (Alfano et al., 2007) and somatic symptoms (Ginsburg et al., 2006) than clinically anxious youth without GAD.

The field has advanced with demonstrated efficacy of cognitive-behavioral and pharmacological strategies in the treatment of childhood anxiety and phobic disorders (see Albano & Kendall, 2002; Creswell & Cartwright-Hatton, 2007; Kendall, 1994; Ollendick & King, 1998; Silverman et al., 2008; for a review of pharmacological interventions see Walkup et al., 2002). Central to CBT interventions for anxiety problems are exposure-based anxiety reduction strategies (i.e., relaxation training consisting of progressive muscle relaxation and deep breathing paired with gradual approach to fearful stimuli followed by positive reinforcement of progress

Table 18.1 Common techniques used in CBT for childhood anxiety disorders

Technique	Description	Example use for GAD
Graduated exposure	The basic idea is that you cannot run from your problems/fears, you must face them head on.	This means confronting the worry (i.e., fully processing the worry or worry-provoking stimulus). Worry hierarchy is developed and therapist helps client face from least intense to most intense.
Relaxation training	Training in progressive muscle relaxation and deep breathing.	When worries arise client is instructed to do relaxation exercises.
Systematic desensitization	Relaxation training paired with exposures along a hierarchy.	Condition a relaxed response to worries or worry provoking stimuli by pairing "relaxation" with increasing levels (or hierarchy) of the worries or worry provoking stimulus.
Self-monitoring	Systematic observation and recording of target behaviors.	Client keeps a daily record of worries and the things that prompted the intense worry.
Cognitive modification-challenging irrational beliefs	Often termed "cognitive restructuring" (Aaron Beck) An array of strategies utilized to identify and restructure maladaptive and distorted cognitions.	Identification of the cognitive causes of the worries in GAD and teaching of positive self-talk, challenging beliefs, and worry schemas. Socratic method of challenging irrational beliefs. Empirical demonstrations of the fallacy of the belief with the use of mini experiments and exposure hierarchy
Contingency management	Designed to facilitate child graduated exposure by using behavioral contingency management procedures. Specific principles and procedures positive reinforcement, shaping, extinction, and contingency contracting.	Contracts are written between the parent and child that details the child exposure task (i.e., the step on the hierarchy) as well as the details of the reward that the parent would give to the child (i.e., an item on the reward list) as a consequence for successful completion of the exposure task.
Modeling	The therapist acts out appropriate reactions to different situations.	The client models the therapist's positive solutions to the worries.

through praise or tangible reinforcers). Also central to CBT are cognitive self-control training strategies (see Silverman & Kurtines, 1996). The latter involve teaching children to self-observe, self-talk (identify and modify), self-evaluate, and self-reward (see also Kendall, 1994).

Review of Outcome Studies

The number of studies examining the efficacy of psychosocial treatments for anxiety disorders in childhood has grown substantially. Overall, meta-analyses and reviews of the literature suggest that CBT is an effective treatment for GAD in children and youth. Meta-analyses suggest that when compared to placebo, selective serotonin reuptake inhibitors (SSRIs) also significantly reduce primary anxiety symptoms but that benzodiazepines and tricyclics are not effective in reducing anxiety symptoms. When CBT is compared with wait-listing or no

treatment, CBT also improves primary anxiety. Moreover, CBT reduces primary anxiety symptoms more than fluoxetine, but the combination of sertraline and CBT significantly reduced clinician-reported primary anxiety symptoms and response more than either treatment alone. However, adverse events are much more common with medications than CBT and CBT is associated with fewer dropouts than medications (see Barrett & Farrell, 2007; Silverman et al., 2008; Wang et al., 2017).

The majority of treatment studies that have included children with GAD have employed individual or group treatment formats (ICBT, GCBT) with some also including a Parent component. Several of these studies have included only a small number of youth whose primary diagnosis was GAD or OAD (e.g., Nauta et al., 2003; Wood et al., 2006; Bogels & Siqueland, 2006; Öst et al., 2001; King et al., 1998; Heyne et al., 2002). Although no study has focused solely on the treatment of GAD, several have included a relatively large number of youth diagnosed with GAD. In the following sections we review this literature with a focus on studies in which a large portion of the youth participants had a primary diagnosis of GAD or OAD.

Individual Format Kendall (1994) reported the first large-scale clinical trial in which individual child-focused cognitive-behavioral treatment (ICBT; $n = 27$; ages 9 to 13 years) was found to be efficacious relative to a waitlist control condition ($n = 20$) using a randomized design and employing multimethod assessment and diagnostic interviews (e.g., structured interviews, multisource assessment). Primary diagnoses in the sample were OAD ($n = 30$), separation anxiety disorder (SAD) ($n = 8$), and avoidant disorder (AD) ($n = 9$). Sixty-four percent of the children in the treatment group no longer met criteria for an anxiety disorder after treatment, whereas only one child in the control condition no longer met criteria for a diagnosis after the wait period. Analyses of treatment effects by diagnosis indicated no differential treatment effects for children diagnosed with OAD versus other diagnoses.

In a similar study using a randomized design and employing a multimethod assessment, Kendall et al. (1997) replicated his initial findings on ICBT with a larger sample ($N = 94$) of 9- to 13-year-old children with a primary diagnosis of anxiety: OAD ($n = 55$), SAD ($n = 22$), and AD ($n = 17$). Participants were randomly assigned to a 16-week cognitive behavioral treatment or an 8-week waiting-list control condition. Assessments occurred at pretreatment, mid-treatment, post-treatment, and at 1-year follow-up. Results indicated that per parent ADIS interview, 71.28% of the treated children no longer had their primary diagnosis as primary at the end of treatment and 53.19% no longer met criteria for their primary anxiety disorder at post-treatment based on either parent or child ADIS interviews. Gains were maintained at 1-year follow-up for most dependent variables. By comparison, only two of the children in the waitlist condition no longer met criteria for their primary anxiety disorders at the end of the waitlist period. Kendall et al. (1997) also examined treatment effects by diagnosis. They concluded that there

were no overall differences in treatment effects among OAD, SAD, and AD. However, there were significant Diagnoses by Trials interactions in predicting the mother report STAIC-P and the CBCL internalizing scale with simple main effects tests revealing reductions only for the OAD and SAD groups. Another interaction in predicting TRF internalizing scale scores was also significant with reductions in scores only for the OAD group.

Barrett et al. (1996) examined the efficacy of the CBT approach developed by Kendall and colleagues with an Australian sample of clinically anxious 7- to 14-year-old children: OAD ($n = 30$), SAD ($n = 30$), and Social Phobia (SoP) ($n = 19$). The children were randomly assigned to one of three 12-week conditions: CBT ($n = 28$), CBT plus a parent component referred to as FAM (CBT + FAM) ($n = 25$), or a waiting-list (WL) condition ($n = 26$; treated after the waitlist period). 69.8% of the children ($n = 37$) in the treatment conditions no longer met criteria for an anxiety disorder following treatment compared to 26% of the children ($n = 6$) in the WL condition after the waiting period. There was also a difference between the treatment conditions with 84% of the children in the CBT+FAM condition no longer meeting criteria compared to 57% of the children in CBT alone condition. This difference was no longer significant at a 6-month follow-up but was significant again at a 1-year follow-up with 70.3% of the children in the CBT group no longer meeting criteria for an anxiety disorder compared to 95.6% of the children in the CBT+FAM group. Barrett et al. did not find significant differences in the treatment outcome by type of pretreatment diagnosis (GAD, OAD, and SoP).

Dadds et al. (1992) had also demonstrated that CBT+FAM ($n = 7$) was superior to a waitlist condition ($n = 7$) in a relatively small sample of 7- to 14-year-old anxious youth: OAD ($n = 10$), SAD ($n = 4$), with five of the seven children in the treatment condition no longer meeting criteria for an anxiety disorder diagnosis at post-treatment. All seven children in the waitlist condition continued to meet criteria for an anxiety disorder at end of the treatment period. Treatment effects by diagnosis were not reported.

Two other studies have examined the efficacy of ICBT in comparison to group cognitive-behavioral treatment (GCBT) (Flannery-Schroeder & Kendall, 2000; Manassis et al., 2002). Flannery-Schroeder and Kendall randomly assigned 8- to 14-year-old anxious children to one of three conditions: 18-week ICBT ($n = 13$), 18-week GBCT ($n = 12$), or 9-week waitlist (WL) ($n = 12$; treated after the waitlist period). Primary diagnoses were GAD ($n = 21$), SAD ($n = 11$), and SoP ($n = 5$). Results showed that 73% of the children in the ICBT group and 50% of the children in the GCBT group did not meet criteria post-treatment for their primary anxiety disorder. Only 8% of the children in the WL condition did not meet criteria for their primary anxiety disorder at post-treatment. Differences between the two treatment conditions and the WL condition were significant, but the two treatment conditions were not significant from each other. In addition, 64% of children in the ICBT group and 50% of children in the GBCT group no longer met criteria for any anxiety disorder following treatment. At 3-month follow-up, 79% of children in ICBT and 53% of children in GBCT did not meet criteria for their primary diagnosis and 50% of children in ICBT and 53% in the GBCT did not meet criteria for any anxiety disorder (GAD, SAD, and SoP). Treatment effects by diagnosis were not reported.

Manassis et al. (2002) randomly assigned 78 clinically anxious 8- to 12 year-old children to a 12-session ICBT ($n = 41$) condition or a 12-session GCBT ($n = 37$) condition. In both conditions, parents received a parent training program. Primary diagnoses were GAD (60.3%), SAD (25.6%), simple phobia (SP) (6.4%), SoP (6.4%), and Panic Disorder (1.3%). Both conditions were shown to lead to significant improvements in parent and child report measures, and only clinician ratings varied by treatment group with clinicians rating the ICBT group as showing more gains than the GCBT. Independent of treatment condition, children with GAD showed more gains by mothers than children with other diagnoses.

In sum, ICBT has been shown efficacious to waitlist controls in a number of well-designed randomized control studies with samples consisting of a large portion of youth diagnosed with GAD/OAD. In addition, where ICBT was compared with GCBT, there were no consistent differences, but when differences were found, these favored ICBT. Similarly, when outcomes were compared by diagnosis, there appears to be fairly inconsistent results. However, when differentials in gains were found, these tended to be relatively better results for youth whose primary diagnosis was GAD/OAD.

Group Format A group format has also shown efficacy for the treatment of GAD. Barrett (1998) was the first to demonstrate that group cognitive-behavioral treatment (GCBT; $n = 23$) was efficacious relative to a waitlist control condition ($n = 20$) (ages 7 to 14 years). Primary diagnoses were: OAD ($n = 30$), SAD ($n = 26$), and SoP ($n = 4$). The percentage of children who were improved (i.e., no longer met DSM-III-R criteria for any anxiety disorder) was significantly greater for children in GCBT (74.8%) than for children in the waitlist control condition (25.2%). Treatment effects by diagnosis were not reported.

Silverman, Kurtines, Ginsburg, Weems, Lumpkin, and Carmichael (1999a) also used a randomized clinical trial to evaluate the efficacy of group cognitive behavior therapy (GCBT) versus a waitlist control condition to treat GAD ($n = 8$; or 22% of the completers in the sample had GAD); OAD ($n = 17$; 46% of the sample); or SoP ($n = 12$; 32% of the sample). Results indicated that GCBT was efficacious in producing and maintaining treatment gains (youth in GCBT showed substantial improvement on all the main outcome measures. These gains were maintained at 3-, 6-, and 12-month follow-up and youth in the waitlist control condition did not show improvements from the pre- to post-wait). In particular, using the ADIS-C/P diagnoses, 64% (16/25) of the participants in GCBT were recovered at post-treatment (i.e., no longer met primary diagnoses); 12.5% (2/16) in the waitlist condition were recovered at post-wait. Although there was no differential effect for type of primary anxiety diagnosis, comorbid child depression and parent depressive symptoms were associated with less favorable outcomes (see Berman et al., 2000). We review additional predictors of efficacy in the next section.

Predictors of Treatment Outcome

Of the ICBT and GCBT studies targeting GAD reviewed above, most examined potential moderating effects of some key demographic and related variables on treatment outcomes. No moderating effects were found for gender (Silverman, Kurtines, Ginsburg, Weems, Lumpkin, & Carmichael, 1999a; Silverman, Kurtines, Ginsburg, Weems, Rabian, & Serafini, 1999b; Manassis et al., 2002), or age and comorbid status (Silverman, Kurtines, Ginsburg, Weems, Lumpkin, & Carmichael, 1999a; Silverman, Kurtines, Ginsburg, Weems, Rabian, & Serafini, 1999b; Kendall et al., 1997). Only one study found main effects for treatment outcomes based on gender and age (Barrett et al., 1996). Specifically, for females, the CBT+FAM condition was more effective than the CBT alone condition at the end of the treatment and at 1-year follow-up. Younger children (7–10 years) had higher rates of diagnosis-free participants at post-treatment and at 1-year follow-up in the CBT+FAM condition compared to young children in the CBT alone condition. The older children (11–14 years) did not show differences in treatment effects across outcomes.

Of the studies reviewed, only Silverman, Kurtines, Ginsburg, Weems, Lumpkin, and Carmichael (1999a) included a sufficient number of ethnic minorities, mostly Hispanic/Latino ($n = 26$), to examine moderating effects of ethnicity on treatment outcomes. They found that ethnicity did not moderate treatment effects. A second study by Silverman, Kurtines, Ginsburg, Weems, Rabian, and Serafini (1999b) also included a sufficient number of Hispanic/Latino youth for conducting moderation analyses. However, this second study was focused on children with phobic disorders of whom 14% had a

comorbid diagnosis of GAD. Two subsequent studies combined the two samples from the Silverman studies (Silverman, Kurtines, Ginsburg, Weems, Lumpkin, & Carmichael, 1999a; Silverman, Kurtines, Ginsburg, Weems, Rabian, & Serafini, 1999b) and reanalyzed those data to examine the equivalence of treatment effects across Hispanic/Latino and white non-Latino youth (Pina et al., 2003) and potential moderating effects of ethnicity and other child individual characteristics and parent mental health in treatment outcomes (Berman et al., 2000). Although the samples for these two studies include children with a large portion of other anxiety disorders in addition to GAD, we review them considering the scarcity of research in this area with ethnic minorities.

Pina et al. (2003) examined the efficacy of exposure-based cognitive treatments on 6- to 16-year-old Hispanic/Latino youth (n = 52) and European American youth (n = 79). Primary diagnoses for the Hispanic/Latino youth were GAD/OAD (n = 10), SAD (n = 4), SoP (n = 10), SP (n = 23), and other (n = 5). Primary diagnoses for the European American youth were GAD/OAD (n = 15), SAD (n = 4), SoP (n = 7), SP (n = 46), and other (n = 7). Results indicated that 84% of Hispanic/Latino youth and 83.9% of the European American youth no longer met criteria for their primary diagnosis at post-treatment and these percentages were statistically equivalent. Treatment effects were also equivalent between the two cultural groups in clinically significant improvement and child- and parent-completed questionnaires. Treatment gains over time (3-, 6-, and 12-month follow-ups) were also generally equivalent across the two groups in most measures, with one exception. The European American youth reported more gains over time through the use of the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978).

One other study has focused on ethnicity in the treatment of GAD using GCBT. Ginsburg and Drake (2002) randomly assigned 12 African American 14- to 17-year-old adolescents to a GBCT condition (n = 6; 4 completed) or an attention and support (AS) condition (n = 6; 5 completed). Primary diagnoses of completers were GAD (n = 5), SoP (n = 2), and SP (n = 2). The GBCT protocol was 10 weeks and based on the work of Silverman, Kurtines, Ginsburg, Weems, Lumpkin, and Carmichael (1999a); Silverman, Kurtines, Ginsburg, Weems, Rabian, and Serafini (1999b). At post-treatment, three of the four youth in the GCBT condition no longer met criteria for their primary diagnosis and one of the five youth in the AS condition no longer met criteria for their primary diagnosis.

Berman et al. (2000) examined a number of potential moderators of treatment outcomes of exposure-based CBT with data from Silverman, Kurtines, Ginsburg, Weems, Lumpkin, and Carmichael (1999a); Silverman, Kurtines, Ginsburg, Weems, Rabian, and Serafini (1999b). They found that comorbid diagnoses of depression (assessed through the ADIS, C/P), depressive symptoms (measured with the Children's Depression Inventory, CDI; Kovacs, 1981), and trait anxiety (measured with the State Trait Anxiety Inventory for Children – Trait Version, STAIC; Spielberger, 1973) at pretreatment were associated with treatment failure, defined as not having "'recovered' (i.e., no longer meeting criteria for the DSM diagnostic criteria for the primary and targeted phobic or anxiety disorder)." Parents' global severity ratings on the Symptom Checklist-90 (SCL-90; Derogatis, 1983), parents' symptom scores on the obsessive-compulsive, psychoticism, depression, hostility, and paranoia subscales of the SCL-90, parents' self-rating of depression (measured with the Beck Depression Inventory, BDI; Beck et al., 1961), and parent self-ratings of anxiety (assessed with the Fear Questionnaire; Marks & Matthews, 1979) at pretreatment were also associated with treatment failure as defined above. Age, income, and primary anxiety diagnosis were not predictors of success or failure in therapy.

In addition, children's scores on the STAIC and parents' global severity score on the SCL-90 and scores on the depression, hostility, obsessive-compulsive, and paranoia subscale of the SCL-90 at pretreatment were associated with poor outcomes gauged by a lack of a drop of 4 points or more on an 8-point clinicians' severity scale.

Children's scores on the CDI and STAIC and parents' scores on each of the subscales of the SCL-90 predicted post-treatment clinicians' ratings of symptom severity (i.e., more than 5% of variance in severity ratings explained) for those involved in individual treatment, whereas only the children's scores on the RCMAS and externalizing subscale of the CBCL were predictive of severity ratings for those in group treatment (i.e., more than 5% of variance explained). SCL-90 global severity rating and scores on the depression, hostility, somatization, paranoia, obsessive-compulsive, and psychoticism subscales of the SCL-90 predicted clinician's ratings (i.e., more than 5% of variance explained) of symptom severity at post-treatment for children under 12 years old. For adolescents (12 years or older), CDI scores and parents' scores on the internalizing scale of the CBCL and parents' score on the RCMAS were predictive of severity ratings (i.e., more than 5% of variance explained).

Southam-Gerow et al. (2001) also examined potential effects of a number of child, parent, and environmental characteristics on treatment outcomes, specifically good treatment response (i.e., not meeting criteria for any anxiety disorder based on ADIS -P) versus poor treatment response (i.e., meets criteria for one anxiety disorder immediately after treatment ($n = 135$) or at 1-year follow-up ($n = 107$) based on ADIS -P). They combined the samples from the Kendall (1994) and Kendall et al. (1997) studies and reanalyzed those data (85% of total *N* for their analyses) in combination with new data collected in the same anxiety clinic (15% of total *N* for their analyses). Pretreatment primary diagnoses were OAD or GAD (59%), SAD (24%), and SoP or AD (17%). They found that higher scores on the withdrawn subscale of the Child Behavior Checklist and higher scores on the Anxious/Depressed subscale of the Teacher Report Form were associated with poor treatment response immediately following treatment and at 1-year follow-up. In addition, being older was associated with poor treatment response immediately following treatment and mother depression (measured by the BDI) was associated with poor response treatment at 1-year follow-up. Ethnicity, gender, family income, family composition, and a measure of therapeutic relationship did not have an effect on treatment outcome.

In all, the available literature indicates little or no differential effects of ICBT and GCBT for GAD based on demographic variables (i.e., gender, family income, and ethnicity) and primary anxiety diagnosis, but other variables appear to affect treatment outcomes. Specifically, comorbid depression, severity of anxiety symptoms, and parental psychopathology each have tended to be associated with poorer outcomes. In addition, although effective across ages, CBT-based treatments may be even more effective for younger children with GAD. Better attention to moderators and mediators of efficacy is needed in the next generation of outcome studies.

Practical Suggestions for Implementing CBT for Youth with GAD

For clinicians new to the treatment of anxiety in youth, we would suggest using one of the excellent guides for professionals (e.g., Silverman & Kurtines, 1996) and parents (reviewed in Weems, 2005). For example, the text *Treating Anxious Children and Adolescents* by Rapee, Wignall, et al. (2000) was designed for professionals and presents their insights that they have gained from years of research and clinical work at their anxiety disorders research center and clinic. The goal of the text is to provide mental health professionals with understandable and detailed suggestions for conducting effective treatment procedures. Although not a treatment manual, the book provides sample treatment programs designed for different clinical contexts (i.e., the authors' typical program, a managed care setting, and an extended treatment setting) with illustrative case studies. Rapee, Spence, et al. (2000) is a companion book for parents. An excellent chapter on conducting exposure with youth with GAD can be found in Davis et al. (2020).

Table 18.1 delineates some of the common techniques used in CBT for GAD. In the following we provide some specific suggestions for

doing treatment for youth with GAD. While CBT is directive we always take time to develop rapport with the child and their family and part of this work is done during the assessment process. Participants in our intervention work with anxiety disorders including GAD first learn about anxiety in general. To do this the therapist presents a cognitive and behavioral conceptualization of anxiety (see Silverman & Kurtines, 1996 for more detailed instructions). It is explained to client and his or her mother and father that when we are afraid or anxious, fear or anxiety is evident in three main ways: (l) body reactions, such as heart beating fast, etc., (2) cognitions (e.g., talking to oneself, such as "I might fail"), and (3) behaviors, in particular, we avoid the feared object or event. We also explain that worry is natural because it helps us to plan for the future and anticipate future danger; however, when it gets too intense it can interfere with our ability to do well in school or prevent us from doing the things we would like to do.

The therapist also takes time to explain the importance of exposure or approach behavior. With GAD it can be more difficult to help the client conceptualize this in terms of worry. "How am I supposed to approach my worry?" youth and parents may wonder. We explain that we will approach the things that make us worry (school, tests) and confront the worries. For a child who worries about crime or world events, this means talking about the specific concerns and processing the worry fully. Often worries are maintained by a superficial contemplation of the true dangers involved.

In initial sessions youth are given an overview of the treatment and the therapist tries to create the sense that therapy is a joint effort between the counselor and the youth to help them worry less and to help them so that the worry no longer interferes with their life. The overall rationale might be explained as being able to worry appropriately and so the emphasis is on mastery but not perfection (i.e., no worry at all is an unreasonable goal). The joint effort is facilitated by using the first session to develop a therapeutic alliance (i.e., emphasis in the initial sessions should also focus on empathetic understanding of the goals and desires of the client (both child and family).

The therapist also tries to foster a sense of universality about worry and youths develop a worry hierarchy in the initial session. Use of a worry interview can facilitate the ranking of the various worries from least to most fear provoking/interfering/intense. Later in treatment the therapist will utilize various techniques (e.g., relaxation training) and client education (contingency management) to help the client face increasingly intense worries along the hierarchy.

We next begin to teach relaxation techniques. After the child has mastered the relaxation techniques (with in-session and homework assignments), the relaxation techniques are then practiced during imagined exposure to the initial or lower level hierarchy items. The goal of these sessions is to create a context where youth can practice their relaxation skills while "facing" or approaching items on the stimulus hierarchy. We find that homework assignments are facilitated by parental involvement, and depending on the age of the child we often include parents in the therapy sessions (i.e., with younger children parents tend to spend more time in the session). In addition, we also hold a parents-only time at the end where the procedures are taught to parents.

In addition to pairing exposures with relaxation, we use contingency management procedures. This includes positive reinforcement, shaping, extinction, contingency contracting, following through, and consistency. In particular, performance of in-session and out-of-session exposures along the fear hierarchy is facilitated by the use of contingency management. Specifically, contracts are written between the parent and child that detail the child exposure task (i.e., the step on the hierarchy) as well as the details of the reward that the parent would give to the child (i.e., an item on the reward list) as a consequence for successful completion of the exposure task.

Sessions then begin to focus on hierarchy exposure tasks (i.e., gradual exposure to items on the hierarchy combined with relaxation and contingency contracting), with self-efficacy building (i.e., therapist praise at success along the

hierarchy and self-praise at successes), and continued relaxation training practice. We introduce the concept of self-evaluation as deciding whether or not one is satisfied with his/her accomplishments. Sports examples are used to help youth learn the concept of shaping (or gradual learning). For example, it might be explained that it would not be reasonable to expect to hit a three-point shot in basketball every time you shoot or even in every game.

Youth are helped to make a list of possible rewards that the youth might receive (e.g., get to go to the park with mom; extra playtime after school; points toward a tangible reward). An emphasis on verbal self-rewards is part of our work with older youth and children who are particularly motivated. Examples might include: "I'm really proud of myself," "I really handled that well," "I can handle it if I try," "Good going," and/or "Great Job!" The importance of believing in one's self is emphasized as well. The therapist explains how we should reward or praise ourselves for even partial successes (shaping). That is, we will praise ourselves for partial successes as well, not just for the "three-point shot." The focus is on the idea that no one does everything perfectly and not doing something 100% perfectly should not mean that you should not praise yourself.

We next begin cognitive modification work. Some therapies do this cognitive training before exposures are begun (Kendall, 1994). This may be more appropriate for older youth who can understand the abstract issues involved. We have found that the exposures often provide concrete examples so that children understand the cognitive component better. Thus, doing the cognitive work as exposures progress is one developmental modification to CBT that therapists may wish to try. Cognitive modification is also often termed "cognitive restructuring" (Beck, 1976) and is really a vast array of strategies utilized to identify and help restructure maladaptive and distorted cognitions. Such strategies include the identification of negative thoughts, images, and beliefs and the teaching of positive self-talk, self-observation, challenging beliefs and schemas, and self-evaluation. Common negative thoughts in anxious youth and their definitions with GAD-related examples are presented in Table 18.2 (See also Weems et al., 2007).

Table 18.2 Common negative thoughts experienced by anxious youth

Negative cognition	Definition	GAD-related examples
Catastrophizing	Expecting the worst possible outcome of an event or situation	Worries that if it rains there will be a flood. News story about crime means robbers are going to break into the house at night.
Overgeneralizing	Believing that a single negative outcome is representative of or will occur in all similar future events.	One difficult test results in worries that school will always be awful.
Personalizing	Attributing control over the outcome of negative events to internal causes.	A team loss results in persistent worries that "the team lost the game because of me."
Selective abstraction	Focusing on only the negative aspects of an event.	Worries that she/he ruined the whole recital/game because of one little mistake.
Anxiety sensitivity	The beliefs that anxiety-related sensations (such as heart beat awareness, increased heart rate, trembling, shortness of breath) have severe negative social, psychological, or physical consequences.	A racing heart rate leads to worries that they have heart problems.

Cognitive modification strategies might include challenging the above irrational or erroneous beliefs by demonstrating the logical fallacy of the belief or by empirical demonstrations of the fallacy of the belief. For example, we use mini experiments and the exposure-hierarchy to demonstrate that the result a child expects from the worry (e.g., social ridicule) does not always happen. However, the period from childhood to adolescence is characterized by changes in the way a child is able to process information (e.g., young children are often not conscious—or as conscious—of their threat evaluative thoughts and are often unable to articulate their cognitive experience in a way that lends itself to easy identification of their anxiety-related cognitions). Trying to identify anxious cognitions such as catastrophizing or attempting to have the child monitor catastrophizing thoughts in such cases will often prove unhelpful to the therapeutic process.

In our work with younger children (see e.g., Weems & Carrión, 2003), we start from a "teaching adaptive cognitions" framework. That is, the focus is simply on teaching verbal (cognitive) statements that are adaptive. In the case of children with GAD the idea is teaching statements that counteract avoidance and promote facing your worries. For example, the therapist might ask the child with GAD, "What can you say when you worry about what will happen when you have to leave Mommy to go to school? How about, 'Mommy will be back later today', or 'I will have fun in school today' or 'I am a big girl/boy now I can go to school by myself'." Framing the cognitive session in this way changes the focus from identification and modification to directly teaching adaptive self-statements.

Summary

This chapter reviewed the literature on the treatment of generalized anxiety disorder (GAD) in youth. Worry is a central feature of the DSM definition of generalized anxiety disorder in youth, and so in addition to a careful diagnostic assessment, we suggest a comprehensive assessment of the child's worries. The extant empirical data on treatment efficacy suggests that cognitive behavioral therapy (CBT) techniques and procedures have excellent empirical support (Silverman et al., 2008). While the treatment studies to date have included other anxiety disorders in the samples evaluated, we concluded that GAD can be effectively treated with CBT. Moreover, treatment efficacy does not appear to vary by format (e.g., group versus individual), ethnicity, and gender. However, there is some evidence to suggest that comorbid depression and parental mental health may decrease efficacy. We concluded the chapter by providing some hands-on suggestions in the implementation of CBT for GAD in youth based on our intervention experience.

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Selective Mutism

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Introduction

Selective mutism (SM) is an anxiety disorder in which children are unable to speak in certain social contexts where it is expected of them (e.g., school), while they are able to speak in other more comfortable settings, such as at home. An initial conceptualization of SM is thought to originate from the German physician Adolf Kussmaul who described the condition in the nineteenth century as *aphasia voluntaria*, or "a voluntary absence of speech" (Kussmaul, 1877 in Driessen et al., 2020). In the 1930s, a Swiss child psychologist coined the term *elektiver Mutismus* (Tramer, 1945 in Driessen et al., 2020), and the condition became known as "elective mutism." Elective mutism was first included in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (1980) within the category of "Other Disorders of Infancy, Childhood, or Adolescence" and the term was updated to "selective mutism" in the DSM-IV (1994) to indicate that the condition is not elected freely by an individual but instead present in certain, selective contexts. The DSM-5 (American Psychiatric Association, 2013) reclassified SM in the category of "anxiety disorders" given overlap in symptom presentation, etiology, and treatment practice with other anxiety disorders (Muris & Ollendick, 2015).

As per DSM-5 criteria for SM, the child's inability to speak in public settings must be ongoing for at least a month and not be better explained by any other symptoms of psychosis, neurodevelopmental, or speech disorders (2013). These children do not fail to speak due to an intellectual deficit, as they are easily capable of speaking to people with whom they feel comfortable, such as their immediate family members. The prevalence of SM has been found to be 0.03–0.79% in the population, with a higher rate among girls than boys (Bergman et al., 2002). This relatively rare condition typically has an age of onset between 2 and 5 years of age (Kristensen, 2000; Sharkey & McNicholas, 2012) and is highly comorbid with other disorders, especially social anxiety (69%) (Driessen et al., 2020). Additionally, one study on the comorbidity of SM and language disorders found that 81% of children with SM had speech and language disorders (Klein et al., 2013).

Conceptualization

While somewhat controversial, the reclassification of SM as an anxiety disorder was borne out of a substantial number of studies describing the overlap between SM and other anxiety disorders in terms of symptomatology and etiology, as well as very high levels of comorbidity between SM

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and other anxiety disorders (Driessen et al., 2020). Given this relatively recent re-classification, and that SM most often has its onset in the early childhood years, it is helpful to consider a functional analysis of the behavior associated with this diagnosis. That is, mutism in situations where speech is expected *is an avoidance behavior*. As such, SM can be conceptualized as a pattern of avoidance of anxiety-provoking situations that has been strengthened over time through negative reinforcement. When the child with SM is mute, others in the environment typically remove the demand for speech, thus negatively reinforcing mutism as a response in situations where speech is expected and anxiety-provoking.

This cyclical pattern is similar to that seen in other childhood anxiety disorders, and understanding it is extremely helpful when designing and implementing a treatment plan for children with SM. This cycle usually begins when a child with SM is asked a question or prompted to speak in some way. This results in anxiety-provoking thoughts (such as "What if I sound strange?" "What if I don't know the answer?" or "What if they won't stop asking me questions?") and/or feelings including emotional responses (such as anxiety, fear, or nervousness) or physiological responses (such as increased heart rate, nausea, headache, or sweatiness). To reduce these uncomfortable thoughts and feelings, the child will then avoid the situation by remaining silent. Many times, an adult may "rescue" the child by speaking for them or removing the expectation to speak. When the expectation is removed, the child experiences a sense of relief, which results in negative reinforcement of the mute behavior. Because of this, the child will then have an increased chance of avoiding speech the next time a prompt for speech in an uncomfortable situation occurs.

Intervention

Psychosocial Treatment

Outcome comparisons among various psychosocial treatment approaches for SM are difficult, as there is a lack of published quantitative data on nonbehavioral approaches. Given data regarding effectiveness of Cognitive Behavioral Therapy (CBT) for other childhood anxiety disorders, CBT is the treatment approach most frequently used to treat SM. Reviews of the SM treatment literature over the past 25 years (e.g., Viana et al., 2009; Zakszeski & DuPaul, 2017) reveal that more than 95% of published studies incorporate a behavioral approach, and most use multiple behavioral strategies within each treatment. However, SM presents unique challenges that require typical anxiety-focused CBT approaches to be modified. SM has an earlier age of onset than most childhood anxiety disorders, requiring developmental modifications to anxiety treatments. In addition, children with SM often fail to speak to the therapist at the onset of treatment. Both of these differences necessitate unique strategies for child engagement and caregiver involvement throughout the treatment process. Finally, children with SM tend to experience the most functional impairment in the school environment (Bergman et al., 2008), thus requiring treatment involvement of and coordination with school personnel.

In recent years, several randomized control trials (RCTs) have demonstrated that behavioral therapy is effective at reducing symptoms of SM (Cornacchio et al., 2019; Bergman et al., 2013; Oerbeck et al., 2013), with effects maintained for many children up to 5 years post-treatment (Oerbeck et al., 2018). Behavioral approaches to treating SM target the underlying function of speech being withheld (i.e., to escape anxiety and/or speech demands). A variety of behavioral treatments have been studied in individual families (Bergman et al., 2013), caregiver-child dyads (Catchpole et al., 2019), intensive therapy groups (Cornacchio et al., 2019), and caregiver-focused formats (Oerbeck et al., 2013). Successful interventions have been administered in clinic settings, focused on schools, facilitated with mobile apps (Bunnell et al., 2018), or incorporated a multimodal approach (Klein et al., 2016). While several specific treatments have been investigated with strong evidence of effectiveness, there are general behavioral principles that are utilized

nearly universally. These will be summarized here.

Psychoeducation

Psychoeducation involves teaching children and their caregivers about factors maintaining symptoms of SM and providing an overview and rationale for behavioral intervention. Emphasis is placed on helping families understand the relation between anxiety and avoidance, the role of avoidance in maintaining anxiety, and the process of exposure treatment. Examples from the individual child/family situation are used to facilitate understanding and engagement. During the psychoeducation phase of treatment, caregivers are also coached through identifying ways that their own behavior reinforces their child's avoidant responding/mutism via accommodation.

Initial Treatment Interactions

Early stages of behavioral treatment for SM can be quite difficult, especially in cases where a child has rarely spoken outside the home. Initial treatment interactions that target increasing speech between the child and the therapist are important in setting the stage for successful behavioral intervention. That is, there is a careful balance between eliciting and reinforcing speaking behavior, while deliberately avoiding negative reinforcement of mutism. Differential attention to speaking behaviors is often used, with nonverbal avoidance behaviors (e.g., pointing or nodding) being ignored. Given the young age of many children presenting for SM treatment, initial sessions are often play-based and include activities, games, and toys that are both pleasant and designed to elicit speech. At this stage, any attempt at vocalization or verbalization (e.g., whispering directly into a caregiver's ear while the therapist is in the room) is attended to and rewarded. At times, intervention must start with merely reinforcing speaking behavior in the treatment setting, even without the therapist present.

Different behaviorally-based SM treatment approaches handle initial interactions between the child and the therapist in unique ways, ranging from highly directive to intentionally nondirective. For example, in their two-session intervention using mobile apps, Bunnell et al. (2018) used a structured shaping hierarchy and contingency management protocol that included immediate rewards for successive approximations of speech beginning in the first visit. In Social Communication Anxiety Treatment (S-CAT; Mulligan & Shipon-Blum, 2015), the therapist is intentionally "nonchalant" during initial interactions, reducing pressure on the child to speak and increasing comfort by not expecting the child to look at the therapist. Similarly, Oerbeck et al. (2018) use "defocused communication," during which the therapist sits beside rather than opposite the child, creates joint attention using an activity the child enjoys, "thinks aloud" rather than asking the child direct questions, gives the child enough time to respond rather than talking for the child, continues the dialog even when the child does not respond verbally, and tries to receive a verbal answer in a neutral way rather than praising the child. In Parent-Child Interaction Therapy for Selective Mutism (PCIT-SM; Carpenter et al., 2014), intervention first focuses on teaching caregivers Child Directed Interaction (CDI) skills to help the child warm up in a new situation before verbal demands are made. Exposure skills are introduced after comfort has been achieved, using Verbal Directed Interaction (VDI) skills.

Graduated Exposure: Shaping, Prompting, and Modeling

Exposure-based interventions form the backbone for treatment of most childhood anxiety disorders (Higa-McMillan et al., 2015). In the context of SM, exposure treatment includes practicing speaking behavior in settings (e.g., school, in community locations), with people (e.g., extended family members, teachers, peers), and in situations (e.g., when ordering food or needing help) where comfortable speech does not currently occur. Notably, exposure practices are explicit and agreed upon by the child, without any intent to "catch" the child with SM speaking unawares. The goal of exposure-based treatment is for the child to engage in brave speaking behavior because she has decided to face her

fears, not because she has been tricked into speaking in a new situation or with a new person.

Most often, initial exposure practices involve speaking in front of and then to the therapist, with later exposures taking place at school and in other community settings. During the initial phases of treatment, the therapist takes primary responsibility for directing most aspects of the treatment, including exposure exercises. However, one of the guiding principles of behavioral treatment for SM is that this responsibility or "control" should be gradually transferred to caregivers or teachers and, to the extent possible, to the child (Bergman et al., 2013). Thus, later exposures or "homework assignments" are often facilitated by caregivers and school personnel in between visits with the therapist.

Exposure-based hierarchies must be individualized, based on the child's current patterns of speaking behavior. Shaping is often used in SM treatment, with the therapist reinforcing successive approximations of the desired outcome – comfortable speech. Some children's initial "brave talking hierarchies" or "talking ladders" begin with making non-word sounds with their mouths (e.g., blowing), mouthing sounds or words, or vocalizing phonemes, whereas others can begin treatment by responding with words. The therapist frequently prompts speech during the shaping process, usually encouraging the child to use words to communicate, speak with louder volume or in a more typical voice, and extend the duration of speech.

Hierarchies typically expand along several dimensions, with the choice of dimension depending on the child's presentation and treatment goals (see Figs. 19.1 and 19.2). Sample dimensions include: from speaking directly to a caregiver to speaking directly to the therapist, from responding to categorical questions to answering open-ended questions, from responding to questions to asking questions, from whispering to full volume, and from planned to spontaneous speech. Once consistent and spontaneous speech with the therapist has been established, a child can then become an active partner in generating ideas for expanding exposures. Similar to other exposure-based therapies, fear thermometers and fear ladders are useful tools for generating exposure ideas. Strategies for early in-session exposures include naming games (col-

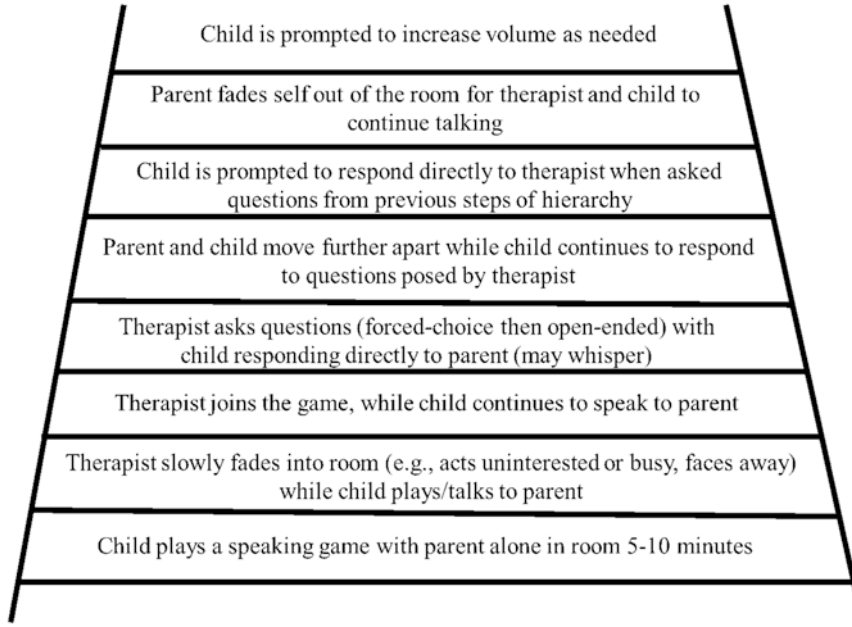

Fig. 19.1 Sample hierarchy for initial fading in therapist

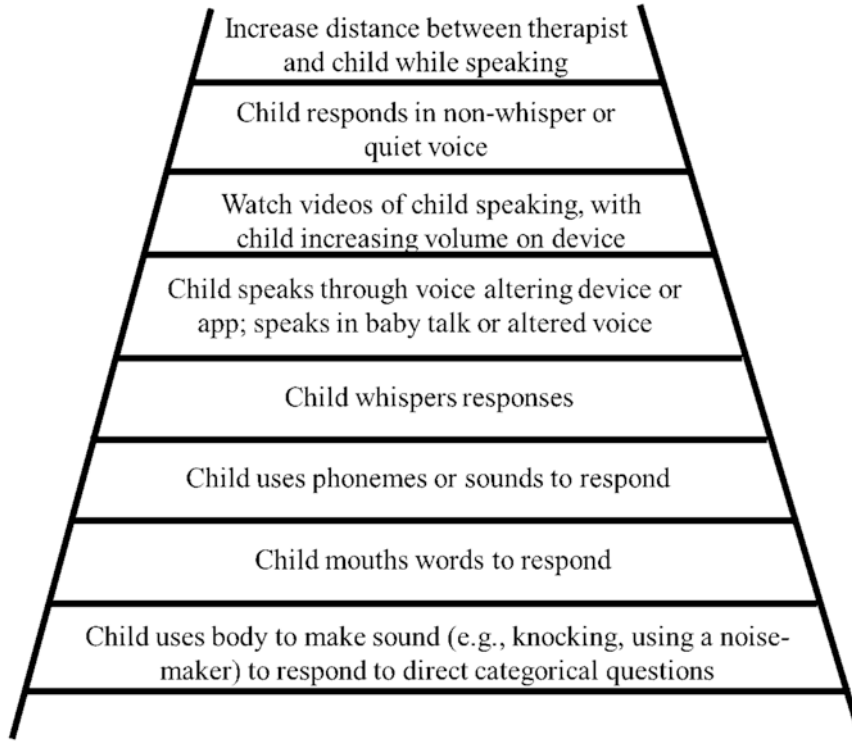

Fig. 19.2 Sample hierarchy for initial use of voice and increasing volume

ors, animals), counting, and structured games with "rules" for verbal components (e.g., during Candyland, the player must name the color of the card chosen or during Uno the player must name the color and number on each card played). Children often then progress to answering categorical questions using a set formula, such as:

1. The therapist asks an open-ended question (What is your favorite color?) and waits 5 seconds for a response.
2. If the child does not respond, the therapist repeats the question in a forced choice format (Is your favorite color pink, purple, or something else?), again waiting 5 seconds for a response.
3. If no response happens, the therapist takes a step back in the hierarchy (e.g., caregiver asks the question and child responds to caregiver) until a successful exposure is completed.
4. All verbalized responses receive gentle praise and rewards (see *Contingency Management* below).

Once the child is engaging in regular, audible speech with the therapist, exposures then move outside of the therapy room to begin to gain ecological validity. Such exposures must occur with the permission of the parent, and no identifying/protected health information is shared during practices (e.g., child's name or diagnosis). Most of the time, it is advisable for the parent to be present during exposures so they can learn the steps for conducting exposure practices and what to so when a practice does not go as anticipated, as well as model confidence in their child's ability to be brave and provide praise for successful practices. In a shared treatment setting (such as a clinic or shared office), children with SM are often engaged in exposures with confederates in the setting, including colleagues, students, and office personnel. Children are prompted to answer or ask general questions (e.g., "what is your favorite color?" or "what is your favorite animal?"). Where possible, in-session exposures may also expand to gift shops, food courts, coffee

stands, information desks, and other situations that prepare caregivers for facilitating exposures outside of session. The therapist begins to actively coach caregivers in facilitating exposures, including establishing a plan for practice with the child, executing the exposure, problem-solving potential barriers, and rewarding success.

For some children with SM, initial out-of-session exposures may include practices with extended family members with whom they do not currently speak comfortably. These exposures can be completed via telephone, video chat, voice or video recordings, or in person and often follow the same sequence of exposures completed in session. Community-based exposures may include asking/answering questions at grocery stores or general merchandise stores (e.g., Target, Walmart). For example, a child may be challenged to ask "How much does this cost?" in order to earn a treat, or encouraged to ask a store clerk a question (e.g., "Where is the cereal aisle?"). Children with SM can complete exposures that include ordering their own drinks, meals, or treats at restaurants, ice cream shops, donut shops, etc. Such exposures are best facilitated when planned and practiced with the therapist or caregivers in advance, before entering the in vivo situation. Once in the situation, the child with SM may require coaching or additional practice with the caregiver in order to be successful. As a general rule, caregivers should be encouraged to try to end every exposure practice with an accomplishment, even if the accomplishment is not the end goal of the practice that was planned. For example, if the planned exposure is for a child to order her own ice cream and she freezes, the caregiver can instead change to a categorical question by asking, "Would you like chocolate or vanilla ice cream?" and praise an audible verbal response.

Exposures in the school setting follow a similar graduated pattern as established in session and in the community. However, as caregivers typically cannot remain in the school environment for long periods of time, and given that children are likely to respond differently when their caregiver is present in the school setting, extensive engagement with school personnel is an important treatment component. That is, it is often imperative to identify a treatment liaison or partner in the school setting who can facilitate exposures. School-related exposure situations may include the parking lot, carpool line, school entryway, classrooms, hallways, offices, playgrounds, "specials" areas (music, art, library), and the cafeteria. Expectations for speaking in school generally involve peers, teachers, administrators, and other personnel. Stimulus fading, or "sliding in," is an important tool in school-based exposures.

Stimulus Fading/Sliding In

Stimulus fading involves systematically increasing the difficulty of an exposure by gradually adding in new stimuli. In SM treatment, this usually begins with fading or "sliding in" a new person into a situation where the child is already talking to a trusted person. This mechanism can be used to facilitate the child using speech with the therapist early in treatment by fading the therapist into a room where a child with SM is talking/playing with a caregiver. Stimulus fading is used in conjunction with ongoing rewards and prompts for speech as agreed upon by the child, caregiver, and therapist during collaborative hierarchy building.

Stimulus fading is an important mechanism in school-based exposures, where the goal is for teachers, peers, and other school personnel to become part of the population of people with whom the child speaks regularly. Children with SM are often mute in the general school setting, even with caregivers, siblings, and others with whom they speak comfortably outside of school. A child with SM may need to start the sliding in process at school by getting comfortable speaking with their caregiver in the school setting, which may include the parking lot, school grounds, or entryway before advancing to the classroom. Once in the classroom, a teacher or other identified school-based liaison may "fade in" or "slide in" to the setting. This may include having the caregiver and child play verbal games or read books aloud in an empty classroom while the liaison enters the room and sits far away from the interaction. The liaison may then gradually

move closer to the interaction, eventually joining in. Once the child is comfortable with this scenario and speech is audible and comfortable, a new stimulus is introduced. For example, a peer selected by the child may be asked to join in a verbal game, question and answer session, or reading circle that the child has been practicing with her teacher. Over time, other classmates may be invited to join the small group until the child can speak and read aloud to her entire class.

Stimulus fading in a school setting must often be accompanied by educating teachers and school personnel about SM, including the general importance of encouraging independent speech from the child and ignoring or discouraging nonverbal avoidance behaviors. In addition, peers and teachers may benefit from coaching on using "light praise" rather than overly enthusiastic or potentially embarrassing positive attention for new speaking behaviors.

Self-modeling

In prior SM treatment paradigms, self-modeling has been discussed as a useful component, sometimes distinguished from exposure-based practice in that the procedure is specifically designed to maximize the child's identification as a comfortable speaker and increase self-efficacy (Kehle et al., 1998). For SM treatment, self-modeling involves making an audio or video recording of a child as he speaks in a comfortable situation. The recording is then played in a low-frequency speaking situation with the child present. In some interventions, video splicing is used to create a video in which the child comfortably answers questions that appear to be posed by a new adult (e.g., classroom teacher) within the same video "conversation." There are various free, user-friendly video editing software programs (e.g., Avidemux [Windows and Mac compatible], iMovie [for Mac users], VSDC Free Video Editor [for Windows users], Splice for mobile platforms, etc.) that can be used to create these videos. Some evidence suggests that video self-modeling, when combined with stimulus fading and reinforcement, produces meaningful changes in speech in a short time period (Bork & Bennett, 2019). Regardless of its conceptualization as separate from exposure-based intervention or a useful step in a fear hierarchy, the use of audio and video recordings can be quite helpful in SM treatment.

Contingency Management

Contingency management is often used to support exposure-based practices for children with SM. It includes positive reinforcement of desired behaviors (i.e., rewards for speaking) and lack of reinforcement for undesired behaviors (i.e., ignoring silence or nonverbal responding). Interventions for SM most often include rewards for steps toward treatment goals, including those completed in-session, during planned between-session exposures, and spontaneous instances of brave talking. In many behavioral models of intervention, rewards are introduced at the outset of treatment and typically include immediate reinforcers that are inherently valuable in the moment (e.g., stickers for preschool-aged children) or understood to be part of a token economy (e.g., "Brave Bucks," reward tickets or points). Families are encouraged to develop a rewards list and, over time, to establish an "exchange rate" that makes sense given the frequency of reinforcement.

Negative reinforcement plays a large role in maintenance of SM symptoms, in that the relief that occurs when the demand for speech is removed in the face of a child's silence (e.g., the speaker moves on or someone else answers for the child), is highly rewarding. During SM treatment, caregivers and others in the child's environment (e.g., siblings, teachers, and peers) should be coached in removing accommodations for nonverbal responding. Accommodations typically include responding for the child, accepting nonverbal responses (e.g., nodding, pointing), and "giving up" during planned exposure practices. Relatedly, classroom-based accommodations that allow for nonverbal responding (e.g., communication boards, use of notes or gestures/signals) should be reserved for situations related to health and safety (e.g., restroom need, illness/injury) and faded out over time.

Finally, a response cost component can be added to exposures, particularly when it occurs

somewhat naturally in an exposure situation. For example, a child may be coached to complete an exposure that includes ordering her own drink at a restaurant. If she is able to order her drink, she may have whatever drink she chooses. If she is not able to do so, the caregiver will order water instead. In this instance, a natural reinforcer or disincentive is provided for speaking or not speaking, respectively.

Psychopharmacology

There is limited information regarding treatment options for children who demonstrate persistent symptoms of SM despite engaging in evidence-based psychosocial intervention. Therefore, clinicians often look to the broader literature on treatment of childhood anxiety disorders, including psychopharmacology. For example, the Childhood Anxiety Multimodal Study (CAMS; Compton et al., 2014) indicated that children with moderate to severe anxiety disorders benefitted most from a combination of CBT and serotonin-specific medication (i.e., sertraline).

Applying this evidence to SM should be done with caution, as SM has several features that distinguish it from other anxiety disorders of childhood. For example, the onset of SM is typically younger than in other anxiety disorders, and many providers lack experience in treating young children with medication. In addition, traditional psychosocial interventions that are very effective with other childhood anxiety disorders (e.g., Coping Cat; Kendall & Hedtke, 2006a, b) require significant modification to apply to children with SM. We may expect medication interventions to require similar modification.

There is a dearth of evidence regarding efficacy of medication in treating children with SM, and studies that exist have significant limitations including small sample size, lack of comparison groups, and minimal blinding. Most studies are single case reports or twin studies, and heterogeneity of study design and outcome measures make it difficult to amass evidence across studies (Manassis et al., 2016). Smaller studies with less rigorous methodology and case reports suggest benefits, good tolerance, and high parental acceptability.

Manassis et al. (2016) completed a systematic review of the evidence for the use of pharmacotherapy in reducing symptoms of SM in children, including only studies with >2 participants. Symptomatic improvement was found for 66/79 children treated with SSRIs, with fluoxetine being the most frequently prescribed medication. In addition, 4/4 children treated with an MAO inhibitor demonstrated improvement. Reporting on tolerability was inconsistent across studies, and the duration of follow-up assessments was highly variable.

In an attempt to overcome some of the limitations in the extant literature on pharmacotherapy of SM, Barterian et al. (2018) completed a randomized, single-case, multiple-baseline design to examine the effects of fluoxetine on symptoms of social anxiety and speaking behavior in 5 children with psychosocial treatment-resistant SM. All children demonstrated reduced social anxiety symptom severity and improvements in speaking behavior during this 12-week trial, and overall parental acceptability ratings were high. Of note, all five children continued to meet diagnostic criteria for SM after the 12-week trial.

Limitations in the literature suggest that clinicians treating children with SM should approach the possibility of pharmacotherapy carefully, using a risk-benefit analysis for each case. While most studies show that the potential benefits of medication typically outweigh the risks in childhood anxiety disorders (Bridge et al., 2007), studies of the risk and benefit specifically for children with SM are significantly lacking. In addition, optimal dosage, timing of medication, and guidance on timelines for discontinuation are currently nonexistent. Overall, the body of evidence suggests that exposure-based CBT alone should be considered a "first line" treatment for most children, particularly those of preschool age. Medication may be reserved for those with who do not respond to a trail of a strongly evidence-based psychosocial treatment and should likely be used in combination with ongoing CBT.

Other Considerations for Assessment and Intervention

Temperament

Temperament is an important component to include in conceptualizing SM. First, behavioral inhibition is a vulnerability factor for the development of childhood anxiety, including SM (Muris et al., 2016). Children who demonstrate behavioral inhibition have persistent shyness and fearfulness of new situations and around new people. Behavioral inhibition is closely tied to social anxiety, which is a prominent feature of children with SM (Muris & Ollendick, 2015).

In addition to behavioral inhibition, parents sometimes report strong-willed and oppositional behaviors in their children with SM, including stubbornness, irritability, argumentativeness, noncompliance, and tantrums (Ford et al., 1998). Researchers have found that as many as 29% of youth with SM have oppositional defiant disorder (Yeganeh et al., 2006), while others may exhibit more mild behavior difficulties (Cohan et al., 2008). At this time, it is not clear whether oppositionality is a symptom of SM or a comorbidity (Bubier & Drabick 2009; Drabick et al., 2010). Regardless, understanding the possible temperamental differences among children with SM contributes to more effective intervention, with treatment components to address social anxiety and oppositional behaviors available to supplement intervention directed specifically at reducing symptoms of SM.

Linguistic and Cultural Considerations

Given the relatively low prevalence of SM, linguistic and cultural factors have not received significant attention. As indicated previously, children with speech and language disorders are at higher risk for the development of SM (Starke, 2018), consistent with the diathesis-stress model of anxiety development. Similarly, data indicate that immigrant/bilingual children have a higher prevalence of SM diagnosis as compared to monolingual children across international groups (Elizur & Perednik, 2003; Bradley & Sloman, 1975; Steinhausen & Juzi, 1996). These findings are consistent with the clinical experience of those working with a larger number of children with SM, particularly in diverse practice locations.

Some authors have noted concern with possible over-diagnosis of SM in bilingual children secondary to the "silent period" or nonverbal period that is seen as a frequent and normal part of second language acquisition in youth. The duration of this silent period is typically less than 6 months, but it can last for up to a year, during which time the child may refrain from speaking in the new language until they feel comfortable communicating in it. When this learning period persists, parents, teachers, and clinicians may begin to suspect SM, even when silence in the setting of the new language may be developmentally appropriate. Thus, assessors may need to consider whether the silent period persists out of the typical time frame for language acquisition, in the presence of anxiety or shyness, and most importantly if the difficulties in speaking is not only evident in the new language but also in their home language (Toppelberg et al., 2005). At the same time, early intervention is important for reducing interference and impairment from SM symptoms, and it is not advised to systematically delay treatment for second language learners presenting with possible SM. Understanding bilingual language development is necessary to correctly diagnose SM in second language learners.

Additionally, it is proposed that acculturation status of the parents may be a risk factor for the development of SM (Elizur & Perednik, 2003). Parents' and caregivers' level of assimilation, language acquisition, and cultural acceptance may be additional risk factors to consider that may impact whether a child develops SM, and how and when to best intervene.

Conclusion

Selective mutism is a relatively rare childhood-onset anxiety disorder that is characterized by a failure to speak in some social situations despite

typical verbal communication in other settings. Left untreated, SM can have a significant impact on children's social functioning and academic achievement. Treatment for SM typically includes a modified version of exposure-based Cognitive Behavioral Therapy (CBT), which has been consistently demonstrated to be an effective treatment for other childhood anxiety disorders. Specific CBT-based interventions for SM most often used include psychoeducation and exposure (including behavioral principles of shaping, prompting, modeling, stimulus fading, and contingency management). Parent/caregiver involvement in treatment is paramount, and treatment is typically most effective when school-based personnel can be engaged as treatment collaborators. Temperament, language, and cultural factors are important considerations in diagnosing and treating SM. Finally, supplemental treatment with medication may be considered for older children and those who demonstrate a limited response to psychosocial interventions.

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Treatment of Social Anxiety in Children and Adolescents

20

Tracy L. Morris and Johann D'Souza

Transitory shyness is particularly common among very young children, and a large segment of the population will experience symptoms of social anxiety at some point across the lifespan. However, for some, the experience of social anxiety is pervasive and leads to substantive distress and impairment. Social anxiety disorder (SAD; also known as social phobia) is defined as a "marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others" (SAD; American Psychological Association, 2013, p. 118). The classic symptom constellation includes heightened physiologic reactivity (e.g., increased heart rate and muscle tension), cognitions reflecting negative evaluation (e.g., "Everyone is looking at how stupid I am."), and overt escape and avoidance and avoidance behaviors (e.g., school refusal, reticence to speak), although primary response modes vary considerably across individuals. As school is children's primary social venue, it is not surprising that the school context is a significant source of distress for children and adolescents with SAD (Blöte et al., 2015). As children often do not have the freedom to avoid school and other feared social situations, parents and teachers may misinterpret clinging and crying as oppositional behavior rather than as a symptom of social anxiety, and as such appropriate intervention is delayed or denied. For those for whom more covert cognitive or physiologic modes predominate, parents may be unaware of their child's distress until the condition becomes quite severe and comorbid conditions such as depression and substance abuse lead to pronounced changes in functioning. For instance, one study found that if social anxiety is left untreated, it gets worse over adolescence, perhaps because parents have less of a role in encouraging their children to participate in activities, while at the same time school and social demands are increasing (Hoff et al., 2017).

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Epidemiology

Lifetime prevalence estimates for SAD range from 5.0% to 12.1% in the United States depending on the sampling procedures and methods of assessment employed, with a greater prevalence in females (Ruscio et al., 2008; Grant et al., 2005). Studies in other Western countries show similar prevalence rates (Iancu et al., 2006). A

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national survey found that 9% of adolescents met criteria for lifetime SAD with a higher prevalence in females (Burstein et al., 2011). Social anxiety disorder often begins in childhood or early adolescence (Chavira & Stein, 2005). It is possible that the increased social demands and capacity for self-awareness that occur during adolescence may result in symptoms of shyness crossing the threshold into SAD during this developmental stage. It also may be the case that age of onset estimates has not been entirely accurate due to the relatively limited research on the expression of social anxiety in young children, which in turn may be due to the paucity of developmentally appropriate assessment measures (see Morris et al., 2004).

Over the lifetime, SAD is frequently comorbid with a range of other psychiatric conditions from mood disorders to substance use disorders. However, SAD is especially comorbid with anxiety-related disorders such as agoraphobia (32.4%), generalized anxiety disorder (32.0%), panic disorder (27.2%), and separation anxiety disorder (27.4%; Burstein et al., 2011). Children and adolescents who experience extreme levels of social anxiety have lower levels of peer group acceptance and fewer close friendships (Greco & Morris, 2005; La Greca & Lopez, 1998; Morris, 2001), which may help set the stage for a downward spiral leading to depression. Adolescents may turn to alcohol and other substances in an attempt to self-medicate and feel less inhibited in social situations—and their subsequently more socially gregarious behavior is reinforced by peers which in turn leads to increased substance use (Blumenthal et al., 2010; Essau et al., 1999). Social anxiety disorder is likely to be a chronic condition in the absence of direct intervention (Yonkers et al., 2001).

Causal Factors

As with most psychiatric disorders, no single causal path has been identified for SAD. Rather, explanatory models for the development of social anxiety include the interaction of multiple factors (Spence & Rapee, 2016; Wong & Rapee, 2016). Primary proposed risk factors include genetic predisposition, physiologic reactivity, parenting style, and peer socialization. Behavioral inhibition (a tendency to approach new situations with restraint, avoidance, and distress) is thought to have an inherited biological component, and higher rates of SAD have been found among children previously classified as behaviorally inhibited (see Hirshfeld-Becker et al., 2008 for review). Experiential avoidance is another mechanism that has been identified as contributing to social anxiety (Epkins, 2016).

A growing literature base has implicated the role of parenting in the development and maintenance of SAD. For example, one study found that unsolicited physical assistance by mothers was associated with greater child social anxiety (Morris & Oosterhoff, 2016). Results from another study suggest that parents' negative beliefs about anxiety are related to increased parental accommodation, which is then related to increased child anxiety severity (Johnco et al., 2021). Children and adults with social anxiety have described their parents as engaging in overcontrolling behavior and restricting social interaction (Anhalt & Morris, 2008; Greco & Morris, 2002). Laboratory investigations have found parents of socially anxious children to demonstrate more controlling and rejecting behavior toward their children during joint interaction tasks than parents of non-anxious children (Greco & Morris, 2002; Hummel & Gross, 2001; Rork & Morris, 2009). Parents of anxious children have been found to model threat interpretations to ambiguous cues and to provide and reinforce avoidant solutions in response to hypothetical social scenarios (Bar-Haim et al., 2007; Brumariu & Kerns, 2008; de Rosnay et al., 2006; Hane et al., 2008; Lewis-Morrarty et al., 2012). Outside the home, the quality of children's peer relationships has been found to be associated with social anxiety, though it is often difficult to ascertain whether lowered peer acceptance is a cause or consequence of anxiety-related behavior (Erath et al.,

2007; Greco & Morris, 2005; La Greca & Lopez, 1998; Morris, 2001; Storch et al., 2005). Some research has suggested that children and adolescents who are socially anxious underestimate their own level of social skill and focus—to their detriment—on perceived errors in social behavior (Higa & Daleiden, 2008; Inderbitzen-Nolan et al., 2007). In addition, the perception of social acceptance may be as or more important than actual social acceptance. One study in a clinic-referred sample of youth found that youth self-perception and mother-perception of social acceptance were independently associated with social anxiety even after controlling for depression (Epkins & Seegan, 2015). Another interesting study found that social support and social self-efficacy are uniquely associated with lower SAD symptoms, and social support even has a statistically significant effect on reducing SAD symptoms after a negative life event (Aune et al., 2021).

Assessment of Social Anxiety in Children and Adolescents

Proper assessment is necessary not only for purposes of diagnostic classification, but in order to generate useful targets of change for inclusion in treatment plans—and to adequately evaluate treatment outcome. When evaluating children and adolescents, it is important to obtain information from multiple sources. Due to the covert nature of many aspects of social anxiety, parents should not be considered the gold standard for information about their children in this matter (De Los Reyes et al., 2010). Since context matters, teachers and peers may be the most appropriate sources of information regarding a child's performance in school and interactions with peers. A multi-contextual assessment strategy will help guide case conceptualization and treatment planning, and the most commonly employed methods for the assessment of social anxiety in children and adolescents are presented briefly below.

Anxiety Disorders Interview Schedule for DSM-IV Child/Parent Version (ADIS-C/P; Silverman & Albano, 1996)

The ADIS-C/P provides thorough coverage of anxiety disorder symptom clusters and also screens for the presence of affective and disruptive behavior disorders. The social phobia section of the ADIS-C/P asks the child (and parents—who are interviewed separately from the child) to provide fear, avoidance, and interference ratings across 13 social and performance situations. Intensity ratings are included to assess the extent to which social fears interfere with daily functioning.

Self-report Measures

Self-report questionnaires are integral to the assessment of children over 8 years of age. The most extensively validated and widely used self-report measures of social anxiety are the Social Anxiety Scale for Children-Revised, the Social Anxiety Scale for Adolescents, and the Social Phobia and Anxiety Inventory for Children.

Social Anxiety Scale for Children-Revised (SASC-R; La Greca & Stone, 1993)

The SASC-R is a 22-item measure comprised of three factors: fear of negative evaluation, social avoidance and distress with new or unfamiliar peers, and more generalized social avoidance and distress.

Social Anxiety Scale for Adolescents (SAS-A; La Greca & Lopez, 1998)

The SAS-A parallels that of the SASC-R. Scores on the SASC-R and SAS-A have been found to correlate with peer sociometric data and measures of self-esteem. Research conducted by Reijntjes et al. (2007) found SASC-R scores were predictive of negative response biases and

lower approach behavior among children playing a videogame task with peer confederates.

Social Phobia and Anxiety Inventory for Children (SPAI-C; Beidel et al., 1995)

The SPAI-C consists of 26 multi-part items assessing overt behavior, thoughts, and physiologic responses across a range of potentially fear-inducing situations. Beidel, Turner, Hamlin, and Morris (2000) have provided data on the external and discriminant validity of the measure. The SPAI-C has been shown to correlate with independent observer ratings of anxiety and effectiveness during behavioral performance tasks, as well as with children's ratings of their own anxiety and distress. Importantly, the measure successfully discriminates between children with SAD, normal controls, and those with other anxiety disorders (Viana et al., 2008). Psychometric properties of the SPAI-C also have been established with cross-cultural samples (Aune et al., 2008; Pina et al., 2014; Scaini et al., 2012), and a validated brief version of the SPAI-C is also available (Bunnell et al., 2015).

Several investigations have examined the association of the SPAI-C and SASC-R and have found that the measures appear to assess overlapping, but not identical constructs (Morris & Masia, 1998; Epkins, 2002). General findings have been that the SPAI-C has greater specificity and selectivity for diagnoses of SAD. However, as the SASC-R typically takes less time to administer than the SPAI-C, the SASC-R may be preferable in large-scale screening investigations.

Behavioral Observation and Performance Tasks

Direct observation of behavior is a critical component of the assessment of social anxiety and associated social skills. Observation of children in the natural setting (e.g., school classroom or on the playground during recess) may be particularly enlightening if one is able to move beyond clinic walls. However, relevant analog or role-play tasks may readily be conducted within office confines especially with the benefit of digital technology (Glenn et al., 2019; Le & Beidel, 2017).

Peer Report

Peer nominations or ratings of social status may be particularly useful in gauging the generalization of treatment effects. Classic sociometric nomination procedures categorize children along two dimensions: social preference (how much a child is liked or disliked by his or her peers) and social impact (the child's visibility within the peer group; Coie et al., 1982). Due to the effort required to obtain peer reports within school settings, such data typically are included only in the context of extended research investigations and seldom systematically collected by clinicians engaged in routine treatment.

Psychological Treatment of Social Anxiety

Theoretical Models Underlying Behavioral and Cognitive-Behavioral Treatment

Current empirically supported treatments for social anxiety have their roots in the historical work on classical conditioning and operant learning conducted by John Watson and B.F. Skinner. Watson's case study of "Little Albert" (Watson & Rayner, 1920) illustrated how fear and anxiety may develop through the pairing of aversive and neutral stimuli, which may then rapidly extend to other associated stimuli. Accordingly, the classical conditioning paradigm has been put forth as one explanation for the acquisition and generalization of the heightened physiological arousal experienced by children with anxiety disorders.

In his work on operant conditioning, Skinner emphasized that behavior is learned as a function of its consequences (Skinner, 1953). Anxiety-related responding (e.g., avoidance) will increase if followed by a pleasurable event (positive reinforcement) *or* the removal of an aversive stimulus (negative reinforcement). All children experience normal, developmentally appropriate fears which

are relatively limited and decrease over time (King, Muris, & Ollendick, 2005). Young children may whine, cry, or engage in oppositional behavior in an attempt to escape or avoid a feared stimulus or situation. By comforting their distressed child, parents may inadvertently reinforce inappropriate fearful or avoidant behavior, which increases the likelihood of the child responding in a fearful and avoidant way in the future. In the case of social anxiety, parents who allow their child to refuse to participate in social activities with same-age peers, or to stay home from school in order to avoid the distress of an oral spelling bee, are strengthening the child's avoidance behavior and reducing the chance of learning that the feared event is not as bad as anticipated.

Clearly, both classical and respondent approaches have a place in furthering our understanding of anxiety. Mowrer (1947, 1960) proposed a two-factor learning theory that serves to integrate the two paradigms. To summarize, upon exposure to an aversive event, the child responds with increased physiological reactivity and subjective distress. This uncomfortable physiological arousal then becomes associated with previously neutral stimuli present at the time (including external environmental stimuli and internal cognitive cues that may serve as reminders of the aversive event). As this state of heightened physiological arousal is aversive for the child, escape from associated stimuli is negatively reinforced through reduction of arousal—increasing the likelihood of subsequent avoidance behavior. In a vicious cycle, extended avoidance further reduces the likelihood that the child will develop the necessary skills to manage arousal and anxiety in the future.

Following the early behavioral work on conditioning and learning, later theorists such as Albert Ellis and Aaron Beck sought to provide more focus on cognitive factors underlying anxiety. The basic premise of most cognitive models is that anxiety stems from a response bias in which an individual overestimates the probability of threat in their environment and underestimates their ability to cope with the situation (Ellis & Harper, 1975; Beck, 1976). Children with social anxiety may engage in self-talk emphasizing negative evaluation and embarrassment (e.g., "What if I mess up and they all laugh at me?").

While at first glance behavioral and cognitive perspectives on the development and maintenance of anxiety disorders may appear in conflict, many contemporary theorists have noted that it is not necessary to treat cognitions as a distinct class in that the same principles of learning apply to cognitions as to physiological and overt behavioral responding. The more relevant question really lies with which approach to treatment will be most effective for which individuals. As such, it is important to consider the specific mechanisms which make SAD treatments effective.

Behavioral and Cognitive-Behavioral Treatment Components

Behavioral and cognitive-behavioral approaches to the treatment of social anxiety in children and adolescents have received strong empirical support (Scaini et al., 2016). As most treatment programs have included one or more of the following components, these frequently implemented techniques will be covered briefly before the research findings from specific treatment packages are reviewed.

Exposure Therapy

Ample empirical evidence suggests that exposure may be the key component in the successful treatment of child anxiety disorders (Ale et al., 2015; Peris et al., 2015; Whiteside et al., 2015). Exposure involves having the child face the feared stimulus or situation for a sufficient period of time for anxious physiological arousal to habituate or diminish. The repeated presentation of feared stimuli (e.g., public speaking) followed by the absence of the feared consequence (e.g., being laughed at) teaches the child to associate the stimuli with a neutral or even positive response (Craske et al., 2014).

Exposure-based techniques include flooding, graduated exposure, and systematic desensitiza-

tion. Flooding involves sustained exposure to highly feared stimuli (in vivo or imaginally), whereas graduated exposure refers to progressive exposure to feared stimuli proceeding from less feared to more feared. While flooding has been used to great success in the treatment of OCD and PTSD, it is less frequently employed in the treatment of social anxiety in children and adolescents—in part due to the generalized complexity of social stimuli central to social anxiety and to the perception that graduated exposure is easier to tolerate, which increases willingness to engage in treatment. Due to its efficacy and relative ease of administration, graduated exposure has become a standard component of many treatment protocols for social anxiety.

In contrast to flooding and graduated exposure techniques, systematic desensitization requires that the child first master relaxation training. Once the child is in a relaxed state, the therapist presents items from the child's fear hierarchy. There is no strong empirical evidence to suggest that the inclusion of relaxation training yields any incremental gain to the success of exposure in the treatment of social anxiety, and some theorists would contend that use of relaxation or distraction strategies may impede the process of extinction. However, some therapists may find that the process of relaxation training helps establish rapport which in turn may foster cooperation among extremely fearful children during subsequent exposure sessions.

Contingency Management

Contingency management entails the provision of specific consequences for the child engaging in specific target behaviors. This typically involves working closely with the child's parents (and possibly teachers) to develop contracts outlining the manner in which rewards and punishment will be delivered for the performance or absence of specific behaviors. For example, a contract targeting social interaction may state:

> If Brennan joins a group activity with his peers during recess on three of five school days, the family will go to a movie of his choice on Saturday afternoon. In addition, if Brennan tries to avoid attending school on any day, he will forfeit his allotted television time for 2 days.

Contingency management contracts can be particularly useful in providing a system of reinforcement for the completion of between-session homework assignments employed in conjunction with graduated exposure treatment plans.

Social Skills Training

Social skills deficits are commonly implicated in the presentation of social anxiety in children and adolescents (Beidel et al., 1999; Halls et al., 2015). Children who manifest extreme shyness and social avoidance from an early age may miss out on opportunities to learn age-appropriate social skills. Real or perceived social skills deficits may then lead to heightened anxiety in social situations. Social skills training (SST) programs generally include coaching, modeling, and social problem-solving components. Common skills covered in such programs include peer group entry and exit strategies, conversational skills, assertiveness, and developing and maintaining friendships. SST may even be more effective than exposure therapy for treating SAD (Beidel et al., 2014). The research suggests that children with SAD behave in less socially acceptable ways than children with generalized anxiety disorder which could explain why cognitive-behavioral treatments alone are not as effective as SST in treating SAD (Scharfstein & Beidel, 2011; Scharfstein & Beidel, 2015). SST components have been included in several of the empirically supported treatments for social anxiety discussed later in this chapter.

Peer Modeling and Peer-Pairing

Peer relationships are central to social and emotional development. Interaction with peers provides a crucial context for the learning of social skills and emotion regulation. Children who are isolated from their peers are at increased risk for chronic social anxiety and other forms of psycho-

pathology. Consequently, the incorporation of peers in the treatment of social anxiety may be very beneficial. Peer-helper interventions involve the selection and training of socially skilled peers who model desired social behavior and administer reinforcement to the target child. In contrast, peer-pairing interventions merely provide strategic opportunities for the target child to engage in joint activities with a more socially skilled peer (with no formal training required of the peer). One advantage of peer-pairing is that it is relatively easy to implement within activities occurring in the child's natural environment, thus allowing for enhanced generalization. Notably, simple peer-pairing interventions have been shown to increase positive social interaction and sociometric status among peers (Morris et al., 1995).

Cognitive Restructuring

The term cognitive restructuring encompasses a variety of techniques intended to alter maladaptive thinking patterns, increase the frequency of positive self-talk, and enhance self-concept. Cognitive restructuring techniques require that the client have sufficient metacognitive and logical reasoning skills to engage in formal problem-solving. As such, cognitive restructuring techniques are not likely to be effective with very young children. In the treatment of adolescents with social anxiety, cognitive restructuring is often employed to target irrational self-statements tied to fear of negative evaluation ("I'm nobody. I want to ask Dylan to the prom but I know she will say no…then everyone will make fun of me... and no one will ever go out with me").

Cognitive restructuring is typically combined with modeling and reinforced practice, and as such is rarely implemented as a purely cognitive procedure. Empirical findings have been mixed regarding the incremental utility of using exposure and cognitive restructuring in combination. With respect to treatment outcome, the benefits of cognitive restructuring tend to be more pronounced for self-report data than for direct measures of behavioral change (e.g., observation and behavioral performance tasks) perhaps because socially anxious children believe their social skills are worse than they are (Cartwright-Hatton et al., 2005; Parr & Cartwright-Hatton, 2009).

Multi-component Programs for the Treatment of Social Anxiety

While there is a strong literature supporting behavioral therapy and cognitive- behavioral therapy for treating SAD in children, the limitations of such therapies have led to utilization of adapted treatments such as group therapy, social skills training, school-based approaches, and parent-based approaches (Scharfstein & Beidel, 2011). These adaptations are receiving increased research support as it becomes clearer that the treatment for SAD may differ in unique ways from the treatment for other childhood anxiety disorders (Scharfstein & Beidel, 2011).

Cognitive-Behavioral Group Treatment for Adolescents (CBGT-A)

CBGT-A initially was designed as a 16-week treatment program consisting of psychoeducation, skill building, cognitive restructuring, and exposure to socially distressing or fearful situations (Albano et al., 1995). Hayward et al. (2000) conducted a study in which 35 adolescent girls were assigned to CBGT-A or waitlist control conditions. Significantly fewer adolescents in the treatment condition met diagnostic criteria for social phobia following intervention. However, no differences between groups were found at one-year follow-up.

Herbert and colleagues (Herbert et al., 2009) have reported results from a randomized controlled trial comparing three forms of treatment: (a) a 12-week group treatment program (G-CBT) reported as similar to that of CBGT-A, (b) individual CBT, and (c) group psychoeducational supportive therapy. Large effect sizes were yielded for all three treatments. Treatment condition was not related to symptom reduction as measured by self-reports (SPAI-C, SAS-C) or

clinician severity ratings (CGI-S). At treatment completion, there were no significant group differences on treatment responder criteria (with recovery rates of 16–29%). However, at the three-month follow-up assessment, greater treatment response (54%) was observed for adolescents who completed the course of G-CBT. Significant limitations of the study include the relatively small initial sample size (23–26 per group), a 29% treatment drop-out rate, and further attrition of 27% for the final assessment (follow-up data were obtained for only 13 adolescents in the G-CBT group).

Social Effectiveness Therapy for Children (SET-C)

Beidel, Turner, and Morris (2000) published the first randomized controlled trial of behavioral treatment for social phobia in pre-adolescent children. In contrast to "cognitive-behavioral" treatment programs such as CBGT-A, SET-C does not include a cognitive restructuring component. SET-C is a 12-week behavioral intervention that incorporates parent education, group social skills training, peer generalization, and individual graduated in vivo exposure components. Instruction, modeling, behavior rehearsal, feedback, and social reinforcement are used to teach and reinforce appropriate social behavior. A unique and essential component of SET-C is the use of peer interaction experiences (age-appropriate group recreational activities with peer facilitators) to assist in the generalization of social skills to situations outside the clinic. Fifty children (aged 8–12) were randomized to SET-C or an active treatment for improving test taking and study skills. Children in the SET-C group demonstrated statistically and clinically significant improvements across multiple domains (including self-reported anxiety, independently observed social skills, and adaptive functioning in daily situations), and gains were maintained 6 months post-treatment. Notably, 67% of children who participated in the SET-C program no longer met diagnostic criteria for social phobia following treatment compared to only 5% of those receiving the active control treatment.

Extensive follow-up data have been reported for SET-C. Beidel et al. (2005) provided results of a three-year follow-up assessment that included 90% of children who completed the original controlled trial of SET-C. Seventy-two percent of these children (now aged 11–18) no longer met criteria for SAD, a significant increase from the 62% who were diagnosis-free at the end of treatment. No participants had sought additional intervention following the completion of SET-C, thereby supporting the durability of treatment gains. At five-year follow-up, 25 SET-C completers (now aged 13–20) were reassessed and compared to a matched non-clinical sample to determine long-term treatment effects (Beidel et al., 2006). None of the individuals had sought pharmacological or psychological treatment after completing SET-C, yet 80% no longer met criteria for SAD (a recovery rate that continued to climb from post-treatment through extended follow-up). Comparing treatment responders to the matched non-clinical controls, there were no differences in self-report, parent report, or observation of social skill—thus demonstrating meaningful and lasting change for these formerly socially anxious children. Another follow-up study found that child-reported loneliness mediated the improvement in social anxiety symptoms (Alfano et al., 2009).

Baer and Garland (2005) conducted a pilot investigation in which they substantially modified the SET-C protocol to create a simplified treatment for use in community psychiatric clinics by encouraging participants to find peer or family "coaches" who could help with exposure practice in the natural environment. Following intervention, 36% of adolescents in the treatment group no longer qualified for a diagnosis of social phobia, while no members of the waitlist group demonstrated such improvement. Although reported effect sizes were smaller than those obtained with the SET-C, the authors note that this modified treatment may be more easily transported to community settings. Another pilot study reported the feasibility of an adaption of the SET-C using virtual environment technology

in order to increase practice opportunities and generalizability of the context and found that (Wong Sarver et al., 2014).

School-Based Intervention

Programs that take place at school allow better access to evidence-based care as well as opportunities to practice in an ecologically valid context (Masia-Warner et al., 2015). Masia-Warner and colleagues reported results for 42 adolescents with SAD who were randomized within their schools to Skills for Academic and Social Success (SASS) or a waitlist control condition (Masia-Warner et al., 2005). SASS, based in part on the SET-C and CBGT-A programs, consisted of 12 in-school sessions including psychoeducation, cognitive restructuring, social skills training, exposure, and relapse prevention; two individual problem-solving meetings; four unstructured social events; two psychoeducational parent meetings; and two brief psychoeducational teacher meetings. At treatment completion, 67% of adolescents completing SASS no longer met the criteria for SAD, compared with only 6% in the waitlist control condition.

In further work with the SASS (Masia-Warner et al., 2007), 36 adolescents diagnosed with SAD were randomized to 12 weeks of SASS or an attention-control condition termed Educational-Supportive Group Function (ESGF). ESGF included psychoeducation and general relaxation skills but did not include social skills training, cognitive restructuring, exposure, or peer generalization components. SASS proved superior to ESGF (59% versus 0% diagnosis-free) with symptom improvement maintained at a six-month follow-up.

Cognitive-Behavioral Treatment Plus Parental Involvement

Given the mounting evidence that parents may play a role in the development and maintenance of anxious behavior, including parents in the treatment process may be prudent. Spence et al. (2000) investigated the effectiveness of a cognitive-behavioral treatment (CBT) program with or without parental involvement. Fifty children diagnosed with social phobia (aged 7–14) were randomly assigned to CBT, CBT plus parental involvement (CBT-PI), or a waitlist control condition. CBT components included social skills training, relaxation, cognitive restructuring, and graduated exposure. The parent involvement component was designed to help parents model and reinforce the social skills taught in CBT, ignore anxious and avoidant behavior, encourage their child's participation in social activities, and provide contingencies for homework completion. Parents participated in a 30-minute weekly training session and also observed the children's group sessions behind a one-way mirror. The CBT and CBT-PI interventions both included 12 weekly group sessions and 2 booster sessions (at 3 months and 6 months post-treatment). Based on parent report, children in both active treatment groups demonstrated improvement in social skills. However, statistically significant differences were not found for either treatment with respect to children's total number of peer interactions or independent observer ratings of assertiveness. While CBT and CBT-PI both resulted in a decrease in social anxiety symptoms, neither yielded statistically significant change in social behavior, thus perhaps providing support for the inclusion of peers in an effort to enhance generalization to the child's natural social environment. There also is evidence to support the utility of stand-alone, parent-based treatment for childhood anxiety disorders (Lebowitz et al., 2020). Supporting Parenting for Anxious Childhood Emotions (SPACE) involves working with parents to reduce parental accommodation and validate their child's anxious feelings while expressing their confidence in their child's ability to tolerate distressing situations. SPACE was shown to be non-inferior to child-only CBT (versus family-based) for anxiety outcomes (including social anxiety) in children.

Pharmacological Treatment of Social Anxiety

At present, the most widely prescribed pharmacologic agents for the treatment of social anxiety in children and adolescents are the class of drugs known as selective serotonin reuptake inhibitors (SSRIs). Serotonin-norepinephrine reuptake inhibitors (SNRIs) such as venlafaxine and duloxetine have some support in treating children with SAD (March et al., 2007). On the other hand, no randomized control trial to date has found tricyclic antidepressants, buspirone, or benzodiazepines clearly effective for treating SAD in children (Snir et al., 2021). We report below studies that focused only on youth with social anxiety (versus studies who sampled youth with a variety of anxiety presentations).

The SSRI paroxetine (Paxil) was tested in a large multicenter randomized placebo-controlled trial of 322 children and adolescents with SAD (aged 8–17; Wagner et al., 2004). Following 16 weeks of treatment, clinician-rated improvement was significantly greater for paroxetine (48%) than placebo (15%). Adverse side effects were relatively infrequent and included insomnia (14.1% vs. 5.8%), decreased appetite (8.0% vs. 3.2%), and vomiting (6.7% vs. 1.9%). The SNRI venlafaxine (Effexor) was tested against placebo in a randomized controlled trial of 293 children and adolescents with SAD (aged 8–17) who were treated across 48 academic and community clinics (March et al., 2007). Drop-out rate was 35% for venlafaxine versus 27% for placebo control. After 16 weeks, treatment response to venlafaxine was significantly larger than placebo as determined by self-report (SAS-C/A) and clinician ratings (CGI-Improvement). Notably, there were three reported cases of treatment-emergent suicidal ideation in the venlafaxine condition, with none occurring in the placebo condition.

In addition, several open-label studies have been conducted for children with SAD. The SSRI escitalopram (Lexapro) was used to treat 20 children and adolescents with social anxiety disorder (Isolan et al., 2007). After 12 weeks of treatment, 65% of the intent-to-treat sample met treatment response criteria and showed significant improvement on self-report and parent-report measures. Another open-label pilot trial used the antidepressant mirtazapine (Remeron) with 18 children and adolescents diagnosed with SAD (Mrakotsky et al., 2008). A significant decrease in social anxiety symptom severity and impairment was observed after 8 weeks of treatment. However, notable weight gain was observed (M = 3.27 kg) and four participants experienced additional side effects (e.g., moderate sleepiness, moderate headaches, and increased depressive symptoms). The antidepressant tandospirone was tested in an open-label controlled trial in children with social anxiety disorder (Huang et al., 2013). The study found that 48.6% of children taking tandospirone showed clinical global improvement as compared to 55.6% of children taking sertraline.

Comparison of CBT and Pharmacologic Treatments

Segool and Carlson (2008) present the results of a meta-analysis in which they reviewed seven CBT trials and seven SSRI trials conducted between 1994 and 2004 for children and adolescents (aged 6–19) with SAD. All evaluated CBT studies included cognitive restructuring and exposure, and the majority included psychoeducation and social skill training components. It should be noted that the authors excluded results from SET-C trials on the basis that SET-C is a behavioral intervention that does not include cognitive restructuring. Studies ranged in duration from 3 weeks to 16 weeks. All CBT and SSRI treatments yielded moderate to large effect sizes (0.59–2.92) for reduction of social anxiety symptoms and overall impairment, with slightly larger effects for SSRIs. Gains in social competence were somewhat (but not significantly) higher for CBT than SSRI. The authors noted major limitations in drawing conclusions across studies, in part due to the lack of universally applied assessment measures.

As the Segool and Carlson meta-analysis excluded SET-C, it is important to note the findings of research directly comparing SET-C with SSRI treatment. Children and adolescents with

SAD (aged 7–17) were randomized to 12 weeks of pill placebo, fluoxetine (Prozac), or SET-C (Beidel et al., 2007). Participants in the placebo and fluoxetine conditions attended a 60-minute weekly medication management and supportive counseling session by a psychiatrist. Following treatment, significantly more participants in the SET-C condition met treatment responder criteria and no longer carried a diagnosis of SAD than those in the fluoxetine or placebo conditions. Treatment gains were maintained at one-year follow-up. In addition, while both SET-C and fluoxetine were more effective than placebo at reducing social distress and behavioral avoidance, only SET-C led to significant improvements in social skill and social competence. This finding reinforces the idea that social skills are as or more important than anxiety reduction in treating SAD (Scharfstein et al., 2011).

Although the empirical research base primarily has investigated the use of psychological or pharmacologic treatments in isolation from one another, clinicians and healthcare providers have long stressed the notion that pharmacologic treatments will be enhanced if behavioral or cognitive-behavioral treatments are implemented in conjunction (Chavira & Stein, 2002). Medication may reduce the physiological arousal that accompanies anxiety in relatively short order, but behavioral and cognitive-behavioral interventions are more likely to result in acquisition of skills (e.g., social competence) that will generalize across settings, leading to greater maintenance and enhancement of treatment gains over the long term, with fewer side effects and greater cost-effectiveness (Snir et al., 2021).

Summary

Social anxiety disorder is a common anxiety disorder among children and adolescents. Fortunately, strong empirical support is available for several multicomponent programs for the treatment of SAD in children and adolescents. Several SSRIs have also proven useful in ameliorating the condition, although the one study that directly compared an SSRI (fluoxetine) with behavioral treatment (SET-C) demonstrated differential superiority for the behavioral intervention. More research is needed on the use of combined behavioral and pharmacologic treatment. The literature is rapidly expanding with respect to our knowledge of potential risk factors in the development of anxiety (particularly in terms of parenting), and this information is furthering the development of treatment targets and applications. The inclusion of parents and peers in the provision of treatment is an especially exciting trend as it reflects increasing developmental sensitivity to the social world of children and adolescents. As social anxiety is a relatively early onset and chronic condition, future efforts should be directed toward early intervention studies and dissemination of treatments beyond specialized academic centers. No doubt, frontline clinicians will have much to offer as we work toward cost-effective treatments that may be delivered through school, home, and clinic settings to the large numbers of children and adolescents who are currently underserved.

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Treatment of Pediatric Post-traumatic Stress Disorder

21

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Trauma is defined as exposure to threatened or actual death, serious injury, or sexual violence (American Psychiatric Association, 2013). Based on national surveys of adolescents, more than 60% of children in the United States are exposed to trauma prior to age 18 (e.g., Finkelhor et al., 2015). Post-traumatic stress disorder (PTSD) is the most common sequelae to trauma. In the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (2013), the APA characterizes PTSD by symptoms of intrusion (e.g., nightmares, flashbacks), avoidance (e.g., of thoughts, feelings, places, or people that are reminders), negative changes in cognition and mood (e.g., self-blame, anhedonia), and hyperarousal (e.g., exaggerated startle response, hypervigilance). Symptoms must last for at least 1 month and be associated with functional impairment. Complex PTSD is now included in the 11th revision of the International Classification of Diseases (ICD-11; World Health Organization, 2019), defined as including the criteria for PTSD plus difficulties with affect regulation, self-concept, and relationships with others. For children exposed to trauma, approximately 50% have at least one symptom of PTSD and 20% meet full criteria for the disorder (e.g., Alisic et al., 2014).

These findings underscore the need for intervention for preschoolers, children, and adolescents who have been exposed to trauma. This chapter examines treatment outcome studies of psychosocial treatments for PTSD in youth. The following sections include theoretical and practical arguments for cognitive-behavioral therapy (CBT), the psychosocial intervention with the most scientific support. Specific treatment considerations, including developmental and cultural factors, are discussed. Lastly, factors related to treatment outcome also are highlighted. In sum, trauma-specific CBT is well established for pediatric PTSD, and the next step in the field is adequate dissemination and implementation of best practices.

Child and Adolescent Models of PTSD Development

Early theoretical explanations of PTSD relied upon classical and operant conditioning learning paradigms. In brief, traumatic events were conceptualized as unconditioned stimuli evoking unconditioned responses (e.g., fear), resulting in

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conditioned pairing between trauma cues (e.g., memories, triggers/cues) and re-experiencing symptoms (e.g., nightmares, flashbacks). Subsequent models of PTSD have integrated these conditioning paradigms with research on emotion, memory, social-cognition, and neurobiology to better explain the structure and persistence of PTSD symptoms among adults and children.

Emotional processing theory (Foa & Kozak, 1986, Foa et al., 1989) primarily focuses on the development of maladaptive emotional (i.e., excessive fear response to triggers) responses that underlie anxiety disorders. Briefly, Foa and Kozak (1986) argue that traumatized individuals have pathological fear structures (i.e., fragmented memories) that encompass event-related unthreatening stimuli (e.g., environmental triggers), responses (re-experiencing symptoms, exaggerated startle response, and hypervigilance), and cognitions related to perceived danger that serve to maintain avoidance behaviors, and thereby, contribute to the development of PTSD symptoms. For example, a teen who was sexually abused by her stepfather, an exterminator who used a lot of cologne, experienced flashbacks and physiological symptoms when she smelled over-the-counter pest sprays and men's cologne, and therefore avoided trauma reminders (e.g., men wearing cologne, drug store aisles).

A related phenomenology of PTSD focuses on cognitive processing (e.g., self-blame). According to cognitive theories of adverse events, PTSD symptoms develop and persist from an incongruity between preexisting beliefs (e.g., "There is a just world") versus attributions about the traumatic experiences (e.g., Ehlers & Clark, 2000). Trauma survivors with PTSD engage in assimilation (making the trauma fit into the preexisting belief, which can result in self-blame) or over-accommodation (changing the preexisting belief in an extreme way; e.g., "Men can't be trusted"). Michael et al. (2007) argue that PTSD is a result of cognitions of perceived threat and lack of control, maladaptive coping strategies (rumination, avoidance) and global "trauma-sensitive" beliefs about the self ("There is something wrong with me"), others ("I cannot trust people"), and the world ("The world is dangerous"). Mitchell et al. (2017) found support for this model in children. In addition, amelioration of trauma-specific beliefs in psychosocial treatment is predictive of improvements of PTSD (Pfeiffer et al., 2017; Sharma-Patel & Brown, 2016).

Using Trauma-Specific Cognitive-Behavioral Therapy to Treat PTSD in Youth

Description of Trauma-Specific Cognitive-Behavioral Therapy

Trauma-specific CBTs are designed to ameliorate PTSD symptoms in youth in a developmental and cultural framework. Trauma-specific CBTs include components that address trauma reminders (i.e., re-experiencing symptoms), avoidance, trauma-specific cognitions, physiological dysregulation, and caregiver factors. Treatment typically begins with psychoeducation of the child and caregiver about the trauma(s) experienced (e.g., legal terms, prevalence), biopsychosocial impact of trauma (focusing on the child's specific trauma responses), connections between the child's trauma and responses, and explanation of how treatment will address these responses to instill hope for recovery.

Affect identification and modulation are used to teach children and caregivers how to identify and cope with trauma-related emotions of anxiety, anger, sadness, guilt, shame, etc. Children and caregivers learn to recognize and monitor their emotions. Relaxation strategies (e.g., diaphragmatic breathing, progressive muscle relaxation, journaling, mindfulness) are used to decrease hyperarousal. Skills are presented with psychoeducation on the rationale and steps, then practiced in session and at home.

Exposure therapy (conducted gradually or via flooding) and cognitive restructuring are the core elements of trauma-specific CBT. Cognitive coping is used to address negative thoughts related to daily life stressors and to challenge the maladaptive trauma-specific automatic thoughts that emerge during exposure. Skills include cognitive

restructuring, guided visualization, and positive self-talk. Exposure to the traumatic memory and associated fear network alters the memory such that threat cues are re-evaluated in the absence of aversive consequences (Foa et al., 1989). This is conducted through imaginal exposure (also called trauma narration) in which details of the trauma, and associated feelings and thoughts, are processed in session. Additional emotions (e.g., shame, guilt) are addressed through direct confrontation of inaccurate thoughts (i.e., cognitive restructuring; Resick & Schnicke, 1992). This discussion of the trauma also allows for elaboration and integration of a clearer memory into the child's existing memory system (Ehlers & Clark, 2000). For children who are avoiding innocuous cues, therapists implement in vivo exposure using a hierarchy of feared situations. Parent involvement is used to support participation in and responses to exposure and cognitive restructuring, as well as manage trauma-related behavior problems (Cohen et al., 2000). Peterman et al. (2015) outline fundamental principles to guide the use of exposure in children.

In trauma-specific CBT, caregivers participate for two reasons: (1) to learn to manage their own affect and (2) to coach and support their children. Parent training is incorporated in trauma-specific CBT to address the externalizing behavior problems commonly seen in child trauma survivors. Throughout coping and exposure phases of trauma-specific CBT, therapists meet with children and caregivers together to practice coping skills and parenting techniques and plan for home practice. After completing the trauma narration, conjoint child-caregiver sessions are used to allow the child to share the narrative with the caregiver, enhance communication between the child and caregiver, and guide the child and caregiver in family safety planning and problem-solving prior to termination.

Efficacy of Trauma-Specific Cognitive-Behavioral Therapy

In a recent systematic review and meta-analysis, Mavranezouli et al. (2020) evaluated psychosocial treatments for pediatric PTSD. They included 32 studies with 2260 participants. Results suggested a large positive effect for trauma-specific CBTs delivered individually with conjoint parent training. Treatment components found to be efficacious include: cognitive therapy, somatic interventions (e.g., relaxation), meditation, imaginal and in vivo exposure, and family therapy. Treatment packages with the strongest evidence were Trauma-Focused Cognitive Behavioral Treatment (TF-CBT; Cohen & Mannarino, 1996), Cognitive Behavioral Intervention for Trauma in Schools (Jaycox et al., 2012), and Child-Parent Psychotherapy (Lieberman et al., 2005). The authors concluded that TF-CBT, particularly when implemented as individual therapy with conjoint parent training, appears to be most effective in the management of PTSD in youth.

Gutermann et al. (2017) conducted a meta-analysis of the long-term treatment effects of psychosocial interventions for pediatric PTSD. They found that the mean follow-up effect sizes ranged from medium (for controlled studies) to large (for uncontrolled studies and pooled analysis including all studies). These effect sizes were equivalent to those at post-treatment, suggesting that treatment effects remain stable at follow-up.

Using Other Short-Term Interventions to Treat PTSD in Youth

Eye Movement Desensitization and Reprocessing

Eye Movement Desensitization and Reprocessing (EMDR) is described by the developers as a structured "comprehensive, integrative" therapy that includes elements from "psychodynamic, cognitive behavioral, interpersonal, experiential and body-centered therapies" (EMDR Institute, Inc., 2004). EMDR consists of graduated imaginal exposure sessions with simultaneous visual tracking of therapist hand movements; however, there is considerable debate on the mechanisms underlying the effectiveness of EMDR (e.g., Lee et al., 2006).

Recent studies have compared EMDR with trauma-specific CBT. In a meta-analysis of EMDR versus CBT for children with PTSD (Moreno-Alcázar et al., 2017), the researchers found that EMDR was more efficacious than waitlist and placebo conditions and similar in efficacy to CBT. Similarly, a recent study (Jaberghaderi et al., 2019) compared TF-CBT, EMDR, and a control condition with children exposed to domestic violence. They found that the TF-CBT and EMDR had greater reductions in PTSD than the control condition, but there were no differences between the active treatments. According to the meta-analysis conducted by Mavranezouli et al. (2020), EMDR is an effective treatment but to a lesser extent than trauma-specific CBT.

Psychodynamic Psychotherapy

There is limited research suggesting the efficacy of psychodynamic psychotherapy for pediatric PTSD. Parker and Turner (2014) conducted a systematic review of psychodynamic psychotherapy for sexually abused children. They conducted a thorough search for randomized and quasi-experimental designs comparing psychodynamic psychotherapy to treatment-as-usual or waitlist conditions. They found no studies that met their inclusion criteria.

Summary of Psychosocial Treatments for PTSD

In sum, trauma-specific CBT and EMDR are efficacious for pediatric PTSD. TF-CBT has the strongest empirical support, with more than 20 randomized controlled trials supporting its efficacy. Access to TF-CBT has been made easier by the web training (https://tfcbt2.musc.edu), Train-the-Trainer program, and evidence of its efficacy via telehealth (Stewart, Orengo-Aguayo, Young, et al., 2020). More research is needed to better assess and treat developmentally specific trauma sequelae, determine long-term effects of treatment, and show effectiveness of these treatments among diverse groups and settings. The literature is reviewed below in the context of these issues.

Critical Issues in Treating PTSD in Youth

Developmental Considerations

Most studies of treatment for PTSD in children focus on elementary-school-age and preadolescent youth. There are important differences in clinical presentation of PTSD at different developmental levels that should inform treatment (Danielson et al., 2010; Scheeringa et al., 2011). For example, young children may present with nightmares that are neither necessarily distressing nor associated with trauma, repetitive play, and behavior problems. Avoidance symptoms might manifest as age-specific fears (e.g., dark, monsters, closets). In contrast, adolescents present with risky behaviors (e.g., substance abuse) and are more likely to report numbing. Below is a summary of treatment studies conducted with preschoolers and adolescents, with associated clinical recommendations.

Treatment of preschoolers Two early trials of TF-CBT with preschoolers with PTSD secondary to sexual abuse showed promising outcomes (Cohen & Mannarino, 1996; Deblinger et al., 2001). More recently, Hébert and Daignault (2015) conducted a pilot study of TF-CBT with sexually abused preschoolers and found reductions in PTSD, with gains maintained at 1-year follow-up. In a study of preschoolers with varying trauma histories, Scheeringa et al. (2011) found that not only did TF-CBT participants evidence significantly greater reductions in PTSD symptoms compared to the waitlist condition, preschoolers in TF-CBT were able to comprehend and complete over 80% of the treatment content. Similarly, Salloum et al. (2014) found support for the use of TF-CBT provided in a stepped care model with preschoolers. The participants showed reductions in PTSD and maintained gains at a 3-month follow-up. In a pilot RCT by Salloum et al. (2017), a stepped-care

approach to delivery of TF-CBT (in which caregivers were trained to deliver treatment components) was compared to standard TF-CBT (delivered by clinicians) for preschoolers. There were no differences in outcomes, but the cost of stepped care was significantly less than standard TF-CBT.

Pollio and Deblinger (2017) reviewed some of the modifications that have been made to TF-CBT for preschoolers including shortened sessions, focused time on skill building or narration followed by planned positive activities or breaks, and repetition of skills for acquisition. There also is a stronger emphasis on caregiver involvement. For instance, caregivers are provided psychoeducation on normative transient fears and normative noncompliance, with the goal of differentiating from trauma-related problematic behaviors. Relaxation skills are simplified with metaphors (e.g., cooked/uncooked spaghetti), visualizing, and drawing images of calming scenes or situations (e.g., beach, waterfalls). Affect expression is taught using concrete and play-based activities (e.g., feeling charades). For cognitive skills, simpler prompts (e.g., what is your brain saying?) and identifying "unhelpful and helpful" thoughts to generate better coping statements are some of the recommended strategies. Finally, for trauma processing, young children may benefit from more structure, prompting, and use of creative arts to facilitate the narration.

An evidence-based trauma treatment that was developed specifically for young children (ages birth-5) is Child-Parent Psychotherapy (CPP; Lieberman et al., 2015). CPP focuses on the attachment relationship and, thus, is implemented in a dyadic format with primary caregivers. There are five randomized controlled trials demonstrating its efficacy to improve caregiver functioning, parent-child relationship, and child trauma symptoms (Hagan et al., 2017).

Treatment of adolescents In the last decade, there has been an increase in recognition that trauma treatment for adolescents warrants particular attention. TF-CBT is considered the gold standard for adolescents (Black et al., 2012) mainly because most samples in the studies of TF-CBT have included both children and adolescents. Supplementing these investigations, effectiveness trials solely with adolescents also have demonstrated comparable findings (Cisler et al., 2015; Weiner et al., 2009).

In addition, there is an emergence of studies on the treatment of adolescent PTSD and integrative interventions to treat PTSD and co-occurring problems. To date, there has been one randomized trial of adolescents receiving prolonged exposure (PE; Foa et al., 2013). They found that sexually abused girls who received PE (versus supportive counseling) had greater reductions in PTSD and depressive symptoms, with gains maintained at 12-month follow-up.

The integrative treatments incorporate multiple evidence-based approaches in one package, often used modularly, to address co-occurring problems (e.g., PTSD and substance use/risky sexual behavior). For example, Risk Reduction through Family Therapy (RRFT; Danielson et al., 2012) integrates TF-CBT into its model along with family and community-level interventions. Danielson et al. (2012) reported greater improvements in PTSD symptoms, depression, and substance use risk for teens receiving RRFT (versus treatment as usual) in their randomized control trial. Seeking Safety (Najavits et al., 2006), another integrative treatment with coping skills and modified trauma narration developed for teens with substance abuse and PTSD, has been investigated in a small randomized controlled trial with results supporting its utility.

Two integrated interventions without caregiver involvement have less successful results. Trauma Affect Regulation: A Guide for Education and Therapy (TARGET; Ford et al., 2012) is a skill-based treatment without caregiver involvement and exposure that has been tested with traumatized youth in juvenile justice systems, with mixed findings when compared to other treatments (see Black et al., 2012 for review). Skills Training in Affect Regulation (STAIR; Cloitre et al., 2001), an intervention with coping skills (psychoeducation, behavioral, and cognitive coping skills to address affect and interpersonal

dysregulation) and exposure, originally developed and found efficacious for adult women with sexual abuse histories, has been modified and studied in two open trials, applied in a group format in schools (Gudiño et al., 2016) and inpatient for adolescents (Gudiño et al., 2014) with mixed results for PTSD.

Analogous to developmental modifications for preschoolers, these treatment approaches include prescriptions for adolescents (e.g., Black et al., 2012). Psychoeducation may include information about the effects of trauma on specific areas of the brain that can maintain PTSD symptomatology or influence risky behavior. Coping skills are often expanded to incorporate mindfulness and meditative strategies, and journaling. Given that adolescents often experience chronic trauma, narration may include a life timeline and discussion of themes (e.g., dangerous world) instead of processing every incident of trauma. Finally, safety planning often occurs from the onset of treatment to address risky behavior (e.g., self-injury, substance use).

Trauma Type

Trauma type has been shown to be an important predictor of PTSD with prevalence rates varying from 13% following natural disaster to 35% following sexual abuse (Alisic et al., 2014). In turn, treatment of PTSD may vary based on trauma type. Although exploration of all trauma types is beyond the scope of this chapter, below is a summary of research on treatment of PTSD following common trauma types most often studied in the literature.

Sexual abuse/assault Research has demonstrated that CBT, specifically TF-CBT, is effective for reducing symptoms of PTSD in victims of child sexual abuse. Deblinger et al. (1996) evaluated the efficacy of TF-CBT in treating PTSD in a sample of 90 children (7–13 years old) and their caregivers, with greater reductions in PTSD symptoms compared to control, maintained 2 years post-treatment (Deblinger et al., 1999). Since this study, TF-CBT has been found superior in reducing PTSD symptoms compared to waitlist control, supportive psychotherapy, and routine community care (Cohen et al., 2018). Deblinger et al. (2011) demonstrated significant improvements in PTSD symptoms regardless of treatment length (8 versus 16 sessions) with gains maintained at a 12-month follow-up (Mannarino et al., 2012).

Child Physical Abuse

Decades of evidence demonstrate CBT as an effective intervention for child physical abuse, particularly when parents are included in treatment. Alternatives for Families: a CBT (AF-CBT; Kolko, 1996a; Kolko et al., 2011) includes offending caregivers in treatment to improve parenting skills, safety, and family outcomes, in addition to child symptomatology. An early RCT (Kolko, 1996b) comparing parent and child CBT and AF-CBT to TAU found that both active treatments led to improvements in children's internalizing and externalizing symptoms and parenting-related variables. In a nonrandomized sample of 195 children (ages 5–15 years old), AF-CBT led to significant reductions in PTSD symptoms and improvements in family dysfunction compared to TAU (Kolko et al., 2018). A similar parent-child CBT intervention (Runyon et al., 2010) has been found to be efficacious in decreasing PTSD symptoms (Thulin et al., 2020). Multisystemic Therapy for Child Abuse and Neglect (MST-CAN; Swenson et al., 2010), an intensive, in-home program that treats youth and caregivers, also showed significant decreases in PTSD symptoms compared to standard care in a sample of 86 physically abused youth (10–17 years old) and families.

Witnessing domestic violence In a review of treatments for children who witnessed interpersonal violence, Anderson and Van Ee (2018) found that programs with parents and children working individually and jointly were most successful in addressing pediatric PTSD. An RCT examining TF-CBT among 124 youth (7–14 years old) with histories of witnessing domestic violence demonstrated a significant decrease in

PTSD symptoms compared to usual care (Cohen et al., 2011). Jaberghaderi et al. (2019) compared a CBT (based on AF-CBT), EMDR, and a control condition in 139 Iranian youth (8–12 years old) exposed to domestic violence; they found significant decreases in PTSD in both treatments compared to control.

School-based treatments also have been successful in treating youth exposed to interpersonal violence. Cue-centered treatment is a school-based manualized treatment to help youth identify how trauma impacts current behaviors and emotions, and to use insight-oriented strategies to respond adaptively to trauma cues. Cue-centered treatment resulted in a greater decrease in PTSD compared to waitlist control in an RCT of 65 youth (8–17 years old) exposed to domestic violence (Carrion et al., 2013). The Kids' Club (Graham-Bermann, 1992), a group focusing on emotion identification, coping skills, cognitive restructuring, and safety planning, was effective in reducing PTSD symptoms in school-aged children (Vickerman & Margolin, 2007) and decreasing internalizing symptoms in preschool-aged children (Graham-Bermann et al., 2015).

Community Violence

A systematic review of programs for youth exposed to community violence (Ali-Saleh Darawshy et al., 2020) reported an overall dearth of well-designed studies in extant literature, with CBT approaches demonstrating the best evidence. Cognitive-Behavioral Intervention for Trauma in Schools (CBITS; Jaycox et al., 2012) is a school-based intervention using CBT strategies in weekly group sessions, with additional individual and educational sessions, to address PTSD, anxiety, and depression in traumatized youth. Use of CBITS in an RCT of 126 middle-school youth resulted in improvements in PTSD symptoms, depression, psychosocial dysfunction, and academic performance (Kataoka et al., 2011; Stein et al., 2002). Santiago et al. (2015) found a significant decrease in PTSD and depressive symptoms in 40 parent-child dyads treated with CBITS and CBITS-plus-family, with additional improvements in school involvement and attitude toward mental health in the family group.

War

Meta-analyses of war and terrorism exposure interventions suggest that CBT-based interventions are most effective in alleviating PTSD (Nocon et al., 2017), particularly with cultural adaptations (e.g., translation of materials; Jordans et al., 2016). Culturally modified TF-CBT has been shown robust outcomes in Zambia (Murray et al., 2013), Kenya (Dorsey et al., 2020), and the Republic of Congo (McMullen et al., 2013; O'Callaghan et al., 2013). School-based CBT also has been found to be efficacious with war-exposed children in Indonesia (Tol et al., 2008), Syria (Gormez et al., 2017), and with Palestinian youth (Qouta et al., 2012).

Disasters A meta-analysis of interventions for youth victims of disasters identified CBT, EMDR, and narrative exposure therapy as having the best outcomes (Brown et al., 2017). CBT also has been found to be efficacious for PTSD related to traumatic bereavement following disaster. Brown, Goodman, et al. (2020) conducted an RCT comparing TF-CBT with Client-Centered Therapy for 40 children-mother dyads who experienced the death of the father during 9/11. They found that both treatments led to significant improvements in children's PTSD, depression, and grief symptoms, whereas caregivers receiving TF-CBT had greater symptom reduction than those receiving Client-Centered Therapy.

Accessibility and delivery of treatment is an important consideration following large-scale disasters. In a field trial, Jaycox et al. (2010) compared youth with PTSD randomized to CBITS versus TF-CBT following Hurricane Katrina. They found decreases in PTSD in both conditions. There was a slightly larger decrease for children in TF-CBT, but CBITS was perceived as more accessible. In a pilot study of an adaptation of CBITS that excludes exposure and

allows for nonclinician delivery, Jaycox et al. (2009) found a significant decrease in PTSD symptoms in flood-impacted Pakistani youth. For easier accessibility, Ruggiero et al. (2015) developed a web-delivered CBT intervention, called Bounce Back Now. In an RCT of 987 tornado-impacted adolescents, the researchers found fewer PTSD symptoms at postintervention compared to no-intervention control group. The researchers highlighted the benefit of population-based recruitment and increasing access to care.

Multiply Traumatized Youth

Studies have shown that youth who experience multiple traumas present with more complex symptomatology (e.g., Ross et al., 2021). TF-CBT can be tailored to the domains that are problematic with complex trauma (Cohen et al., 2012). In a study of 176 youth-parent dyads, TF-CBT was found to be effective in decreasing complex PTSD symptoms in youth who experienced chronic and acute trauma (Ross et al., 2021). A study of 842 youth (ages birth-18 years old) in the welfare system with complex trauma compared the effectiveness of TF-CBT, Attachment, Self-regulation, and Competency (ARC), and Child-Parent Psychotherapy (Bartlett et al., 2018). All models resulted in improvements in PTSD symptoms, with the best outcomes for TF-CBT and ARC.

Cultural Considerations

Researchers examining cultural factors in the treatment of pediatric PTSD have focused primarily on race and ethnicity. Children and adults of color and from lower socioeconomic backgrounds are more likely to be exposed to trauma (e.g., Curran et al., 2018) and, in turn, have higher levels of PTSD (e.g., Andrews et al., 2015). Community-based trials that include multicultural youth have demonstrated the effectiveness of TF-CBT, both with and without adaptations (e.g., Ross et al., 2021; Stewart, Orengo-Aguayo, Villalobos, et al., 2020; Stewart, Orengo-Aguayo, Young, et al., 2020).

Given the disparities in trauma exposure among minority youth and cultural factors that may reduce acceptability and efficacy of existing interventions, examining cultural adaptations to evidence-based treatments for pediatric PTSD is an important avenue of research. A recent review summarized such adaptations for trauma-specific CBTs (Ennis et al., 2020). Seventeen studies were identified and adaptations ranged from translations only to inclusion of additional components (e.g., family sessions). Fourteen studies evaluated the adapted treatments and found favorable outcomes, with only a few evaluating efficacy through RCTs, precluding firm conclusions. More research is needed to determine the potential need for cultural adaptations and to evaluate the relative efficacy of established treatment protocols compared to adapted ones.

Treatment Modality

Trauma-specific CBT is typically delivered individually with conjoint parent training and family sessions for sharing the trauma narrative. TF-CBT has been adapted to be delivered in groups (Deblinger et al., 2016). Mavranezouli et al.'s (2020) meta-analysis of treatments for pediatric PTSD found that the group version of TF-CBT demonstrated a large effect size. CBITS, described earlier, is delivered in a group format in schools and has been shown to be efficacious for reducing PTSD symptoms in diverse populations.

Group interventions confer important unique benefits relative to individual treatments, including increased availability and cost-effectiveness of services, opportunities for training (e.g., live supervision of less experienced clinicians), and increased social support among both children and caregivers (Deblinger et al., 2016). Group interventions also are well-suited for community-level traumas such as community violence and natural disasters due to their reach and relative efficiency of implementation. It is important to note that both TF-CBT group and CBITS require individual sessions for the imaginal exposure

component. More investigations are needed that directly compare evidence-based group treatments to established individual treatments disseminated in the same setting.

Caregiver Participation in Treatment

Evidence supports the participation of the nonoffending parent or caregiver in the treatment of traumatized youth. Caregiver involvement may not be necessary, however, for youth PTSD symptom reduction. In an early meta-analysis, Silverman et al. (2008) found that the inclusion of parents was associated with more effective treatment of only child anxiety and depression, but not PTSD symptoms. Two recent meta-analyses similarly found that treatments for pediatric PTSD with and without caregiver participation yielded similar effect sizes (Gutermann et al., 2017; Miller-Graff & Campion, 2016). A recent review of caregiver involvement in TF-CBT (Brown, Cohen, & Mannarino, 2020) summarized the literature on the effects of TF-CBT on caregiver symptoms and the potential role of changes in caregiver factors in children's symptom improvement. The authors concluded that during TF-CBT, caregivers improve in their own depressive symptoms and distress (Martin et al., 2019), and that caregivers' processing of their own cognitive and emotional responses to trauma predict changes in child internalizing and externalizing, but not PTSD symptoms (Yasinski et al., 2016, 2018). Dorsey et al. (2017) highlighted that caregiver involvement continues to be empirically supported in the treatment of pediatric PTSD, noting that specific characteristics (e.g., very young children, parents' trauma-related distress) may warrant caregiver involvement.

Additional Factors Related to Treatment Outcome

Few studies have been able to examine mediators and moderators of evidence-based treatment of PTSD in youth due to relatively small sample sizes of treatment outcome studies. Nonetheless, evidence suggests that several additional factors may impact treatment outcome. Trauma-specific CBTs appear to be more efficacious among older youth compared to younger children (Dorsey et al., 2017; Gutermann et al., 2016; Miller-Graff & Campion, 2016). Some have found that treatment effects are smaller among those with more severe PTSD at baseline (Miller-Graff & Campion, 2016), although studies also suggest that existing trauma-specific CBTs may be just as efficacious for complex PTSD presentations (Ross et al., 2021). Emerging research suggests that improvements in maladaptive cognitions during TF-CBT are predictive of degree of PTSD reduction (Pfeiffer et al., 2017). Additional factors, including family-level variables (cohesion/conflict, caregiver psychopathology) and treatment format (with or without caregiver involvement), warrant further examination.

Limitations of Current Research on the Treatment of Pediatric PTSD

The efficacy research for the treatment of pediatric PTSD is robust. That said, given the prevalence of trauma exposure and subsequent mental health problems, we recommend more effectiveness research, particularly dissemination and implementation science. We need research examining treatments for complex or multiple types of traumas (i.e., poly-victimization), particularly across ecological contexts (e.g., family *and* community violence), and those with significant comorbid psychopathology (e.g., substance use; Hahn et al., 2020). Additionally, research is limited on the efficacy of trauma-specific CBTs in higher levels of care (e.g., inpatient, residential), despite high prevalence of trauma histories for youth in these settings. Given that trauma-specific CBTs are more efficacious for older (versus younger) children (Miller-Graff & Campion, 2016), empirical evaluation of developmental adaptations to existing treatments (e.g., Pollio & Deblinger, 2017) may increase effectiveness for this vulnerable population, who are likely to require significant caregiver involvement.

Relatedly, the study of caregivers in the treatment of pediatric PTSD may be particularly salient for traumas that occur within the family context (i.e., maltreatment). Further work is needed to empirically identify the subset of children for whom the involvement of a supportive adult may be critical for the reduction of PTSD symptoms. Additionally, research focusing on correlates of outcomes in diverse groups (e.g., gender, sexual orientation), and particularly related to factors that may better explain symptom disparities (e.g., socioeconomic status, poly-victimization, race-based traumatization, disparities in access to treatment), is needed. Finally, as suggested by Dorsey et al. (2017), dismantling studies comparing specific components of different evidence-based treatment packages can inform which components are necessary for whom, leading to more parsimonious treatment packages that can be more efficiently implemented.

Conclusions and Research Recommendations

The extensive literature to date reviewed in this chapter clearly demonstrates the efficacy of trauma-specific CBT for PTSD symptoms among youth who have experienced a range of traumas. TF-CBT has garnered the most robust evidence base and is highly efficacious; however, several other treatment models have been developed and evaluated, particularly among minority youth or among those with comorbid conditions. In contrast to initial research that focused on child sexual abuse, studies now include youth impacted by a broader range of interpersonal and noninterpersonal traumas. Still, youth response to treatment is varied and some remain symptomatic, especially when initially presenting with histories of more chronic traumas and/or more severe psychopathology, warranting continued empirical investigation. Studies with higher numbers of participants, particularly in community settings, are needed to examine mediators and moderators of treatment outcomes. These will extend the findings of efficacy trials, elucidate treatment mechanisms, and identify for whom existing treatments are most/least efficacious. This work will in turn inform much-needed work on increasing the accessibility and availability of evidence-based services for youth who most need them, including using alternative delivery methods (e.g., telehealth), to increase their reach.

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Obsessive-Compulsive Disorder in Children and Adolescents

22

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Background

Obsessive-compulsive disorder (OCD) is a psychiatric disorder that impacts 1–2% of children and adolescents (Canals et al., 2012; Barzilay et al., 2019) and is characterized by the presence of obsessions and compulsions to the extent that there is significant distress or impairment in time and/or functioning (American Psychiatric Association [APA], 2013). Obsessions are defined as intrusive and recurrent thoughts or images that are distressing and unwanted. Compulsions are repetitive behaviors or mental acts that the individual feels compelled to perform in an attempt to alleviate distress or prevent feared outcomes. Although the presence of either obsessions or compulsions is sufficient to meet diagnostic criteria, the two almost always occur together (Foa et al., 1990).

Clinical presentations of OCD vary substantially but tend to cluster around four main categories or dimensions of obsessional content. These include contamination, harm, taboo/unacceptable thoughts, and symmetry, although harm and taboo are sometimes included in the same dimension (Abramowitz et al., 2010; Bloch et al., 2008). Most youth experience symptoms across multiple dimensions (Rosario-Campos et al., 2006). Childhood OCD tends to continue into adulthood, and 30–50% of adults with OCD report onset of symptoms in childhood (March et al., 2001).

Developmental Features and Considerations

Biological Factors

Although the exact etiology of OCD is unknown, it likely results from a combination of various genetic, neurobiological, and psychological factors. Genetic models have demonstrated that the heritability of child onset OCD is 0.43, which yields higher genetic loading compared to adult-onset OCD (Arnold et al., 2018). Twin studies

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have demonstrated that up to 50% of OCD symptom variability is heritable, with no gender differences noted (Mataix-Cols et al., 2013). On the other hand, shared environmental factors do not impact the etiology of OCD (Mataix-Cols et al., 2013). No specific genes have been identified in OCD, although the glutaminergic system appears to be implicated (Arnold et al., 2018).

Neurobiological data on individuals with OCD implicate the cortico-striato-thalamo-cortico (CSTC) circuits of the brain (Pauls et al., 2014). In addition, individuals with OCD uniquely demonstrate impairments in the direct and indirect pathways between the orbitofrontal cortex and subcortical regions (Pauls et al., 2014). It is postulated that excessive activity in the direct pathway, which is usually inhibited by the indirect pathway, directly contributes to repetitive thinking and behaviors seen in OCD. Further neurobiological factors that have been found to be implicated in OCD include differences in glutamatergic and serotonergic systems and increased amygdala sensitivity (Pauls et al., 2014). Psychological factors contributing to OCD are discussed in the treatment section below.

Normative Versus Pathological

In the treatment of child and adolescent OCD, it is important to differentiate normative fears and repetitive behaviors from pathological obsessive-compulsive symptomatology. Insistence on sameness, motor stereotypies, and ritualized behaviors are a normal part of development in children (Evans et al., 2017). These behaviors are biologically adaptive and foster emotional regulation. Such rituals can be seen during routines around transition periods (bedtime, bath time, mealtime), during play and game time, and in response to normative developmental fears (darkness, monsters; Bolton et al., 2009). However, similar ritualized behaviors can be indicative of OCD when they are experienced as distressing, take significant amounts of time, and interfere with activity initiation and completion. Further, completing the ritual excessively as well as experiencing excessive distress when not completing the ritual are signs of OCD symptoms. Therefore, normative rituals are distinguished from OCD in their levels of associated distress, duration, and functional impairment.

Early-Onset OCD

Age of onset has been identified as an important factor in differentiating various OCD presentations. Early-onset OCD, which typically refers to symptoms arising during childhood or early adolescence, tends to have some differing features from adult-onset OCD (Taylor, 2011). Early-onset OCD is associated with a stronger genetic contribution than adult-onset OCD (Arnold et al., 2018). Regarding gender, males tend to have early-onset OCD more commonly than females; however, this gender discrepancy appears relatively even by adolescence (Mathes et al., 2019). Further, nearly 25% of males with OCD have onset before age 10, while the highest frequency of onset in females is during adolescent years (Ruscio et al., 2010). Compared with adult-onset OCD, those with an earlier onset also tend to have higher tic disorders comorbidity (Geller et al., 2001; Taylor, 2011); internalizing and externalizing psychopathology are associated with OCD across the lifespan (Lebowitz et al., 2011). Further, early-onset OCD is linked to future psychiatric diagnoses during adulthood, including obsessive-compulsive personality disorder, eating disorders, and panic disorder (Pinto et al., 2006).

Insight

Most adults and adolescents tend to have good insight into the irrational and peculiar nature of their symptoms; however, this can be more variable in youth. The association between age and insight has been found to increase across the lifespan such that younger children tend to have less insight into symptoms compared to adolescents, and youth in general, less than adult populations (Geller, 2006; Selles et al., 2014). Further,

poor insight in youth is associated with ADHD prevalence and younger age, which may reflect relative cognitive development; as youth with OCD continue to develop metacognition (the ability to "think about thinking"), they may experience increased insight as well (Selles et al., 2018). Low insight in childhood OCD has been associated with increased disorder-related impairment and family accommodation (Storch et al., 2008). Insight in OCD has been found to be associated with symptoms severity and treatment outcomes across time such that poorer insight often yields more severe presentations, increased risk for comorbidities, and less successful treatment (Selles et al., 2018; Storch et al., 2008; Visser et al., 2017). Specifically, poor insight in youth is associated with decreased symptom resistance as well as increased distress and avoidance behaviors (Selles et al., 2018).

Impact

OCD has been shown to have adverse effects on a child's academic, social, and familial functioning (Wu et al., 2018). Nearly 90% of children with OCD experience impairment in one of these domains, and about half experience impairment in all three domains (Piacentini et al., 2003). Severity of impairment is associated with symptom severity, comorbid diagnoses, level of insight, and family accommodation (Geller et al., 2003; Nadeau et al., 2013; Storch et al., 2007b). Obsessive symptoms have been found to be more strongly linked to functional impairment than compulsive or avoidant behaviors (De Caluwé et al., 2014; De Caluwé & De Clercq, 2015).

In regard to academic functioning, both the affected child and their parent report impairments in the child's ability to concentrate on schoolwork and complete homework assignments (Piacentini et al., 2003). In fact, a population-based study in Sweden found that individuals with OCD diagnosed before age 18 demonstrate reduced educational attainments across all education levels from compulsory schooling through postgraduate education (Pérez-Vigil et al., 2018).

OCD impairs the affected child's home functioning as well as all others living in the home by disrupting daily routines for the entire family, especially morning, nighttime, and mealtime routines (Stewart et al., 2017). Intrusive thoughts and just-right compulsions were found to most significantly hinder family functioning. Poor insight is associated with greater disruptions in social and home functioning (Storch et al., 2010). Specifically for parents, 45% of mothers and one-third of fathers endorse occupational impairment related to their child's symptomatology (Stewart et al., 2017).

Emotionally, parents and children with OCD report stress and/or anxiety as the most impactful on their functioning (Stewart et al., 2017). Parents of children with OCD are uniquely associated with increased rates of psychopathology. For example, mothers of children with OCD show higher rates of depression and anxiety than mothers of children with anxious and non-clinical presentations (Barrett et al., 2002; Murphy & Flessner, 2015; Smorti, 2012). This likely reflects a bidirectional relationship, as there is a heightened genetic risk for depression and anxiety in parents of youth with OCD, though raising a child with OCD can be stressful in it of itself.

Parent and child reports of impairment often differ, thus showing the need to evaluate both the parent's and child's perceived functional impairment (Piacentini et al., 2003). Overall, parents are more likely to report more severe impairment than children, especially when it comes to academic and family functioning. However, there are few areas that children tend to report higher severity than their parents, specifically leisure activities that require concentration and academic or social situations wherein their parent is not present (Piacentini et al., 2003; Stewart et al., 2017). Overall, children are less likely to report impairment, except with regard to school functioning perhaps because children are less likely to notice impairment in settings where parental accommodation is possible (Storch et al., 2010). At school, children have mandatory activities that are completed without family members who accommodate, which yields increased awareness of their functional impairments.

Family Factors

Family Accommodation

Many children with OCD seek parental support which unwittingly results in exacerbation of symptomology. This caregiver participation, often termed family accommodation, can include direct engagement with compulsive behaviors, allowance and promotion of avoidant behaviors, alterations of familial functioning, and reassurance-giving that all serve to maintain and/or exacerbate the child's OCD symptoms (Benito et al., 2015; Flessner et al., 2011; Wu et al., 2018, 2019). Family accommodation is particularly salient for children with OCD, as up to 97% of families endorse engaging in family accommodation and about half of the families do so on a daily basis (Peris et al., 2008; Wu et al., 2019). These behaviors are most often done to alleviate the child's distress, minimize activity interruption, or avoid unwanted behavioral outbursts (Wu et al., 2019). Despite short-term mitigations of distress, the family accommodation is negative over the long term as it prevents the child's exposure to feared situations, the associated corrective learning that occurs, and negatively reinforces avoidance behavior through short-term reductions in distress that follow accommodation (Benito et al., 2015; Storch et al., 2007a, b; Wu et al., 2019).

Family accommodation has been positively associated with child OCD severity and functional impairment, insinuating a bidirectional impact of more severe OCD and increased accommodation (Thompson-Hollands et al., 2015; Wu et al., 2016, 2019). Familial accommodation presents across OCD presentations; however, it has been found to be highest in contamination subtypes and lowest in harm/sexual subtypes (Wu et al., 2019). The increased accommodation in contamination subtype could be the result of increased opportunity for accommodation throughout the day, such as during mealtime, bedtime routines, and other household activities, or may also be related to the overt, explicit nature of contamination compulsions that parents are likely to get involved with, such as preparing food a specific way, engaging in washing behaviors together with a child, or other excessive washing (e.g., doing extra laundry). Further, fears of germs are easier to endorse than more stigmatized OCD fears (e.g., harming self or others), which may increase the likelihood a child would voice these fears to their parents and insist on their participation in compulsions or avoidance. Comorbid child psychopathology, specifically externalizing behaviors, ADHD, and ODD, have been associated with increased familial accommodation (Wu et al., 2019).

Parent-Child Conflict and Hostility

Given the high level of family involvement in child and adolescent OCD, it is unsurprising that there would be increased rates of relational conflict and distress within the family. Although family accommodation is virtually ubiquitous, significant familial conflict is only a problem for a subset of families. Multiple factors impact parent-child conflict, including family accommodation, parental characteristics, and communication style.

Family accommodation, as previously mentioned, has negative impacts on both the child and family members. Higher family accommodation is associated with elevated family conflict (Peris et al., 2008). From a purely practical standpoint, involving family members in avoidance and ritual behaviors is inconvenient and can take a significant amount of time depending on frequency and duration. With caregivers specifically, parents report personal distress related to the provision of accommodation. Further, parents often report that the affected child will show anger and/or behavioral outbursts in response to parent refusal of accommodation (Storch et al., 2012; Wu et al., 2019). These anger outbursts are especially relevant for children with comorbid disinhibition difficulties, emotional dysregulation, and oppositional behavior (Lebowitz et al., 2011; Wu et al., 2019). Therefore, their decision to resist or provide accommodation can result in increased parental distress, guilt, and feelings of blame toward the affected child (Murphy & Flessner, 2015; Peris et al., 2008).

In regard to parent characteristics, psychopathology and levels or organization/cohesion are

indicated in parent-child conflict. Parent psychopathology is implicated such that parents with higher hostility and psychopathology broadly assessed are more likely to accommodate their child's OCD (Peris et al., 2008). Furthermore, parents with elevated hostility and psychopathology are more likely to perceive the consequences of resisting accommodation as detrimental. This is relevant in that perceived negative outcomes of resisting accommodation can increase the likelihood of parental accommodation. Organized and cohesive families demonstrate fewer routine accommodating behaviors and distress related to accommodation (Peris et al., 2008; Wu et al., 2014).

Communication styles of parents and the affected child are indicated in parent-child hostility. Parental communication that is characterized as critical and harsh is associated with more severe OCD presentations (Przeworski et al., 2011; Peris et al., 2008). Maternal criticism has been found to be more elevated in communication with their child with OCD compared to an unaffected sibling (Przeworski et al., 2011). Furthermore, increased familial communication dysfunction and parental hostility are associated with diminished treatment response (Peris et al., 2012).

Assessment

Clinician-administered assessments are considered gold standard; however, child and parent-report measures are useful when limitations in time, training, or resources are present. OCD measures that comprehensively assess the breadth and severity of symptoms as well as more pointed measures for associated sequalae such as family accommodation, cognitive beliefs, and functional impairment have been created and validated. The following provides a non-inclusive list of well-established measures that are useful in assessing childhood OCD.

Clinician-Administered Measures

OCD Symptoms and Severity

The Children's Yale Brown Obsessive Compulsive Scale (CY-BOCS) is a clinician-administered, semi-structured interview to assess OCD symptoms and severity (Scahill et al., 1997). It is the most commonly utilized assessment for OCD and has two main components. The initial component of the CY-BOCS is a 61-item checklist that identifies current (within the past week) and past (ever during the lifetime) obsessions and compulsions. The next portion is a measurement of symptom severity, with ten items scored 0–4 Likert scale, with items assessing time, impairment, interference, and distress associated with symptoms as well as the individual's resistance to and control over the symptoms. The CY-BOCS has well-established psychometric properties, including high internal consistency, convergent and divergent validity, test-retest reliability, and interrater reliability (Scahill et al., 1997; Storch et al., 2004).

The second edition of the measure (CY-BOCS-II) was created in order to provide necessary updates given the increased research and understanding of the disorder in recent years (Storch et al., 2019). The four major updates of the measure were: adding in measurement of avoidance symptoms; expanding the severity Likert scale from 0 to 4 to 0 to 5 to allow for increased sensitivity for severe presentations; replacing the "resistance of obsessions" item with a "obsession-free interval" item, as gold standard therapy encourages acceptance/tolerance of obsessions rather than "resistance," and consequently, psychometric properties for this item were mixed; and updating/re-organizing the symptom checklist to minimize confusion and increase utility. Initial assessment of the measure's psychometric properties exhibits moderate-to-strong internal consistency, excellent interrater reliability, and test-retest reliability (Storch et al., 2019).

Family Accommodation

The Family Accommodation Scale for Obsessive Compulsive Disorder-Interviewer Rated

(FAS-IR) is a clinician-administered, semi-structured interview to assess parental accommodation behaviors (Calvocoressi et al., 1999). The assessment measures the presence of 12 accommodating behaviors within the past week, as well as the frequency of each behavior being rated on a 0 (no/not applicable) to 4 (every day/extreme) Likert scale. The measure has demonstrated high internal consistency, convergent and divergent validity, and interrater reliability (Calvocoressi et al., 1999).

Parent and Self-report Measures

Although clinician-administered measures are considered to be most ideal in accurately assessing OCD symptoms and severity, there are parent and self-report measures that can be used when comprehensive, clinician-scored measures are not feasible.

OCD Symptoms and Severity

The Children's Florida Obsessive-Compulsive Inventory (C-FOCI) is a brief screening measure that assesses OCD symptoms and severity (Storch et al., 2009). The symptom component includes a 17-item checklist of common obsessions rated as not present or present. The second component is a unitary severity scale that assesses time, distress, avoidance, interference, and control of symptoms. The C-FOCI demonstrates good internal consistency, convergent and divergent validity, and treatment sensitivity (Storch et al., 2009).

The Obsessive-Compulsive Inventory-Child Version (OCI-CV) is another brief self-report measure for child and adolescent OCD (Foa et al., 2010). This measure assesses 21 common obsessions and compulsions across the six symptom domains of washing, hoarding, ordering, checking, harm-related obsessions, and neutralizing. The psychometric properties of the OCI-CV are strong, including good test-retest reliability, internal consistency, and convergent validity (Foa et al., 2010; Jones et al., 2013).

Cognitive Beliefs

The Obsessive Belief Questionnaire-Child Version (OBQ-CV) is a 44-item questionnaire that assesses beliefs and cognitions related to childhood OCD (Coles et al., 2010). Beliefs assessed include heightened sense of responsibility, perceptions of threat, perceived importance of one's thoughts and the need to control them, and need for certainty. The OBQ-CV has demonstrated internal consistency, test-retest reliability, and convergent validity.

OCD-Related Impairment

Based on the Child Obsessive-Compulsive Impact Scale (Piacentini & Jaffer, 1999), the Child Obsessive-Compulsive Impact Scale-Revised (COIS-R) is a measure specifically designed to measure OCD-specific impairment (Piacentini et al., 2007b). The COIS-R is a 33-item questionnaire that has child-report and parent-report versions. The parent-report version has a four-factor structure consisting of impairment in daily living skills, school, social, and family/activities, whereas the child-report version has a three-factor structure consisting of school, social, and activity impairments. Both measures have good internal consistency, concurrent validity, and test-retest reliability (Piacentini et al., 2007a, b).

The OCD Family Functioning Scale (OFF) was created to assess the context, extent, and perspectives of functional impairment for family members of an individual with OCD (Stewart et al., 2011). OFF is a 42-item measure that assesses impairment in three components: family functioning, symptom-specific, family role-specific domains. There are versions for both the family members and the affected individual; both versions demonstrate excellent internal consistency, good convergent validity, and test-retest reliability.

Family Accommodation

The Family Accommodation Scale for OCD-Self-Rated Version (FAS-SR) was created to promote further collection of family accommodation data when the FAS-IR is not feasible (Pinto et al., 2013). The FAS-SR is a family-member-report

measure that, similar to the FAS-IR, evaluates the presence and frequency of accommodating behaviors. The measure demonstrates excellent internal consistency, convergent validity, and strong agreement with the FAS-IR.

The Family Accommodation Scale Anxiety (FASA) was developed as a modified version of the FAS that broaden the assessment scope to include children with anxiety disorders beyond OCD (Lebowitz et al., 2013). The FASA is a parent-report measure that evaluates family accommodation and associated parental distress. The FASA-child report (FASA-CR) is the child version of the FASA that assesses the frequency and associated schedule/routine modification (Lebowitz et al., 2015). Additional, non-weighted questions assess associated parental distress, child reactions, and child beliefs about the accommodation. Psychometric properties for the FASA and FASA-CR are sound (Lebowitz et al., 2015, 2016).

The Pediatric Accommodation Scale (PAS) measures family accommodation for youth with anxiety disorders (Benito et al., 2015). The PAS has two versions, a clinician-rated (PAS) and a parent-rated (PAS-PR) version. The measures were developed simultaneously, and both assess the frequency and impact of family accommodation. The PAS demonstrated strong psychometric properties, including internal consistency, inter-rater reliability, and convergent and discriminant validity. The PAS-PR demonstrated good internal consistency and convergent validity with the PAS.

Treatment

Conceptualization

The strongest empirical support for psychological models of OCD is those within cognitive-behavioral theory (CBT). Mowrer's two-factor theory, which serves as the primary behavioral model, postulates that classical conditioning establishes the fear and operant conditioning maintains the fear via negative reinforcement (Mowrer, 1960). Classical conditioning occurs when a previously neutral stimulus (e.g., bathroom) is paired with an unconditioned stimulus (e.g., germs) that evokes a response (anxiety). Once classical conditioning establishes an association between the previously neutral stimulus and the fear response, the fear develops and is then maintained via operant conditioning. Specifically, operant conditioning in anxiety proposes that avoidance and compulsions provide temporary relief from distress, and thus these strategies are more likely to occur again in similar situations. The relief that follows the avoidance and compulsive behaviors prevents new learning to occur and negatively reinforces avoidance/compulsions, as these behaviors are more likely to be performed again due to the short-term decrease in distress that follows.

In regard to cognitive conceptualization, maladaptive interpretations of intrusive thoughts are believed to contribute to symptom development. Most individuals experience intrusive thoughts; however, individuals with OCD interpret these thoughts differently. Specific cognitive misappraisals indicated in OCD development and maintenance are perceived sense of responsibility and over-evaluation of the importance of intrusive thoughts (Coles et al., 2010). Furthermore, a subset of individuals with OCD will experience thought-action fusion, or the belief that having thoughts about a certain event increases the likelihood that the event will occur or is morally equivalent to the event occurring (Evans et al., 2011). This phenomenon is related to insight, which as previously mentioned, is associated with poorer treatment outcomes.

Taken together, children and adolescents with OCD experience intrusive thoughts, associated distress, and then engage in compulsive behaviors in order to alleviate their distress. The repeated engagement with compulsive behaviors and avoidance strategies establishes the OCD cycle and maintains the disorder. Notably, parents and family members often become involved in this cycle through accommodation behaviors, and as a result, serve to maintain and/or exacerbate the disorder. Therefore, treatment includes both child and, to varying extents, parent/family involvement.

Cognitive-Behavioral Therapy with Exposure and Response Prevention

The most effective treatment approach for OCD in children and adolescents is CBT, and more specifically, exposure and response prevention (ERP; Piacentini et al., 2007a). The general goal of ERP is to expose the individual to triggers that provoke obsessions while reducing, and eventually eliminating the use of compulsive rituals or safety behaviors. ERP allows the person to learn that their fears are not dangerous and that they can tolerate and manage them (Freeman et al., 2018). ERP is a stepwise treatment that consists of psychoeducation, functional assessment, hierarchy development, ERP, and relapse prevention. Additional components are often utilized in the treatment of children to target the familial involvement and engage the child in a developmentally appropriate fashion.

Psychoeducation

The program begins with psychoeducation on the nature of the disorder and the rationale for the treatment. Given that there is some reluctance among therapists and patients to engage in exposure therapy due to a fear of perceived negative consequences, psychoeducation is important in clarifying that exposure therapy is both very safe and very effective (Schneider et al., 2020). ERP manuals for children describe ERP as "bravery practice" or an opportunity to "boss back" OCD (March & Benton, 2006; Storch et al., 2018). Obsessions can be described as "brain hiccups" with the resulting anxiety described as "false alarms." OCD is externalized as the enemy to fight (e.g., "I understand that OCD is making you do things you don't want to do"; "what is OCD telling you to do?"). This serves as (1) a type of cognitive defusion strategy and (2) a way for the parent and child to team up against the OCD and minimize conflict with each other. In addition to psychoeducation for the child, psychoeducation for the family is important as it serves to reduce child blaming for irrational beliefs and behaviors as well as identify ways to reduce accommodation of these beliefs and behaviors. It is essential that parents understand that accommodating maladaptive thoughts and behavior maintains symptoms in the long-term despite temporary anxiety relief in the short term.

Hierarchy Development

To introduce the fear hierarchy, the therapist can explain that, like acquiring any skill, fighting OCD will take regular practice over time. The hierarchy or "fear ladder" provides the treatment plan with progressively more distressing challenges building from 0 to 10. Children may benefit from visual aids such as a step ladder, and very young children may benefit from a non-numerical scale such as green-yellow-red or easy-medium-hard. The hierarchy should aim to identify symptomatology that will be addressed in treatment including avoided situations and thoughts, rituals, and family accommodating behaviors.

Exposure and Response Prevention

Once the hierarchy is created, the therapist engages the child in exposures to the feared stimuli. Exposures typically proceed from least distressing to most in order to build confidence and buy-in, however, proceeding in a modestly non-linear fashion may help generalize the effectiveness of exposure (Craske et al., 2014). Exposures can be imaginal (e.g., saying "God is mad at me right now") or in vivo (e.g., touching the floor without washing hands). During and after these exposures, the child strives to prevent compulsions or rituals to allow new learning to occur. If the child gives into a compulsion, the therapist works with a family to try the exposure again, or alternatively, temporarily reduces the exposure goal so the child is able to complete it successfully (for example, by taking only one step in an arranging compulsion rather than eliminating it completely). A historical rule of thumb is that the exposure is endured until the child's subjective distress habituates to half the amount at the peak of the exposure, though recent research has demonstrated that this habituation is not necessary to promote treatment outcomes (Craske et al., 2014). This guideline may still hold value as it ensures that exposures are conducted for a suffi-

cient period of time, and when fear reduces without using compulsions, it may be indicative of an extinction learning processes (Benito et al., 2018).

Violating feared expectations is considered to be an important marker of extinction learning during exposure. Cognitive techniques can be used to consolidate learning by asking the child what they fear will happen before the exposure and then asking them after the exposure if their feared consequence occurred. Feared expectations may range from specific feared outcomes (e.g., "my Mom will die if I don't repeat the number 3") to simply expecting that the exposure will provoke too much distress (e.g., believing they can't endure the "not right" feeling if socks are not pulled to the same length). In many cases, the feared outcome will not be immediately refutable (e.g., going to Hell for saying a bad word, getting brain cancer from standing next to a working microwave). In those cases, it may be more important to emphasize tolerance of distress and uncertainty ("Look at that, you did it even though it was super scary! You're so brave!"). In other cases, the feared outcome may actually occur (e.g., a child with obsessions about being bitten by insects may get bit by an ant during exposure bite). Those may also be cases when tolerating distress better than anticipated would be a helpful strategy. In fact, there is some reason to believe exposures that occasionally result in the feared outcome could enhance treatment outcomes through promoting distress tolerance and preparing youth adequately for future challenges when negative events do occur (Krompinger et al., 2019).

To increase engagement, the therapist can help the child turn exposures into a game such as the therapist and child or parent and child daring each other to touch more and more contaminated objects. Using rewards or a token economy to reinforce participation in ERP can also be a helpful engagement strategy during therapy.

Parent Involvement

Parents are very important in facilitating between-session exposures, in other words, adherence to homework. Rewards can be used as a behavioral incentive. Children can be motivated by simple rewards such as stickers while adolescents can exercise increasing independence by picking their own rewards. Regardless of age, sometimes the best reward is genuine praise for sincere effort, which simultaneously encourages a growth mindset. As a further aid, family members are taught to disengage in their child's rituals over time as a way of increasing the child's self-efficacy and thereby fostering long-term gains. Finally, it is important to note that parents and family members may struggle observing their child in distress during exposures, and the subsequent relationship conflict that OCD can bring. Therefore, the therapist can also help family members cope with their own distress (Peris et al., 2008).

ERP has been manualized for children as young as 5–8 years old (Freeman & Garcia, 2008), with demonstrated efficacy (Freeman & Garcia, 2008; Freeman et al., 2014; Lewin et al., 2014). Adaptations for this age group include treating parents as coaches who help their children successfully implement ERP. Parents accomplish this by learning behavior modification strategies for their children while also growing in awareness of their own anxiety. Additionally, parents learn to communicate with their children about thoughts and emotions while learning ways to increase their child's treatment adherence and motivation.

Relapse Prevention

To prevent relapse, parent and therapist should emphasize their confidence in the child's ability to continually implement the strategies to fight OCD. To consolidate learning, the therapist can ask the child to identify the most helpful strategies used in treatment. In addition, the therapist can help the child anticipate and address future challenges. Finally, the child is encouraged to monitor the battle with OCD and let their parent know if they need extra help with a therapist again. Creating a book or personalized treatment guide identifying the most effective strategies, predicted challenges, and warning signs of required treatment re-initiation can be a fun, effective way to consolidate essential informa-

tion for the child to reference following treatment termination.

Delivery Options for CBT

Typically, ERP is delivered in a weekly, face-to-face therapy session. Modified versions of OCD treatment include brief CBT, intensive CBT, Internet-based CBT, and parent only approaches.

There is some research on the effectiveness of brief CBT consisting of a reduced number of sessions. For example, one study of OCD in children and adolescents found that both brief CBT and full CBT led to statistically significant symptom improvement as compared to waitlist control, whereas there was no statistically significant difference in the effectiveness of brief CBT versus full CBT in symptom improvement (Bolton et al., 2011). This is likely not a clinically viable approach for those with moderate and higher symptomology. On the other extreme, intensive treatment can include daily rather than weekly sessions for convenience (taking advantage of holidays), quicker outcomes, or severity of symptoms (Storch et al., 2007a, b; Riise et al., 2018).

In complex cases of childhood OCD, parents may benefit from an intervention focused on managing their own stress. The manual *Helping Parents Manage Childhood OCD: Decreasing Conflict and Increasing Positive Interaction* describes a brief intervention meant to complement exposure and response prevention (Peris & Piacentini, 2016).

ERP can also be implemented using technology. Telehealth-delivered CBT has demonstrated efficacy relative to waitlist (Storch et al., 2011). Internet-delivered CBT for adolescents shows a strong effect in reducing OCD symptoms as compared to a waitlist control (Lenhard et al., 2017; Storch et al., 2011). A more recent study found that Internet-delivered CBT had fewer responders than face-to-face CBT, although this outcome was attenuated when non-responders from both groups received additional face-to-face CBT sessions (Aspvall et al., 2021). This study suggests that many adolescents can benefit from Internet-delivered CBT, especially if access to face-to-face services is difficult.

Pharmacotherapy

In addition to ERP, certain medications have been shown to be effective in the treatment of child and adolescent OCD. Serotonin reuptake inhibitors (SRIs) are the pharmacological treatments with the strongest empirical base (Geller & March, 2012). The United States Food and Drug Administration (FDA) has approved clomipramine (Anafranil) for ages 10 and older, fluoxetine (Prozac) for ages 7 and older, fluvoxamine (Luvox) for ages 8 and older, and sertraline (Zoloft) for ages 6 and older to treat OCD in children and adolescents (Hieber, 2013).

Treatment Efficacy

Several reviews and meta-analyses report the effectiveness of these psychological and pharmacological treatment approaches. CBT for child and adolescent OCD has robust empirical support compared to various psychological and medication comparison conditions (McGuire et al., 2015; Öst et al., 2016). Regarding medications, the first-generation antidepressant clomipramine showed a statistically significantly higher effect size as compared to SRIs, though this medication is less frequently prescribed now as it is only marginally more effective and has a more adverse side-effect profile (Decloedt & Stein, 2010).

Among studies assessing both CBT and medication treatment efficacies, one meta-analysis found that CBT was superior to comparison conditions with a very large effect size (10 studies; $g = 1.21$) while SRIs were superior to control conditions with a moderate effect size (11 studies; $g = 0.50$; McGuire et al., 2015). Another meta-analysis found that CBT had a very large effect on symptom improvement compared to waitlist or placebo, and SRI medication had a moderate effect size compared to placebo (Öst et al., 2016). This study further found that CBT demonstrates a superior response and remission

rate then SRIs and that medication does not increase the effectiveness of CBT. Regarding sustainability, the positive effects of CBT and medication persist for years. One study on CBT and SSRI for OCD in children and adolescents found that 85.3% of participants responded to treatment after 3-year follow-up (Melin et al., 2018). CBT appears to have greater effectiveness than medication especially considering that the benefits of medication are attenuated if the medication is stopped. CBT is recommended as the first line of treatment, and medication alone should only be offered in the event that CBT is unavailable (AACAP, 2012). Taken together, meta-analyses show clear evidence for the effectiveness of CBT and medication over waitlist and placebo control conditions in the treatment of child and adolescent OCD; however, superior effects are seen in CBT.

Summary

Child and adolescent OCD is a relatively common psychological disorder that, when left untreated, can significantly impact both individual and family functioning. Several developmental factors should be considered in the treatment of child and adolescent OCD, including age-appropriate rituals; level of insight; functional impairments in academic, social, and family functioning; and family involvement in the disorder.

The recent literature has underscored the importance of assessing and addressing family factors in the treatment of child and adolescent OCD. Family accommodation, in particular, has been identified as a primary maintaining factor for child and adolescent OCD symptomatology. Advances in the conceptual underpinnings of parental accommodations as well as ways to target them in treatment have significantly enhanced treatment outcomes.

There are multiple well-established assessment measures for various aspects of child and adolescent OCD. Treatment options for the disorder include CBT with ERP and psychopharmacological interventions, with CBT with ERP alone or in combination with SRIs showing strongest effects. It is important that treatment is approached in a developmentally appropriate manner that comprehensively addresses family factors. These treatments have proven exceptionally efficacious. As a result, variations of treatment have emerged including brief CBT, parent-based treatment, and technology-assisted therapies. Although CBT with ERP has stood out as the most well-supported approach for many years, recent advances in understanding of exposure mechanisms, the role of family in the presentation and treatment of OCD, as well as technology-enhanced therapy have served to improve our understanding of how to optimize treatment outcomes for this population in recent years.

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Pharmacological Treatment of Anxiety Disorders in Children and Adolescents

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Introduction

Anxiety disorders are the most common psychiatric disorders in children and adolescents. Among children aged 3–17 years, 7.1% have an anxiety disorder, and the lifetime prevalence of anxiety disorders is 31.9% in ages 13–18 (Ghandour et al., 2019). Evidence-based treatments include cognitive behavioral therapy (CBT) and two specific psychotropic medication classes, the selective serotonin reuptake inhibitors (SSRIs) and the serotonin norepinephrine reuptake inhibitors (SNRIs). The American Association of Child and Adolescent Psychiatry (AACAP) recommends CBT as the first-line treatment for mild to moderate child and adolescent anxiety without co-occurring mental health disorders. For moderate to severe anxiety disorders, the next level of intervention includes SSRIs and possibly SNRIs (combined with CBT). In areas with limited psychotherapy availability, AACAP does recommend SSRI utilization as a first-line intervention (Walter, 2020).

Rigorous clinical trial data indicate that the combination of CBT and SSRIs may be more effective than either treatment alone in the short term. It is important to recognize that most SSRI and SNRI medications are used "off-label" for anxiety disorders. This term indicates that the specific medication is not FDA-approved even if another medication in the same class has shown efficacy in anxiety research trials. The FDA-approved medications are duloxetine, an SNRI, approved for generalized anxiety disorder (GAD), and the SSRIs fluoxetine, fluvoxamine, and sertraline, approved for obsessive-compulsive disorder (OCD). In this chapter, we will explore medication classes frequently utilized for anxiety disorders. Readers will note that the majority of medication use in youth anxiety disorders is off-label. The safety and efficacy of these medication classes is the primary objective of this chapter.

Selective Serotonin Reuptake Inhibitors

Pharmacologic studies of childhood anxiety disorders have historically focused on the triad of pediatric anxiety disorders comprised of general anxiety disorder (GAD), social phobia (SoP), and separation anxiety disorder (SAD) to evaluate pharmacologic interventions, as these diagnoses are commonly comorbid and share similar responses to pharmacologic treatments (Compton et al., 2010). Of the psychopharmacologic interventions, selective serotonin reuptake inhibitors (SSRIs) are the first-line treatment for this triad

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of anxiety disorders and have the most established efficacy for treatment of childhood anxiety disorders through multiple randomized controlled trials (Birmaher et al., 2003; March et al., 2007; Strawn et al., 2015; Wagner et al., 2004).

Selective Serotonin Reuptake Inhibitors' Mechanism of Action

Selective serotonin reuptake inhibitors (SSRIs) are the most commonly used medication to treat anxiety disorders in children, adolescents, and adults. There are three common neurotransmitters that are thought to affect the majority of psychiatric disorders. These are serotonin, dopamine, and norepinephrine. These neurotransmitters are thought to work by relaying neuronal messages when released from synapses. These messages lead to changes in gene transcription, and the deficiency of these neurotransmitters is thought to result in mood and anxiety symptoms. Reuptake inhibitors such as SSRIs block monoamine transporters, resulting in an increase in neurotransmitters, and ultimately leading to downstream gene transcription and symptom relief (Hirschfeld, 2000).

Types of Selective Serotonin Reuptake Inhibitors

Fluoxetine

Multiple randomized controlled trials have found that fluoxetine is an effective treatment for GAD, social phobia, and SAD (Beidel et al., 2007; Birmaher et al., 2003; da Costa et al., 2013). Birmaher et al. compared fluoxetine treatment to placebo and found that fluoxetine titrated up to 20 mg daily was more effective than placebo at reducing anxiety symptoms and improving functioning (61% vs. 35%) over 12 weeks of treatment. Fluoxetine was an effective treatment for social phobia when compared to Social Effectiveness Training (SET-C) and placebo. However, SET-C was superior to both fluoxetine and placebo for improving social skills (Beidel et al., 2007). When comparing fluoxetine to clomipramine and placebo, all three groups were efficacious in treating anxiety disorders, with fluoxetine showing the greatest response rate of 100%, compared to 87.5% and 77.7% for clomipramine and placebo, respectively. Notably, the placebo group in this study showed an unusually high response rate as compared to other studies (da Costa et al., 2013). Fluoxetine dosages in these studies ranged from 10 mg daily to 60 mg daily (Beidel et al., 2007; Birmaher et al., 2003; da Costa et al., 2013).

Sertraline

Sertraline has been found to be an effective treatment for GAD, SoP, and SAD in multiple randomized control trials. Rynn et al. found sertraline to be more efficacious in the treatment of GAD than placebo at a dose of 50 mg/day (Rynn et al., 2001). The Child/Adolescent Anxiety Multimodal Study (CAMS), a landmark NIMH-funded multicenter randomized controlled trial, examined the efficacy of sertraline monotherapy, cognitive behavioral therapy (CBT), sertraline and CBT combination, and placebo pill in 488 children and adolescents between the ages of 7 and 17 years, with moderate to severe GAD, SoP, and SAD. Efficacy was measured by the Clinical Global Impression-Improvement (CGI-Improvement) scale for clinical improvement and Pediatric Anxiety Rating Scale (PARS) for symptom severity. The effect size was 0.86 for combination therapy, 0.45 for sertraline, and 0.31 for cognitive behavioral therapy. The CAMS conclusions were that combination of sertraline and CBT is more effective than either treatment alone or placebo in reducing anxiety severity. Importantly, there was also no significant difference between CBT and sertraline monotherapy (Walkup et al., 2008). In the follow-up to the CAMS trial, the Child/Adolescent Multimodal Extended Long-Term Study (CAMELS) evaluated 319 children for anxiety symptoms. Across all 4 years, 21.7% of youth were in stable remission, 30% were chronically ill, and 48% relapsed. Those who responded initially to acute treatment

were more likely to be in remission at follow-up (Ginsburg et al., 2018). Functional outcomes including global (i.e., life satisfaction) and domain-specific (i.e., social, familial, educational/occupational, and legal) have also been measured in CAMELS and showed that there were meaningful long-term functional benefits in responders and remitters 3–12 years after treatment (Swan et al., 2018).

Paroxetine

There is only one randomized control trial which evaluates the use of paroxetine in children and adolescents with anxiety disorders, with social phobia as their predominant psychiatric diagnoses. Wagner et al. (2004a) completed a multicenter, double-blind, randomized controlled trial treating 322 children and adolescents with a diagnosis of social phobia with paroxetine to evaluate its efficacy and tolerability with a flexible dosing schedule of between 10 and 50 mg/day or placebo for 16 weeks. Efficacy was defined as being "much improved" or "very much improved" on CGI-Improvement with 77% response in paroxetine group compared to 38% in placebo group with a mean dose of paroxetine of 24.8 mg/day (Wagner et al., 2004a). Paroxetine utilization for all pediatric psychiatric disorders ceased in 2004 when the UK (United Kingdom) Medicine and Healthcare Products Regulatory Agency analysis indicated both a lack of efficacy for major depression and an increase in suicidal behavior in children.

Citalopram

There are no pediatric anxiety RCTs for citalopram, and only open trial level data are available. One 12-week open-label trial examined the citalopram's efficacy for anxiety. Twelve children and adolescents from 8 to 17 years old participated and two participants dropped out due to side effects of nausea, lightheadedness, and concentration problems. They received citalopram at a starting dose of 10 mg/day titrating up to a maximum dose of 40 mg/day over 12 weeks. They also received eight brief cognitive behavioral therapy-oriented counseling sessions lasting 15 minutes each. On the CGI-Improvement scale, about 83% of the participants reported "very much improved" symptoms and 41.7% reported "much improved" symptoms of social and generalized anxiety disorder. A small number of participants tolerated citalopram without any side effects (Chavira & Stein, 2002).

Escitalopram

There are no pediatric anxiety disorders RCTs for escitalopram. Isolan et al. (2007) completed an open-label trial, in which they treated 20 youths ages 10–17 with social anxiety disorder for 12 weeks using escitalopram. The dosage range was 2–20 mg/day. They found that 65% (13/20) were much to very much improved post-treatment (Isolan et al. 2007). In a retrospective chart review, Coşkun and team (2012) observed 11 preschoolers (eight girls) with ages ranging from 47 to 64 months. Three participants showed moderate to much improvement in anxiety symptoms. It is important to note that 45% experienced behavioral disinhibition resulting in 27% dropping out of the study due to this side effect. The authors concluded that young children may experience more side effects, particularly behavioral disinhibition (Coşkun et al., 2012).

Fluvoxamine

Fluvoxamine is FDA approved for OCD only and commonly used in clinical setting treat anxiety. The Research Units on Pediatric Psychopharmacology (RUPP) Anxiety Study Group (2001) conducted a large-scale, randomized, placebo-controlled trial involving 128 pediatric patients (ages 6–17) with multiple different anxiety disorders including social phobia, separation anxiety disorder, and generalized anxiety disorder. These participants had received 3 weeks of psychological treatment prior to the trial. The fluvoxamine dose was up to 300 mg/day.

Fluvoxamine was found to make a significant difference in CGI-Improvement and endpoint Pediatric Anxiety Rating Scale (PARS) scores. Improvement in the fluvoxamine group was seen in 48/63 participants (76%) compared to 19/65 for the placebo group (29%) with $P < 0.001$. In general, fluvoxamine was well tolerated; however, the youth had increased motor activity and abdominal discomfort compared to placebo, 17 (27%) vs. 8 (12%) and 31 (49%) vs. 18 (28%), respectively (Riddle et al., 2001). Following this trial, RUPP group investigated for pharmacological treatment moderators and mediators in pediatric anxiety disorders. Study did not find any mediators; however, analysis noted that subjects with social phobia ($P < 0.05$) and greater baseline illness severity ($P < 0.001$) were less likely to improve in either treatment group (RUPP Anxiety Study Group, 2002; Walkup et al., 2003).

Serotonin Norepinephrine Reuptake Inhibitors

Venlafaxine

Venlafaxine is an SNRI whose mechanism of action is to increase the availability of serotonin and norepinephrine. Although it is FDA-approved for GAD and social anxiety disorder in adults, it is not currently FDA-approved for pediatric patients. In an 8-week, placebo-controlled RCT for youth ages 6–17 with GAD, Ryan and colleagues found venlafaxine XR improved both GAD symptoms and HAM-A score compared to placebo (69% vs. 48%; $P < 0.001$). Although venlafaxine was relatively well tolerated compared to placebo, participants experienced the following adverse reactions: anorexia (13% vs. 3%), pain (17% in both groups), somnolence (11% vs. 0%), weight loss (5% vs. 1%), as well as changes in blood pressure (3.25% vs. 1.6%), pulse, cholesterol level, and height (Ryan et al., 2007).

In a 16-week, placebo-controlled RCT, 293 participants ages 8–17 across 48 academic and community centers with a diagnosis of separation anxiety disorder participated in a venlafaxine ER trial. Venlafaxine ER dose ranged from 37.5 mg/day to 75 mg/day. The Social Anxiety Scale-Child or Adolescent version (SAS-CA) and CGI-I scores rated efficacy and responder assessment at each visit respectively. The safety protocol measured weight, heart rate, temperature, and electrocardiogram (EKG) during the visits. Due to lack of efficacy (35%) and adverse effects, 4% of youth discontinued the trial. Over a 16-week period, the dose was titrated from 37.5 mg to a maximum dose of 225 mg. Approximately 56% of the participants in the venlafaxine ER group were rated much to very much improved on the CGI-Improvement scale compared to 37% in the placebo group. Commonly reported side effects were asthenia (20% vs. 9%), anorexia (22% vs. 5%), nausea (23% vs. 11%), and weight loss (11% vs. 3%) during the treatment period. During the titration phase, participants complained of dizziness (13%), headaches (12%), nausea (7%), and nervousness (6%). Additionally, three patients developed suicidal ideation with no completed suicide, and one patient developed an episode of hypomania with venlafaxine ER. The study concluded that venlafaxine ER is well tolerated and an effective treatment for children and adolescents with generalized social anxiety disorder (March et al., 2007).

Duloxetine

Duloxetine is a serotonin and norepinephrine reuptake inhibitor (SNRI). It is the only antidepressant FDA-approved for pediatric GAD. Strawn and colleagues conducted an RCT with flexible dosing for 10 weeks in the acute phase, continuing afterward for 18 weeks of open-label duloxetine treatment in 272 youth. Participant ranged from 7 to 17 years old with a primary diagnosis of GAD. Duloxetine was superior to placebo in symptomatic response (50% improvement on PARS severity for GAD; $P < 0.001$, remission (PARS severity for GAD ≤ 8), and functional remission (CGAS >70; $P < 0.05$). In the duloxetine group, adverse effects of systolic blood pressure changes, heart rate changes, and minor weight loss were observed (Strawn et al., 2015).

Benzodiazepines

Benzodiazepines are drugs that enhance the effects of the neurotransmitter gamma-aminobutyric acid (GABA) at the $GABA_A$ receptor leading to sedative, hypnotic, anticonvulsant, and anxiolytic properties. They have a rapid onset of action leading to relief of anxiety symptoms within minutes to hours. While benzodiazepines have been supported by research for the treatment of adult anxiety disorders, there is limited research on the use of benzodiazepines in the pediatric population (Ballenger et al., 1988). To date, only two randomized clinical trials have evaluated benzodiazepines for treatment of adolescent anxiety disorders (Graae et al., 1994; Simeon et al., 1992). In youth of ages 7–13 with SoP and GAD who were treated with clonazepam, there was no significant difference between clonazepam and placebo (Graae et al., 1994). Evaluation of alprazolam compared to placebo in youth with GAD, ages 8–17, showed similar results, with no significant difference in anxiety symptoms found between alprazolam-treated and placebo-treated youth (Simeon et al., 1992). Poor response to benzodiazepine treatment in adolescents with anxiety disorders is particularly important to note, especially in adolescents with a history of substance abuse, as the potential for benzodiazepine abuse, addiction, and diversion must be considered.

Medications for Treatment Augmentation

Buspirone

Buspirone represents a unique class of anxiolytics and is a serotonin-1A (5-HT1A) receptor partial agonist. Though its mechanism of action is not fully understood, it is suspected that the partial 5-HT1A agonism translates into increased serotonergic activity in the amygdala and other parts of the brain's fear and anxiety circuit resulting in a reduction in anxiety (Jann, 1988). Buspirone is mildly efficacious for treatment of adult anxiety disorders, but there is limited data to establish efficacy or safety of buspirone for the treatment of anxiety disorders in the pediatric population. Two unpublished trials consisting of two placebo-controlled 6-week trials involving 559 pediatric patients, ages 6–17 years, with GAD (dosing 15–60 mg/day) found no significant difference between buspirone and placebo. Strawn et al. (Strawn et al., 2018a) completed an analysis of these abandoned studies and confirmed that buspirone did not differentiate from placebo, but posited that the studies were underpowered to identify small differences, thus no firm conclusions can be made about the utility of buspirone in children and adolescents (Strawn et al., 2018a).

Guanfacine

Guanfacine is approved to treat attention deficit hyperactivity disorder (ADHD) in children and adolescents. It acts by stimulating post-synaptic alpha-2 adrenergic receptors resulting in downstream effects on the prefrontal cortex, an area of the brain associated with learning and memory. While it is unclear how guanfacine may mediate anxiety symptoms, a pilot study by Strawn et al. evaluated the safety, tolerability, and potential anxiolytic efficacy of guanfacine in children and adolescents with GAD, SoP, and SAD and found guanfacine was associated with greater improvement in CGI-Improvement scores compared to placebo (54.2% vs. 31.6%). However, no improvement was noted on measures of anxiety, Pediatric Anxiety Rating Scale (PARS), and Screen for Child Anxiety Related Disorders (SCARED) scores. Guanfacine was dosed between 1 and 6 mg daily and overall was well tolerated (Jeffrey R Strawn et al., 2017).

Hydroxyzine

Hydroxyzine belongs to the class of antihistamines that includes such medications as diphenhydramine. It acts on the histamine-1 (H1) receptor and antagonizes muscarinic receptors and 5-HT2A receptors, which is thought to help

with anxiety. It is approved by the FDA for adult anxiety; however, in the clinical setting, its use is limited to anxiety presenting in a medical setting with organic diseases or medical procedures. As with other antihistamines, it may cause sedation, fatigue, dizziness, dry mouth, increased appetite, and constipation and for youth, a paradoxical hyperactive response (Connolly, 2007; Patel et al., 2018).

Tricyclic Antidepressants (TCAs)

Since the introduction of SSRIs in the 1980s, the use of TCAs has declined as mainstay psychopharmacology. There are two categories of TCAs: tertiary amines and secondary amines. Tertiary amines include amitriptyline, clomipramine, doxepin, imipramine, and trimipramine. Secondary amines include desipramine, nortriptyline, and protriptyline. Tertiary amines are potent serotonin inhibitors and secondarily are effective norepinephrine blockers (Strawn et al., 2018a). Due to cardiac adverse effects and the availability of alternatives with better safety profiles (SSRIs and SNRIs), there has been a decline in TCA utilization across clinical settings. Klein and colleagues investigated the efficacy of imipramine in children ($n = 21$) with separation anxiety disorder. This 6-week placebo-controlled RCT found that imipramine was not superior to placebo. The imipramine group had moderate to severe side effects including irritability and anger. Da Costa and colleagues' double-blind, placebo-controlled RCT of clomipramine ($n = 9$), fluoxetine ($n = 10$), and placebo ($n = 11$) for 12 weeks concluded that clomipramine showed similar efficacy in the comparisons of CGI and C-GAS: CGI (placebo, $p < 0.001$, clomipramine, $p = 0.001$, fluoxetine, $p < 0.001$) compared with fluoxetine but, importantly, was not superior to placebo (da Costa et al., 2013). Previously literature has shown clomipramine to be effective for obsessive compulsive disorder (OCD). OCD was previously listed under anxiety disorders in DSM IV-TR. DeVeaugh-Geiss et al. (1992) in an 8-week multisite study found clomipramine to be effective in children and adolescent with OCD ($N = 60$). The dose of clomipramine ranged from 75 mg/day to 150 mg/day for weights 25–30 kg to >60 kg. Subjects in clomipramine group had 37% mean reduction in symptoms on the Y-BOCS ($p < 0.05$) compared to 8% in placebo group (DeVeaugh-Geiss et al., 1992).

Administration, Monitoring, and Discontinuation

Selecting medications for treatment of child and adolescent anxiety disorders is based upon multiple factors including age, psychiatric and medical comorbidities, family history of treatment response, side effect profiles, potential for treatment non-adherence, and patient and family preference. In general, medications should be started at the lowest possible dose and increased based on clinical efficacy. Antidepressants dosing is not weight-based in children and adolescents. While antidepressant medications may take up to 6–8 weeks to reach maximum effectiveness, a response may be noted within 2 weeks (Strawn et al., 2018b; Varigonda et al., 2015). If there is no improvement in symptoms, medication dosages should be increased or changed depending on medication tolerability. According to the Federal Drug Administration (FDA), monitoring should be weekly for the first 4 weeks after initiation, biweekly in the second month, and monthly thereafter. There are several self-report measures to screen for anxiety disorders in children and adolescents including the Revised Children's Manifest Anxiety Scale (RCMAS), Multidimensional Anxiety Scale for Children (MASC), and the Screen for Child Anxiety Related Disorders (SCARED). Both the MASC and SCARED have adolescent and parent rating versions and may help monitor treatment progress (Birmaher et al., 1999; Lee et al., 1988; March et al., 1997).

Discontinuation of medications should be considered after 8–12 months of remission from anxiety symptoms, ideally during a time of low stress and over several weeks monitoring for a return of symptoms or side effects to discontinuation.

Safety, Adverse Effects, and the Blackbox Warning

SSRIs are the most commonly used first-line medications for anxiety disorders. Dobson and colleagues in 2019 conducted a meta-analysis to evaluate the efficacy and tolerability of pediatric psychopharmacology for anxiety disorders. They concluded that SSRIs are superior to SNRIs, which are superior to 5-HT1A agonists and TCAs in terms of tolerability. SSRIs and TCAs were better tolerated compared to alpha-2 agonists. Overall, SSRIs are superior for reducing anxiety in the pediatric population, but due to adverse effects, the likelihood of discontinuation is high without proper titration and management of expectations (Dobson et al., 2019). It is important to share with caregivers and patients that the following are common side effects and are generally both mild and transient: nausea, vomiting, diarrhea, flatulence, heartburn, decreased appetite, and dry mouth. SSRIs are also known to cause disinhibition or activation in children, as well as irritability, impulsivity, and agitation in adolescents. A dose reduction of SSRIs can decrease activation (Walkup & Labellarte, 2001). In October 2004, the FDA required the manufacturers of all antidepressant medications to add a black box warning after the UK Medicine and Healthcare Products Regulatory Agency findings on paroxetine. The FDA, in conjunction with Columbia University, conducted an extensive review of the raw clinical data from 24 placebo-controlled trials of 9 different antidepressant drugs available in 2004. The investigators (blinded to treatment) confirmed the occurrence of increased suicidal ideation or behavior. The average risk of such events on the antidepressant was 4%, twice the placebo risk of 2%. No suicides occurred in these trials (Hammad et al., 2006; FDA, accessed 2021).

Conclusion

The SSRIs and SNRIs medication classes are effective treatment options for anxiety disorders. Other medication classes have not yet provided sufficient evidence of efficacy for pediatric anxiety disorders or symptoms. Physicians should provide families and youth with psychoeducation related to side effects of SSRI and SNRIs, as discontinuation of treatment is high in pediatric anxiety trials. Additionally, physicians should educate families on the FDA Suicide Warning while simultaneously monitoring for suicidal ideations or behaviors especially in the initial phases of treatment. The SSRIs and SNRIs can be the initial treatment option for moderate to severe anxiety or in mild cases where CBT availability is limited. The combination of CBT and SSRIs is more effective than either treatment alone.

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24 A Common Mechanism for Anxiety Disorders and Drug Addiction: Implications for Current and Novel Pharmacological Treatments

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Pharmacological treatments of anxiety in adolescents generally follow the same guidelines as treatment of anxiety in adults. In order to provide a working framework that considers the dual diagnosis of anxiety disorder and substance abuse, a biological perspective on anxiety and substance abuse is presented with a focus on a common mechanism of conditioned responses resulting in a shared pathophysiology. Implications for treatment approaches are then considered.

Phenomenology of Anxiety Disorders and Substance Abuse

Anxiety and substance use disorders coexist more frequently than expected by chance in both the general population and clinical samples (Castle, 2008). As occurs when psychiatric conditions co-occur, for dual diagnosis patients it is not always possible, or even heuristic, to determine which disorder is "primary" and which is "secondary." Notwithstanding, the notion that substance abuse is a "secondary" disorder is generally prevalent (Kushner et al., 1990). Often the "primary" disorder is considered as that which appears first, yet this presentation may develop as a function of environmental exposures or triggers rather than clinical or biological predominance. A different approach might consider that biological pathways in common may predispose patients to both conditions.

From an epidemiological perspective, anxiety and substance use disorders are among the most prevalent psychiatric disorders, with lifetime rates of 28.8% and 14.6%, respectively (Kessler et al., 2005). Further, if generalized anxiety disorder or panic disorder are present, then odd ratio (confidence interval) for substance dependence is 9.5 (4.8–18.8), lower for social phobia 4.5 (2.5–8.2) and specific phobia 3.8 (2.1–6.7). In addition, post-traumatic stress disorder (PTSD) has been shown to correlate strongly with alcohol use disorder (Compton et al., 2007). Up to 50% of individuals seeking treatment for substance dependence have a comorbid anxiety disorder (Kushner et al., 1990), with implications for treatment as well as recovery. Thus, while it is biologically plausible that substance use disorders, including alcohol abuse, may uncover susceptibilities to anxiety disorders as evidenced by experiments showing that alcohol cues activate brain regions associated with negative affect (Feldstein et al., 2009), it is also plausible that alcohol and substance use diminish the threshold

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for clinical anxiety symptom expression (Feldstein et al., 2009). For example, ethanol and corticotropin releasing factor (CRF) interact to increase release of GABA in central amygdalar nuclei, setting the stage for increased anxiety expression in relation to alcohol consumptpion (Roberto et al., 2020). Additionally, individuals with comorbid alcohol abuse and anxiety disorders are at higher risk for relapse after alcohol treatment, with social phobia predicting any relapse and panic disorder predicting dependence relapse (Kushner et al., 2005). Other studies have reaffirmed the importance of taking into consideration co-occurring depressive and anxiety disorders when treating individuals for substance use, with a significant impact on long-term disability (Bovasso, 2001). Further, there is epidemiologic support for a common "factor" underlying both psychiatric and substance abuse morbidity. In a study of over 5000 respondents to a questionnaire on depressive, anxiety, alcohol, and drug use disorders, there was significant familial aggregation among disorders. That is, if the proband had one of the disorders, then relatives were more likely to have the other disorders even if the relative did not have the original proband disorder (Kendler et al., 1997).

Pathophysiology of Anxiety Disorders and Substance Use

Anxiety disorders and substance use can be framed in the context of conditioned responses, anxious or appetitive, respectively. Anxiety can be partly understood as a conditioned or learned fear response, building on an inborn reactivity to threatening stimuli, captured under the concept of "fear conditioning." Key brain areas underlying fear conditioning include the amygdala and insula. Subjects with social and specific phobias and healthy subjects undergoing fear conditioning, for example, have consistently shown greater amygdala and insula activity associated with negative emotional responses compared to matched comparison subjects (Etkin & Wager, 2007). Substance use disorders, operationalized as drug-seeking behaviors, can also be conceptually framed as a conditioned response or learned behavior. Rat studies support the notion that, as conditioned responses, both anxiety and drug-seeking are subsumed by initiation in prelimbic cortex circuitry and suppression circuitry in infralimbic cortex (Peters et al., 2009). In this physiologic framework, the infralimbic rat brain region is analogous to human ventral prefrontal cortex (Brodmann Areas 10–13, Brodmann Area 25), a critical brain region involved in emotional regulation and ultimately responsible for suppression of (adaptive or maladaptive) conditioned responding (Peters et al., 2008). Extinction memory, a process that involves the suppression of conditioned responses, serves to regulate the emotional response to learned behaviors. Stimulation of the infralimbic area in rats, both electrophysiologically (Milad & Quirk, 2002) and pharmacologically (Sierra-Mercado Jr. et al., 2006), are associated with stronger extinction memory learning. The same stimulation is now associated with enhanced regulation of emotional responses to learned behaviors, aiding behavioral extinction. For example, in Sierra-Mercado Jr. et al. (2006), tetrodotoxin inactivated the ventromedial prefrontal cortex in rats prior to extinction, which led to impaired recall of extinction the next day. These data suggest that active extinction-related neuroplasticity in targeted brain areas plays a role in fear extinction. These same areas could then subsume learned behaviors for anxiety conditioning as well as the inability to regulate emotional responses in drug-seeking behaviors. The amygdala, in particular, is thought to be involved in all stages of fear learning, but prefrontal areas are specific to the extinction phase (Delgado et al., 2006). In particular, long-term potentiation (LTP) maintenance in the medial prefrontal cortex is associated with maintenance of extinction learning, preventing a return of a fear response after administration of the conditioned fear-inducing stimulus in mice (Herry & Garcia, 2002). Using a similar paradigm, it has been proposed that extinction failure in the appetitive domain can lead to relapse in addiction. Studies now show that by inhibiting select brain nuclei with GABA agonists, suppression of cocaine-seeking pro-

duced by previous extinction training requires activity in the rat infralimbic cortex (Peters et al., 2008). On the contrary, activating the same brain region with glutamate-based AMPA receptor stimulation, reinstatement of cocaine drug-seeking was suppressed in these animals (Peters et al., 2008). As noted above, the infralimbic cortex also subsumes extinction learning in anxiety-based paradigms. In contrast to anxiety-based circuitry, in drug addiction, the connection of the infralimbic cortex to the nucleus acccumbens (NAc) shell plays a critical role. Inhibition of the NAc shell induces cocaine-seeking in rats with prior extinction training (Sesack et al., 1989).

Principles of Treatment of Anxiety Disorders and Substance Use

In concert with the parallel pathophysiology of anxiety and substance abuse based on plausible common biological substrates for conditioned learning, there are similarly possible common approaches to conceptualizing interventions that aim to provoke extinction memory or suppression of conditioned responses for both anxiety disorders and drug addiction. The amygdala plays a role in modulating anxiety extinction memory via the lateral nucleus (LA), the afferent arm of the amygdala which receives input from the cortex and thalamus. The LA dissipates its neuronal firing in cell experiments if the unconditioned stimulus (UCS), for example an electric shock, following the conditioned stimulus (CS) sound, is no longer delivered after the CS on multiple occasions (Quirk et al., 1995). An important goal of clinical intervention in anxiety disorders is to facilitate extinction of fear responses through exposure. Any adjuvants to extinction learning thus enhance the therapeutic process. Facilitation of neuroplasticity in the amygdala for learning of extinction responses may then be germane to enhancing anxiety treatments (Myers & Davis, 2002). In this way, the use of D-cycloserine (DCS), a partial glutamate agonist, has been used to facilitate extinction learning and has proven to even prevent learned fear after reinstatement of the UCS (Ledgerwood et al., 2004). It is of interest that DCS has been effective when used acutely shortly before (Walker et al., 2002) or immediately after (Ledgerwood et al., 2005) extinction sessions; more chronic use of DCS can have a blunting effect on the beneficial effects of immediate DCS (Quartermain et al., 1994). However, subsequent studies were unable to reproduce these findings (Ori et al., 2015).

The management of stress, in turn, has been linked to improving outcomes in relapse prevention in substance abuse (Goeders, 2003). A physiologic connection between exposure to stress, modifications of the hypothalamic–pituitary–adrenal (HPA) axis, and abstinence cravings suggest such an approach. In animals, exposure to electric footshock increases subsequent reinforcing efficacy of heroin (Shaham & Stewart, 1994) and morphine (Will et al., 1998). Thus, it is not surprising that the acquisition of amphetamine and cocaine self-administration is enhanced in rats exposed to tail pinch (Piazza et al., 1990), social defeat (Kabbaj et al., 2001), or neonatal isolation (Kosten et al., 2000), all stress-inducing environmental conditions. By activating the HPA axis, it is plausible that anxiety disorders generate a persistent internal milieu that is analogous to the effects of outward adverse environmental stressors. Additionally, anxiety disorders precipitated by environmental stressors may similarly mediate the effects of the adverse environment and perpetuate its effect. In both cases, environmental stressors, anxiety disorders, and substance abuse become intertwined in a self-perpetuating cycle of relapse and barriers to effective treatment. Given that childhood anxiety disorders are precursors to later mental health vulnerabilities, early intervention in anxiety disorders could plausibly address a critical link in the longitudinal acquisition of later co-occurring conditions in different environmental contexts.

Given the plausible etiological connections between stress, anxiety, and substance abuse, it is not surprising that, in particular, post-traumatic stress disorder (PTSD) has been associated with substance abuse. Psychopathologically, PTSD is a multi-determined clinical condition, mediated by the environmental exposure in vulnerable individuals. Females with a history of affective

disorders are at higher risk for PTSD while males with a history of anxiety disorders are similarly at higher risk (Bromet et al., 1998). In turn, individuals who are engaged in substance abuse are at increased risk for exposure to trauma (Cottler et al., 1992). In this complex interaction between anxiety, PTSD, substance abuse, and exposure to trauma, it appears that anxiety disorders mostly precede PTSD but that subsequent occurrence of PTSD or multiple traumas does not increase the occurrence of other anxiety disorders; therefore, non-PTSD anxiety disorders appear to act primarily as predisposing factors for both PTSD and substance abuse. In a comprehensive study of 1420 children followed longitudinally, traumatic events were fairly common and did not frequently result in PTSD; however, multiple traumas or prior anxiety disorders were associated with PTSD development (Copeland et al., 2007). In another study of 1140 children in South Africa, a clear relationship was found between cumulative trauma and incidence of PTSD symptoms and depression but not of anxiety disorders (Suliman et al., 2009). In particular, the subgroup of children who are poly-victimized (Finkelhor et al., 2009) are thus at high risk for both PTSD and substance abuse. Childhood abuse is associated with a persistent sensitization of the HPA axis in adulthood, and in children, a similar sensitization has been detected in social anxiety patients with a history of childhood abuse (Elzinga et al., 2009).

In light of the plausible influence of pediatric anxiety disorders on the development of substance abuse, an epidemiologic perspective would strongly support the early treatment of anxiety, especially in vulnerable children (i.e., positive family history of substance abuse, exposure to trauma). While much research is sorely needed to establish reciprocal etiological pathways between anxiety and substance use disorders, there is sufficient evidence to recommend the early detection and treatment of anxiety in childhood as a component of a general strategy to prevent distal substance use disorders, depression, and PTSD outcomes. In particular, it is known that early-life anxiety disorders predispose to adult anxiety disorders (Kim-Cohen et al., 2003), which are in turn highly comorbid with alcohol abuse (Saraceno et al., 2009).

Pharmacology in Anxiety Disorders and Substance Abuse: Current and Novel Approaches

While psychosocial treatments for substance use disorders are a primary intervention to break the cycle of drug use and drug-seeking behaviors, the current focus will be on the pharmacological treatment of anxiety disorders in the context of substance use in adolescents. Most trials of anti-anxiety agents do not include individuals with substance use, as this is almost universally an exclusion criterion in efficacy trials. Therefore, informed but empirical clinical decision-making needs to guide treatment approaches, given the paucity of controlled data in dual diagnosis populations, especially adolescents. Alcohol withdrawal, for example, uniformly causes anxiety and benefits from anxiety pharmacologic management strategies, but also from medications such as naltrexone to reduce cravings, which is not used in primary anxiety disorders.

In adults, alcohol-related depression has shown a good response to selective serotonin reuptake inhibitor (SSRI) treatment (Lejoyeux, 1996). And in general, given the wide spectrum of anxiety disorders that respond to SSRIs, this medication class remains the treatment of choice for anxiety in the context of comorbidity, including substance use disorders (Dunner, 2001). As evidenced by studies in adults, SSRIs can also be helpful in the context of alcoholism comorbid with PTSD (Brady et al., 1995) as well as social anxiety (Randall et al., 2001). SSRIs are also generally safe in the context of medical complications from substance abuse, such as liver dysfunction (see Table 24.1). On the other hand, bupropion (Wellbutrin) is not recommended in patients with co-occurring affective disorders and alcohol use disorder, due to a potential to decrease the seizure threshold and higher risk of alcoholic withdrawal seizures (Silverstone et al., 2008).

Buspirone (Buspar) has been used to control anxiety symptoms in alcohol abuse with reduced

Table 24.1 Sample pharmacologic approaches to treatment of comorbid anxiety and substance abuse

Drug	Use	Side effects	Comments
Conventional pharmacological approaches			
SSRIs[a] (Fluoxetine) (20–40 mg/day or equivalent; single dose)	Ethanol abuse or drug abuse	Insomnia, headaches, GI upset, sexual dysfunction	Broad spectrum use for anxiety and depressive disorders associated with dual diagnosis
Buspirone (Buspar) (15–60 mg/day; divided doses)	Ethanol abuse or opioid abuse	Dizziness, nausea, headache, nervousness, lightheadedness	Anxiolytic properties useful in ethanol/opioid abuse
Novel pharmacological approaches			
Gabapentin (Neurontin) (300–1800 mg/day; divided doses)	Ethanol abuse	Back pain, diplopia or blurry vision, clumsiness, constipation, diarrhea, dizziness, drowsiness, dry mouth, nausea, stomach upset, tiredness, vomiting, weight gain	Animal studies suggest specific effect in ethanol-dependence; may also decrease withdrawal-associated anxiety from ethanol and cocaine
N-acetylcysteine (200–1200 mg/day)	Cocaine abuse	Nausea, vomiting, headache, rash, dry mouth, dizziness, or abdominal pain (cramps, diarrhea), depletion heavy metals and vitamins	Pretreatment with N-acetylcysteine prevents cocaine-induced changes in nucleus accumbens

[a]Selective serotonin reuptake inhibitors: fluoxetine (Prozac), sertraline (Zoloft), fluvoxamine (Luvox), escitalopram (Lexapro), citalopram (Celexa), paroxetine (Paxil)

anxiety and drinking associated with its use (Kranzler et al., 1994). A similar positive experience was obtained with the use of buspirone in methadone patients (McRae et al., 2004). By extension, these approaches may be reasonable in adolescent populations that require pharmacological management of anxiety disorders in the context of alcohol abuse or opioid dependence.

The benzodiazepine class of medications are not a favorable option for comorbid anxiety disorder and substance use disorder due to higher potential for misuse, but they can be instrumental in alcohol withdrawal protocols. The use of GABAergic agents for managing drug dependence focuses on reducing cravings, making use of glutamate–GABA brain homeostasis modulation. Gabapentin (Neurontin), a non-benzodiazepine anticonvulsant GABA analog, modulates transmission in the central amygdala (CeA) via GABA-B receptors (Roberto et al., 2008). Ethanol, also modulates GABAergic transmission in the pre- and post-synapse in the CeA, but apparently via GABA-A receptors (Roberto et al., 2003). More importantly, when ethanol-dependent rats, which developed an increase in baseline GABA transmission were administered gabapentin, the excess GABA transmission was attenuated. Gabapentin produces a different effect in nondependent rats, specifically, an increase in GABA transmission (Roberto et al., 2008). Thus, gabapentin may have a specific use in the context of ethanol dependence separate from that in non-dual diagnosis patient. Further, in experimental animals, anxiety-related withdrawal was attenuated with gapapentin, which suggests that relief of anxiety via GABA mechanisms may attenuate alcohol consumption. Gabapentin is thus a promising drug for treating alcohol abuse via its anxiolytic properties (Clemens & Vendruscolo, 2008). Earlier, gabapentin had been used to treat cocaine craving in 30 cocaine-dependent subjects. In an 8-week, open-label trial of 1200 mg/day of gabapentin, there was a very significant reduction in craving and use of cocaine in the treated group (Myrick et al., 2001). Pregabalin (Lyrica) is structurally similar to gabapentin but more potent as a GABA analogue (Wensel et al., 2012) and can be considered for similar uses. Although GABAergic medication use has been promising, to date, several experimental GABA-A receptor subtype agonists have failed to reach the market due to poor efficacy and tolerability (Griebel & Holmes, 2013).

In the last decade, clinical research had explored modulation of glutamate NMDA receptors as a potential target. In this context, drugs that were NMDA receptor antagonists block extinction and reconsolidation of fear memories. CNS glutamate modulators are glycine and D-serine (agonists), felbamate (antagonist), and D-cycloserine (partial agonist). Ketamine, amantadine, memantine, dextromethorphan, and riluzole are glutamate modulators, with potential for improving GABA–glutamate homeostasis; however, due to multiple receptor targets and mechanisms, these drugs are only initially being used to target anxiety (Garakani et al., 2020). Additional clinical research trials are needed to pinpoint which of these agents may directly target fear mechanisms (Amaral & Roesler, 2008). Glutamate homeostasis is proposed to play a role in addictions, manifesting as a failure of the prefrontal brain areas to control drug-seeking behaviors, and leading to proposed glutamate-based therapies for addiction treatment (Kalivas, 2009). N-acetylcysteine, for example, activates the cystine–glutamate exchange by restoring nonsynaptic glutamate release and the ability to induce neuronal long-term potentiation (LTP) and long-term depression (LTD): this process can enhance extinction learning and decrease drug-cravings in the case of cocaine (Madayag et al., 2007). Riluzole has several open label studies for generalized anxiety disorder, demonstrating neurophysiological correlates and improvement on anxiety scales (Abdallah et al., 2013).

Conclusions and Future Directions

At present, empirical treatments, based on sound clinical judgment, guide the pharmacological management of anxiety disorders co-occurring with substance use disorders, given the notable dearth of controlled trials in dual diagnosis clinical populations. Hopefully, as effectiveness studies get underway with a renewed interest and support of funding agencies for "real world" outcomes, more data will be available to direct interventions in this challenging group of patients. Pathophysiologic studies, as discussed above, provide initial evidence for a putative common mechanism for anxiety and substance use disorders, in particular, early treatment of anxiety emerges as a potential preventative measure to avert later substance use disorders. If these observations are supported by future research, there will be a notable opportunity to develop pharmacological treatments that take advantage of shared biological mechanisms, mostly focused on the CNS glutamate–GABA homeostatic system.

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Part IV

Food Neophobia in Children: Misnomer, Anxious Arousal, or Other Emotional Avoidance?

25

Dean McKay and Charlene Minaya

> The vital importance of nutrition and the severe risks of poisoning may together account for the strong affective responses associated with eating and for the ambivalence associated with this process. This conflict… is represented by opposing tendencies to fear and to explore new foods, or to like both familiar and novel foods. (Rozin & Fallon, 1987, p. 27)

Coined the "omnivore's dilemma" (Rozin & Fallon, 1987), this evolutionarily based mechanism, which is characterized by seemingly conflicting inclinations to ingest and avoid unfamiliar foods, is thought to influence the food preferences and consumption of humans and other omnivorous species (Addessi et al., 2005; Alley & Potter, 2011; Birch et al., 1998; Dovey et al., 2008; Martins & Pliner, 2005; Rozin & Fallon, 1987; Rozin & Vollmecke, 1986). Theoretically, the coexistence of food neophilia (approach to new and unique foods) and food neophobia (avoidance of unfamiliar or novel food items) served to increase the probability that our early ancestors sought and consumed foods that provided adequate nutrition, while avoiding potentially poisonous or toxic plants, animals, and animal products (Dovey et al., 2008; Flight et al., 2003; Martins & Pliner, 2005; Milton, 1993; Russell & Worsley, 2008). In humans, the latter, protective mechanism appears to be especially pronounced in early childhood. When infants gain the capacity for locomotion, their diets become increasingly omnivorous and varied, and an exclusive milk diet no longer provides adequate nutrition (Addessi et al., 2005; Cooke et al., 2003; Dovey et al., 2008; Lafraire et al., 2016). Interestingly, infant rejection of novel foods can predict food neophobia in early childhood (Moding & Stifter, 2016a). The impact of food neophobia decreases dramatically in later childhood and continues to lessen at a more gradual pace in adolescence and adulthood (Alley & Potter, 2011; Dovey et al., 2008).

Defining Food Neophobia

Food neophobia has been operationally defined as the rejection and avoidance of novel foods (Cooke et al., 2006; Dovey et al., 2008; Knaapila et al., 2007; Pliner & Hobden, 1992) and has been conceptualized as both a behavioral process and a personality trait (Pliner & Hobden, 1992). In their seminal paper, Pliner and Hobden describe the food neophobia trait as "a continuum along which people can be located in terms of their stable propensity to approach or avoid novel foods" (1992, p. 107). In order to highlight the specificity of the food neophobia construct, sev-

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eral researchers have drawn attention to the distinction between food neophobia and the more general construct, picky eating, which is the general reluctance to consume foods that are appraised as objectionable (Cooke et al., 2006; Dovey et al., 2008; Galloway et al., 2003; Jacobi et al., 2003). Thus, food neophobia is considered to be a subtype of picky eating characterized by unwillingness to consume unfamiliar foodstuffs (Dovey et al., 2008).

Avoidance of unfamiliar foods is an age-old problem and is a common complaint among parents. They describe their children, who have highly restrictive diets, as "picky eaters." A wide array of explanations have been offered for this pattern of avoidance in children, ranging from increased taste sensitivity in youth (Cowart, 1981) to a more recent conceptualization based on global sensory hyperawareness (Coulthard & Blissett, 2009; Mustonen & Tuorila, 2010) with moderating effects based on mother's food preferences both pre- and postnatally. This has created difficulties in conceptualization of food neophobia in extreme cases, whereby dietary restrictions lead to dietary deficits. Social facilitation can decrease food neophobia in youth, although this varies depending on the other person's social status or role. Peer modeling can significantly decrease food neophobia, while parental modeling has shown little to no demonstrable impact on decreasing food neophobia (Kutbi et al., 2019; Lafraire et al., 2016). Furthermore, parents may inadvertently worsen the problem associated with food neophobia by pressurizing children to try unfamiliar foods that they make efforts to avoid (Moding & Stifter, 2016b). Tuorila and Mustonen (2010) conducted an experiment with children who had food aversions (but not dietary deficits associated with the avoidance). A total of 72 children between ages 8 and 11 years were given rating tasks for a range of foods. The most negative ratings were given to foods that the children (a) expressed a reluctance to try even though they had never had those foods, and (b) were nevertheless pressed to try. This suggests that efforts to induce trying of new foods require additional inducements whereby the child ultimately tries the food without undue additional pressure.

While past literature has focused largely on sensory hypersensitivity as a predictor, with moderating effects based on parental eating habits, there is limited detailed evaluation of food neophobia and its treatment. The purpose of this chapter is to cover the existing literature, its association with different childhood psychological conditions, and some potentially promising avenues for treatment. As the literature for this problem remains limited, we present illustrative cases where different levels of food aversion were present and how treatment was conceptualized. We recognize that this in no way represents a comprehensive means of developing treatment guidelines for mental health practitioners but, instead, suggests potential avenues for further investigation.

Pathological Patterns of Food Neophobia and Associated Consequences

In contradistinction to the other diagnostic entities outlined in this volume, comparatively little research has been devoted to investigating the relationship between normative and more maladaptive patterns of food neophobia. Indeed, the phenomenology, etiology, maintenance, and emotional underpinnings of food neophobia are, by and large, not well understood. What is clear, however, is that a large minority of children and adolescents exhibit levels of food neophobia that constrain food selection to such a degree that diet variety, diversity, and overall quality are negatively impacted (Cooke et al., 2006, 2003; Falciglia et al., 2000; Galloway et al., 2003; Russell & Worsley, 2008). Recent research suggests, however, that food neophobia has not demonstrated a clear, direct association with childhood weight status (Brown et al., 2016; Tan & Holub, 2012). Kaar et al. (2016) found that food neophobia and overweight status were linked through decreased vegetable consumption and additional research has pointed to a negative

relationship between food neophobia and vegetable consumption (Proserpio et al., 2020). Further, picky eating in childhood has been demonstrated to increase the risk of developing extreme levels of anorexic symptoms in adolescence (Marchi & Cohen, 1990).

While the existing research has been limited in scope, investigations have centered on a small subset of genetic sensitivities to bitter taste, in particular the chemical 6-*n*-propylthiouracil (which is also a drug used in the treatment of Grave's disease, which carries an FDA alert regarding risk of serious liver damage and potential life-threatening effects associated with its use). Individuals with this specific taste sensitivity are significantly less likely to try novel foods, including those commonly accepted among children (such as American cheese and whole milk; Keller et al., 2002). Some have observed a gender interaction, in that males consume more fatty protein products (such as animal-based meat products), leading to higher weight-to-height ratios, whereas females demonstrate a more global food avoidance, including fatty meat products, leading to lower weight-to-height ratios (Keller & Tepper, 2004).

Dietary Restriction In contrast to the developmentally appropriate and adaptive pattern described above, a significant minority of children and adolescents exhibit such severe levels of food neophobia that food is restricted to a dysfunctional degree. Russell and Worsley (2008) recently investigated the relationships between food neophobia and food preferences among a sample of preschoolers recruited from the community. The investigators discovered that trait food neophobia was negatively related to children's preferences for all food groups, with substantial correlations between food neophobia and preferences for vegetables, meats, and fruit. Significant negative correlations were also observed between food neophobia and the number of liked food items, the variety of food preferences, and the overall quality of children's preferences.

Falciglia et al. (2000) compared the diets of fourth- and fifth-grade students with varying levels of food neophobia. Participants were classified into one of three groups based on their scores on the Food Neophobia Scale (Pliner & Hobden, 1992): (a) food neophobia, (b) average, and (c) food neophilia. Compared to the latter two groups, neophobic children were less likely to meet two-thirds of the Recommended Dietary Allowances (RDAs) and Dietary Reference Intakes (DRIs) of vitamin E. The diets of these children were also characterized by a higher intake of saturated fat, less dietary variety, and of poorer overall quality, as measured by the USDA Healthy Eating Index (HEI; 1995). As might be expected, neophobic children also consumed fewer unique foods than their neophilic counterparts.

In a survey of the eating behaviors of preschool British children, Cooke et al. (2003) discovered that scores on the Child Food Neophobia Scale (CFNS; Pliner, 1994) were inversely related to frequency of parent-reported consumption of vegetables, fruit, meat, and eggs. Similar findings were ascertained by Cooke et al. (2006) in a more detailed analysis of these variables. Consistent with their earlier study (2003), and in accordance with the findings of Russell and Worsley (2008), food neophobia was negatively correlated with consumption of fruit, vegetables, protein foods, and total calories, even after controlling for child age, socioeconomic variables, and ethnicity. A comparison of the diets of children with higher and lower levels of neophobia yielded nearly identical results. That is, children with higher neophobia consumed significantly fewer fruits and vegetables, protein foods, and total calories. The relationship between cultural attitudes on food and food neophobia represents an important area of future investigation as food neophobic antecedents and consequences may differ by culture (Choe & Cho, 2011; Siegrist et al., 2013).

Anorexia Nervosa Picky eating in childhood has been demonstrated to increase the risk of extreme anorexic symptoms in adolescence. In a

10-year, longitudinal study of over 800 children, Marchi and Cohen (1990) utilized a logistic regression analysis to identify prospective risks associated with extreme eating disorder symptoms. Among other things, they discovered that (a) pickiness in early and later childhood was a significant risk factor for extreme symptoms of anorexia in adolescence, and (b) picky eating in later childhood and adolescence was predictive of symptoms two years later. A word of caution is in order, however. A careful examination of the pickiness construct utilized by Marchi and Cohen reveals a construct that is similar, yet clearly distinct from food neophobia. Therefore, the extent to which these findings are also true of food neophobia is unclear.

Avoidant/Restrictive Food Intake Disorder Avoidant/Restrictive Food Intake Disorder (ARFID) represents a disorder characterized by failing to consume enough nutrients to sufficiently meet one's biological needs (APA, 2013). To be diagnosed with ARFID, individuals must experience significant weight loss or stunted growth, nutritional deficiency, psychosocial impairment, or reliance on nutritional supplements or intestinal feeding. As ARFID involves food avoidance or severe food restriction, some investigators use the terms interchangeably (APA, 2013) and distinguishing between ARFID and food neophobia can be challenging. Sensory sensitivity has been implicated in both ARFID and food neophobia, although lack of interest in food and fear of aversive consequences may be more pronounced with ARFID (Kutbi et al., 2019; Thomas et al., 2017). Of note, food neophobia measures may help differentiate between individuals with ARFID, and individuals with anorexia nervosa (Becker et al., 2019) or people with disordered eating (Zickgraf et al., 2016), as those with ARFID scored significantly higher on food neophobia. Fortunately, treatment of ARFID has demonstrated a similar impact on food neophobia. In a study of children and adolescents receiving cognitive-behavioral therapy for ARFID, 70% of subjects no longer met criteria for ARFID posttreatment and food neophobia significantly decreased (Thomas et al., 2020). Nonetheless, additional investigation into the relationship between food neophobia and ARFID is required, particularly empirical investigations into the distinctness of the constructs.

In summary, studies have just begun to uncover the adverse outcomes associated with food neophobia. Available research suggests that food neophobia may unfavorably affect diet and eating behaviors, including the variety and overall quality of food preferences and consumption. This is particularly worrisome, as dietary variety and diversity are thought to help ensure that an adequate assortment of necessary nutrients and other essential dietary components are consumed (Falciglia et al., 2000; U.S. Department of Agriculture, 2005). Although less conclusive, research has also indicated that picky eating in childhood may increase the risk of developing anorexic symptoms in adolescence. It remains to be seen if food neophobia poses a similar risk and whether it may lead to ARFID or other eating disorders.

Cognitive-Behavioral Approaches for Food Neophobia

This review thus far illustrates that: (a) food neophobia is fairly common; (b) general food aversion is an adaptive response, and reluctance to try novel foods is an effort to protect from ingesting harmful substances; (c) alternatively, consumption of novel foods is also adaptive as it permits ingestion of chemicals associated with a healthy diverse diet; (d) in extreme forms the avoidance mechanism prevents consumption of food, even if it comes with dietary risks; and (e) this proneness to elevated aversive responses to food may be due, in part, to normal developmental factors, inherited components, and parental behavior.

These factors imply several possible lines of intervention, depending on the severity of food avoidance and willingness to engage in activities designed to expand diet choices. In line with cognitive-behavioral approaches to therapy, the

most appropriate potential interventions would involve exposure, contingency management, or some combination of these two interventions. In any case, parent training would also be considered crucial for successful treatment. Additionally, it is important to note that most people have specific food likes and dislikes. It is therefore essential that clinicians remain sensitive to the goal of expanding the range of accepted foods while also maintaining that some food aversions may remain regardless of efforts to alleviate them.

Treatment Approach #1: Contingency Management

For mild food aversion that does not rise to the level of impairment (associated with inadequacies in diet), offering contingent rewards for trying new foods can be a viable approach. As noted above, pressure for trying new foods creates negative responses to that class of food (Tuorila & Mustonen, 2010). Therefore, creating inducements for trying classes of foods that may fall outside the range of acceptable foods, but are near to the core feature that is being avoided, may be an acceptable means of increasing the range of foods eaten. This essentially combines the notion of a hierarchy of potentially acceptable foods (ranging from readily acceptable to unquestionably rejected) with providing reinforcement for those food items that would not be readily eaten but are low on the hierarchy. For example, if a child accepts only chicken nuggets, he may be persuaded to expand his food choices to breaded chicken cutlets (a nearby item, but not as small or as heavily breaded as nuggets).

Setting up the hierarchy may require some ad hoc guesses as to what would constitute acceptable foods. That is, the clinician may need to approximate foods that are not exactly matched to acceptable foods on a trial-and-error basis to develop a program of contingency management that will be acceptable to the child and viable for the parent or caregiver to implement. Further, the features of new foods that are considered "acceptable" or "unacceptable" can vary based on several characteristics. Just as fear hierarchies are based on specific parameters (e.g., proximity and time in contact; see Wolpe, 1992), food hierarchies may be constructed based on size of food item, texture, and method of preparation. These are just a few possible dimensions on which food hierarchies may be developed. An illustration of this type of hierarchy is presented in Table 25.1. Once a food hierarchy is established, the child should be provided with daily reinforcement for consuming some agreed-upon food listed on the low end of the hierarchy. Once the child becomes proficient at eating low-level preparations of the avoided food, the child should be reinforced for eating preparations that are listed higher on the hierarchy, and so on. Once the hierarchy for a particular preparation is finished, or close to finished, other foods may be approached to expand the range of foods consumed.

Table 25.1 Illustrative hierarchy for developing contingencies to expand food consumption range

Texture	Degree of desirability (0 = not desirable; 10 = highly desirable)
Chicken, cooked without skin	0
Chicken, cooked with skin	2
Chicken, boneless, no breading	3
Chicken, boneless, lightly breaded	5
Chicken, boneless, in strips, breaded	7
Chicken nuggets, small, heavily breaded	9
Method of preparation	
Chicken, sautéed	1
Chicken, grilled	3
Chicken, grilled with light breading	4
Chicken, fried with no breading	5
Chicken, fried, lightly breaded	7
Chicken, fried, heavily breaded	9

Note: These are for a child who primarily consumes chicken nuggets but either reluctantly accepts other chicken preparations or rejects other forms altogether

Treatment Approach #2: In Vivo and Graduated Exposure

For some children, there is a general willingness to try new foods, but a corresponding problem of lingering aversion that arises when the child has a negative gustatory experience. In such instances, exposure (in vivo or graduated) may be attempted, but it would constitute small levels of exposure. That is, in contrast with in vivo exposure approaches for feared situations, where massed exposure to feared stimuli is practiced until there is habituation (for detailed discussion, see Richard & Lauterbach, 2006), it may be more difficult to accomplish true habituation to rejected foods. Indeed, recent analyses have suggested that graduated exposures for food aversion may help children accept new foods (Dovey et al., 2008), but food exposures are unlikely to achieve fear habituation. Instead, the role of food exposures is to expand the range of foods consumed and diminish avoidance, but not necessarily to alter an emotional reaction to different foods.

The hierarchy described in the section related to contingency management would serve the purpose of setting the occasion for an exposure-based approach as well. This can be initiated, developed, and managed in the office, while also being implemented at home by parents and caregivers for enhanced generalization.

The Special Role of Disgust in Food Neophobia

At the beginning, we noted the importance of the omnivore's dilemma in setting the stage for understanding food neophobia. This idea also suggests that disgust plays a critical role in understanding food aversions and neophobia. Food neophobia has been positively related to food-related disgust in both Western and Middle Eastern youth (Egolf et al., 2019; Kutbi et al., 2019). Disgust is covered elsewhere in this book (Chap. 20), so we will not dwell on it here. Instead, we will center our discussion on the difficulties posed by exposure with the aim of reducing avoidance. Recent analyses have suggested that direct exposure to disgust requires more time to produce habituation (McKay, 2006). It has also been noted that the conditioning that leads to disgust is more resistant to habituation by its very nature, since it involves evaluative conditioning (de Houwer et al., 2001). That is, when an object is conditioned to elicit a reaction, the accompanying label attached to it makes it resistant to habituation.

Recent research has suggested that disgust plays an important role in preparing for the development of aversive stimuli in fear-conditioning experiments. To illustrate, Muris et al. (2008) found that when children were informed that specific unfamiliar animals were dirty, they were more likely to fear these animals, as compared to children who were told these same animals were clean. Another way in which disgust may operate to increase food avoidance is by observation of the reaction of others to food items. A recent study showed that when adults were presented with facial expressions of disgust in conjunction with food items, the willingness to consume the food was decreased, compared to control participants (Barthomeuf et al., 2009). In light of the attention bias that individuals with contamination fear (Armstrong et al., 2010) and unselected non-clinical participants (Cisler et al., 2009) show toward disgust stimuli, it is reasonable to suggest that food neophobia may develop, in large part, due to a combination of disgust reactions: the attention bias for minute disgust reactions in others when consuming food as well as the evaluative conditioning process that serves as an etiological mechanism for disgust responses. A preliminary model is illustrated in Fig. 25.1.

Treatment Considerations Related to Disgust: Making Exposure Work In light of the difficulty in producing habituation when there is a strong disgust reaction, and the proneness to direct attention to disgust relevant stimuli, applications of both in vivo and graduated exposure procedures require distraction to allow for adequate tolerability to the stimuli. This method contrasts accepted exposure procedures for fear-based stimuli, where distraction is associated with poorer outcome (Hazlett-Stevens & Craske,

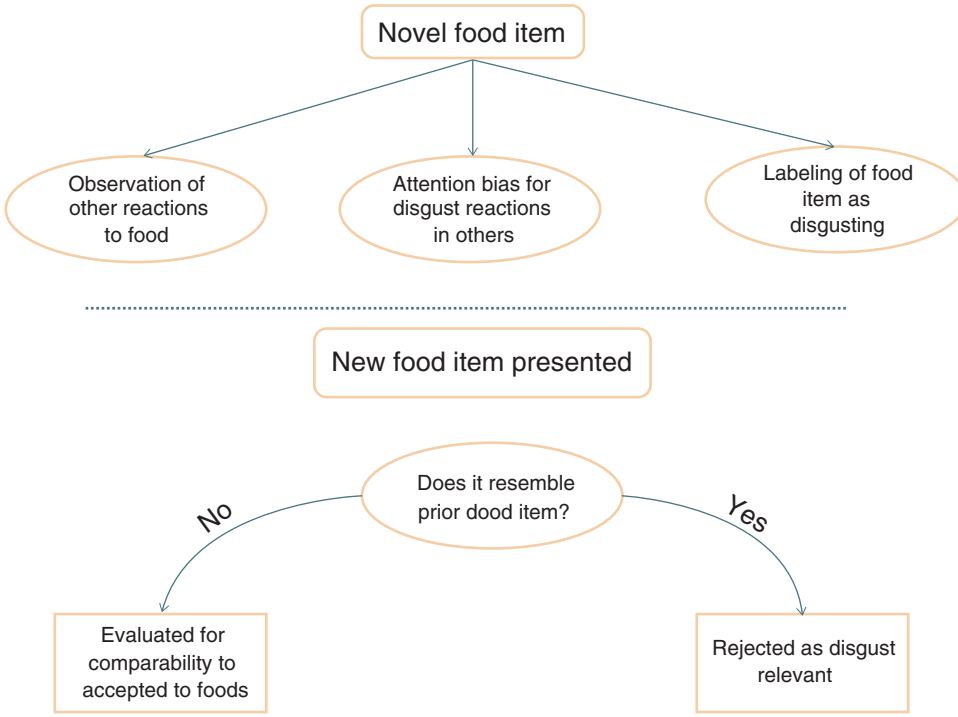


Fig. 25.1 Preliminary cognitive-behavioral model for the development of food neophobia

2008). Therefore, we propose applying a set of appealing distractions while setting up exposure for foods that have been labeled disgusting by children with extensive food avoidance. To illustrate, in a case treated by one of the authors of this chapter (DM), a set of strong olfactory distractions were arranged in advance of trying new foods. The child presenting for treatment was a 9-year-old male with an increasingly limited range of acceptable foods due to pronounced disgust reactions. His food avoidance had become so severe that he was losing weight and had difficulty finding acceptable foods at school and at summer day camp. He expressed strong hunger reactions but, at the same time, he was unable to overcome the disgust reaction for a wide range of foods. An illustration of the functional arrangement of relevant stimuli for this boy (Jake) is presented in Fig. 25.2.

Following the assessment, a hierarchy of potentially acceptable, but presently avoided, foods was constructed. In addition, a set of aromatic substances were identified that Jake found appealing. These included an aromatic candle and scented shaving cream, as well as a "taste block" involving a squirt of mouthwash into the mouth immediately prior to tasting new foods (which Jake also deemed acceptable; other possible stimuli include juices or toothpaste). When initiating exposure, the candle was lit, and the shaving cream was wiped just below Jake's nostrils in advance of beginning exposure to low items on the hierarchy. This arrangement is illustrated in Fig. 25.3. Jake responded well to these activities for low items on the hierarchy, and his mother was instructed to continue this exercise at home. This exercise continued for 15 sessions, with Jake receiving contingent reinforcement (using a "star chart") for trying new foods on a daily basis, as well as contingent rewards for engaging in treatment on a daily basis with his mother or father. By the end of treatment, Jake had gained weight and had a body mass index in the normal range. His gains were maintained at

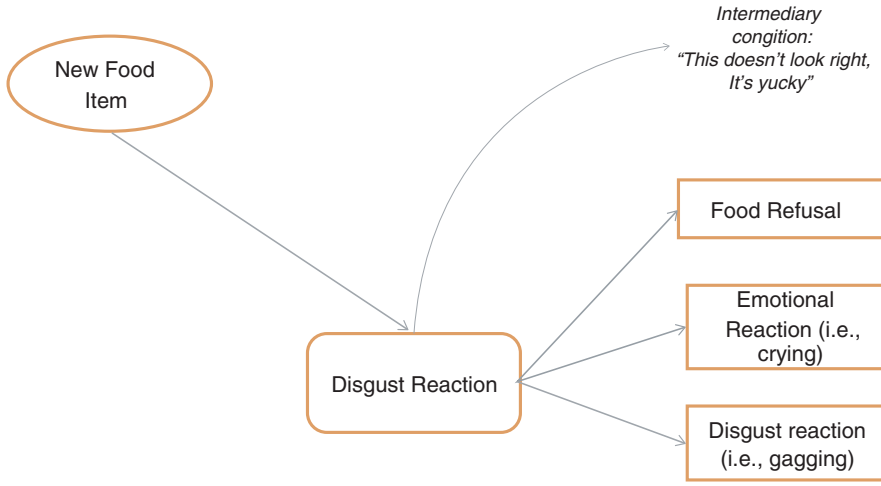
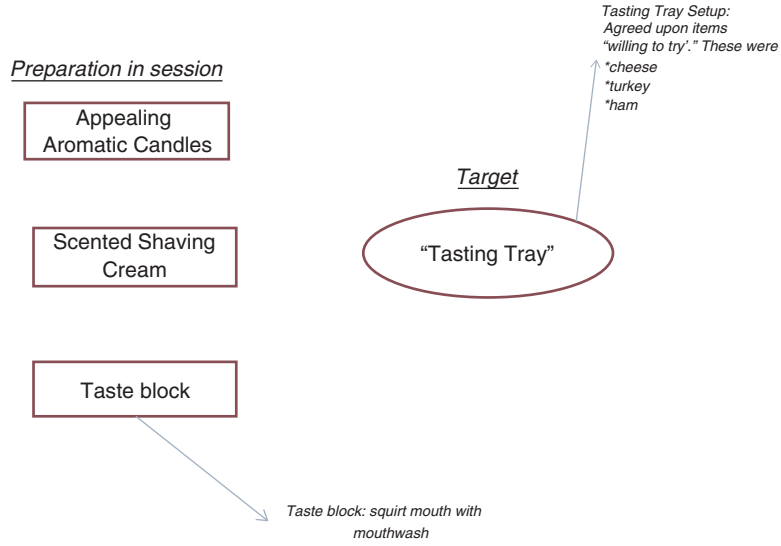


Fig. 25.2 Functional depiction of food refusal maintenance by disgust in "Jake"

Fig. 25.3 Development of exposure procedures for novel food items for "Jake"

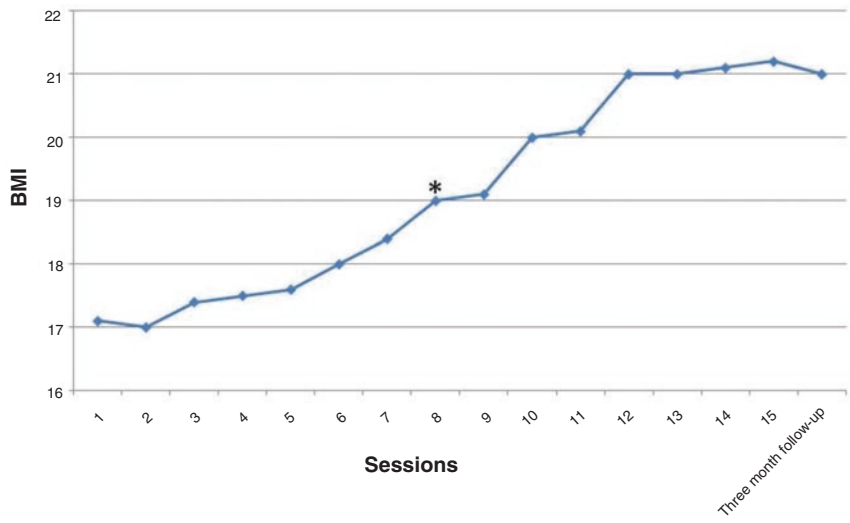


three-month follow-up. His progress is illustrated in Fig. 25.4.

Conclusions

The literature relating to cognitive-behavior therapy for food neophobia is extremely limited at this point. However, basic research on the correlates and causes of food aversion suggests that several important factors play a role in the problem. First, there are several ways that parents and caregivers, while well-intentioned, worsen food avoidance (such as through pressure on children to consume novel or otherwise rejected foods). Second, some food aversions may be heritable, such as the aversion associated with specific chemicals present in bitter foods. Third, several factors associated with disgust appear to play a prominent role in the development and maintenance of food avoidance.

We have attempted to outline several important features of food aversion toward developing a model for treatment. These components include adjusting exposure-based therapy to account for the special limitations in habituation to disgust,



BMI <18.5 considered underweight. Normal weight between 18.5 and 24.5.
• Reached normal range BMI by session 8 and maintained at follow-up.
• BMI calculated by kg/m²

Fig. 25.4 Treatment outcome for "Jake" following cognitive-behavioral therapy for food neophobia

and some potential methods for ensuring success when attempting either in vivo or graduated exposure. While we have been able to demonstrate treatment-related improvements by incorporating an olfactory or gustatory distraction while conducting exposure with a severely food avoidant child, this is by no means to be taken as a set of treatment recommendations. The existing literature is very limited. While some have suggested that exposure could be efficacious (Dovey et al., 2008), there are a wide range of limitations associated with this approach. The most salient concern is how to approach children who are reluctant to engage in treatment at all. In light of the finding that the potential effectiveness of offering inducements to try new foods is offset by pressure to comply with consumption of new foods, it is highly probable that some efforts at developing exposure procedures would actually worsen food avoidance. Another highly salient consideration is the role of legitimate food taste differences. In highly food avoidant children, this may be difficult to discern but, simultaneously, there are little in the way of guidelines for determining variations in food tastes. We hope that this chapter will set the occasion for additional research on food aversions and neophobia within a cognitive-behavioral context in order that comprehensive treatment guidelines may be developed.

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26 Anxiety-Related Problems in Developmental Disabilities

Morgan M. McNeel, Emily R. Jellinek, and Eric A. Storch

Developmental disabilities encompass a range of diagnoses that present developmental challenges in language, learning, behavior, and/or physical mobility (Zablotsky et al., 2019). While many conditions are included in this group (e.g., ADHD, learning disability), this chapter will focus exclusively on anxiety in the context of autism spectrum disorder (ASD) and intellectual disability (ID).

Autism spectrum disorder is characterized by impairments in social interactions and communication and the presence of restricted, repetitive behaviors (American Psychiatric Association, 2013). The prevalence of ASD is approximately 1 in 54 children (Maenner et al., 2020); males are 4.3 times more likely to be diagnosed than females (Maenner et al., 2020). Despite disparities in diagnosis and early intervention among Black and Hispanic children, ASD is similarly prevalent across all races, ethnicities, and socioeconomic status (SES) groups (Durkin et al., 2017).

Intellectual disability, which was formerly referred to as "mental retardation," is marked by the presence of significant impairment in intellectual functioning indicated by an intelligence quotient (IQ) below or equal to 70, adaptive behavior deficits (e.g., caring for self, autonomy, social skills), and the onset of these impairments before the age of 18 years (APA, 2013). Overall, ID affects approximately 1% of the general population. However, approximately 33% of individuals with ASD are also diagnosed with ID. The prevalence of ID does not differ by race and ethnicity, yet it is more likely to be diagnosed in males than females (Maenner et al., 2020; Maulik et al., 2013).

Anxiety disorders commonly co-occur with developmental disabilities. Prevalence estimates suggest that 7–34% of children with ID have comorbid anxiety disorders (Buckley et al., 2020). The lifetime prevalence for anxiety disorders among individuals with ASD is 42%, with approximately 40% of children with ASD having at least one anxiety disorder (Hollocks et al., 2019; Van Steensel et al., 2011). The most common comorbid anxiety disorders among children with ASD are specific phobias (30–44%), social anxiety disorder (SAD; 17–30%), generalized anxiety disorder (GAD; 15–35%), separation anxiety (9–38%), and obsessive-compulsive disorder (OCD; 17–30%) (Van Steensel et al., 2011; White et al., 2009).

Children with ASD and comorbid anxiety disorders are more likely to experience increased impairment compared to youth with ASD without anxiety, as anxiety can exacerbate ASD-related symptoms (White et al., 2009). The presence of anxiety and ASD may contribute to greater social difficulties, emotion regulation

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challenges, and the presence of disruptive and noncompliant behaviors (Kerns et al., 2016a; Wood & Gadow, 2010). These challenges are indicative of the need for accurate and effective assessment and intervention approaches that will aid in mitigating the associated impairment experienced by youth with ASD and/or ID and anxiety.

Considerations for Anxiety and Developmental Disabilities

Given heterogeneity in intellectual functioning, communication skills, and behavior, there are a number of special considerations when assessing and treating anxiety among individuals with ASD and/or ID. For example, impairments in communication and social skills, which are common among individuals with ASD and/or ID (APA, 2013), may limit the child's ability to report their thoughts, affective states, and psychological sensations. Communication impairments inherent to ASD and ID are perhaps the most salient challenge, as they impact not only the individual's ability to communicate their thoughts and feelings but also the caregivers' knowledge of their thoughts and feelings. This impacts the utility of both self- and other-informant reports, and thus, a multimodal approach is advocated.

It is also important to note shared features of anxiety and developmental disabilities, which can also complicate the assessment and treatment process among this population. For example, core symptoms of ASD include restricted, repetitive interests and behaviors, which may be difficult to differentiate from rituals in obsessive-compulsive disorder (OCD). Additionally, avoidance of certain situations (e.g., social interactions) is common in ASD, but may also be indicative of certain anxiety disorders. Determining if such symptoms should be conceptualized as part of ASD or as a separate comorbid anxiety disorder presents a challenge for clinicians (White et al., 2009).

Another challenge is that symptoms of anxiety may present differently in individuals with developmental disabilities. Individuals with developmental disabilities, for example, are more likely to express anxiety or fear through problem behavior, such as aggression, self-injury, and tantrums (White et al., 2009). These behaviors are often used to avoid or escape situations or tasks and present alongside emotional distress, but it can be difficult to determine if anxiety is part of the function of the behavior. Understanding the function of avoidance behaviors is important for both the accurate assessment of anxiety as well as appropriate goal selection and treatment planning. Developmental differences have also been found to impact the content of anxiety. For example, for individuals with ID, fears that may be developmentally appropriate at a younger age may persist into adolescence and adulthood (Gullone, 1996). Further, individuals with ASD may present with fears of an unusual focus (Kerns et al., 2014). More specifically, for example, fears that may be related to atypical sensory experiences are common (e.g., fear of loud sounds, beards, automatic toilets, mechanical objects; Kerns et al., 2014).

These aforementioned considerations present challenges for both the assessment and treatment of anxiety among individuals with developmental disabilities. Thus, the remainder of this chapter will discuss existing research and clinical implications/suggestions regarding accurate identification of and effective treatment of anxiety when working with this population.

Assessment of Anxiety in Developmental Disabilities

Reliable assessment of anxiety is important to accurately classify symptoms and inform treatment planning. Given the aforementioned challenges associated with assessing anxiety among individuals with developmental disabilities, a multimodal, multi-informant assessment process that is methodical and empirically grounded is essential. Assessment methods should include the use of interviews, questionnaires and rating scales, and direct observations.

Clinical Interviews

Clinical interviews, though more time consuming than other methods, allow for more detailed information gathering based on both verbal reports and direct observations during the assessment. Most of the semi-structured clinical interviews used to assess anxiety in youth with developmental disabilities were initially designed for use with typically developing youth. However, two measures have been modified specifically for use with ASD.

The *Anxiety Disorders Interview Schedule for DSM-IV, Child and Parent Versions* (ADIS-IV--C/P) (Silverman & Albano, 1996) are semi-structured interviews to assess anxiety and related disorders in children ages 7–18 years. It is considered the "gold-standard" for assessing anxiety in typically developing youth and has the most research support for assessing anxiety in youth with ASD and IQs > 70. The ADIS-C/P has demonstrated inter-rater reliability (0.77–1.00; Ung et al., 2014), sensitivity to change (White et al., 2012; Wood et al., 2009), and convergent and divergent validity in youth with ASD seeking anxiety treatment (Renno & Wood, 2013). It should also be noted that some studies have found poor agreement between child and parent (Storch et al., 2012). Another limitation is the administration time, which can be up to 2 h. The *Autism Spectrum Addendum to ADIS-P* (ADIS/ASA) (Kerns et al., 2017) was later developed as a supplement to the ADIS-IV-C/P. It includes a set of guidelines designed to differentiate traditional DSM anxiety disorders in ASD from ambiguous symptoms often present in ASD (e.g., worries regarding routine or changes in the environment) and has been found to have strong psychometric properties when used with the ADIS. A fifth edition of the ADIS is reportedly forthcoming.

The *Autism Comorbidity Interview – Present and Lifetime Version* (ACI-PL) (Leyfer et al., 2006) is another semi-structured diagnostic interview that can be used for youth with ASD. It is a modified version of the *Kiddie Schedule for Affective Disorders and Schizophrenia* (K-SADS; ages 5–17) (Kaufman et al., 1997). The ACI-PL was created to differentiate between the core symptoms of ASD and symptoms of other diagnoses, including anxiety. While this approach may make it more stringent than other interviews that do not differentiate (Mazefsky et al., 2012), OCD was the only anxiety disorder examined psychometrically. Compared to the ADIS, it is not as comprehensive and it still takes 1–3 h to complete, but it required less training to administer and is a free measure.

Structured clinical interviews have also been used to assess comorbid psychiatric disorders, including anxiety, in youth with developmental disabilities. Of them, the *Children's Interview for Psychiatric Symptoms – Parent Version* (P-ChIPS; ages 6–17) (Fristad et al., 1998) is the only one that has reported reliability and validity in ASD. It is considerably shorter to administer than the aforementioned semi-structured interviews. Unlike other interviews, the P-ChIPS has also been examined in research studies with youth with IQs ranging from 42 to 150 (Witwer et al., 2012). In youth with IQs < 70, the P-ChIPS has demonstrated inter-rater reliability for phobias, generalized, separation, and social anxiety disorders, but more limited inter-rater agreement for OCD symptoms (Witwer et al., 2012).

Questionnaires and Rating Scales

Self-Report Questionnaires

While self-report questionnaires are the most commonly used formal measures for assessing anxiety in both individuals with and without developmental disabilities, few of these instruments are specifically designed to assess anxiety in developmental disabilities. Among them, the *Multidimensional Anxiety Scale for Children (MASC-C)* (March et al., 1997), the *Screen for Child Anxiety-Related Emotional Disorders (SCARED-C)* (Birmaher et al., 1997), and the *Spence Children's Anxiety Scale (SCAS)* (Spence, 1998) are the most well-researched. However, findings regarding psychometrics are inconsistent and many studies have reported poor child/parent agreement. Given this, and the measures' clear emphasis on language, they may not be appropriate for all individuals with ASD and/

or ID (Lecavalier et al., 2014). The *Revised Child Anxiety and Depression Scale* (RCADS) (Chorpita et al., 2000), however, may be a more suitable self-report measure for this population, as previous investigations have found it to be useful for individuals with ID (e.g., Kaat & Lecavalier, 2015). An adapted version of the RCADS, the *Anxiety Scale for Children with ASD, Parent and Child versions* (ASC-ASD) (Rodgers et al., 2016), includes additional items related to sensory anxiety, intolerance of uncertainty, and phobias, and it shows promising psychometric properties for youth with fluent speech.

The *Revised Children's Manifest Anxiety Scale (RCMAS)* (Reynolds & Richmond, 1978) is a self-report questionnaire that may be useful as a screening measure of anxiety for youth with developmental disabilities. It consists of 37 yes/no questions across three anxiety domains (physiological, worry/oversensitivity, and social concerns/concentration), measuring the presence of symptoms based on child self-report rather than the severity. Despite good internal consistency and some evidence for specificity and sensitivity (Mazefsky et al., 2011) and a second edition (RCMAS-2), which has demonstrated improved psychometric properties, updated norms, and broader item content coverage, it is not an appropriate outcome measure for these reasons (Lecavalier et al., 2014).

The reliability and validity of the *State-Trait Anxiety Inventory for Children* (STAIC) (Speilberger, 1973) has not been evaluated in developmental disabilities, but it may be useful for distinguishing trait and state anxiety in ASD (Lanni et al., 2012). Further, a number of self-reports designed for typically developing children to assess social anxiety (e.g., *Social Anxiety Scale for Children – Revised* [SASC-R], *Social Anxiety Scale for Adolescents* [SAS-A], *Social Worries Questionnaire* [SWQ]) may also have utility in ASD. While the SWQ is relatively under-researched with few psychometric data (Kerns et al., 2016b), investigations using the SASC-R/SAS-S have demonstrated treatment sensitivity (Kaboski et al., 2015), good internal consistency (Kaboski et al., 2015), and some evidence for convergent validity (Henderson et al., 2006).

Most of the aforementioned measures share the limitations of primarily only being examined in youth with individuals who have average or above average IQ and/or greater verbal abilities. While there are known challenges to developing sound measures for individuals with ID given limitations associated with communication, cognition, and comprehension, some evidence supports the feasibility of reliable and valid modified self-reports for individuals with ID (Hagopian & Jennett, 2008). Two specific measures, the Fear Survey Schedule for Children – Revised (FSSC-R) and the Fear Survey for Children with and without Mental Retardation (FSCMR), were developed with specific modifications for this population: verbal *and* visual presentation, simplified language, and neutral items to assess acquiescence or choosing the more positive response (Hagopian & Jennett, 2008). Both the FSSC-R and the FSCMR have been psychometrically evaluated with youth with ID (Reardon et al., 2015).

Other-Informant Rating Scales

Other informants can also complete questionnaires to provide additional information. This is especially helpful when assessing youth with developmental disabilities, given the aforementioned challenges and limitations of self-report measures with this population. The MASC and MASC-2, SCARED, RCADS, SCAS, and SWQ all have versions for other informants to complete. Agreement between child and parent-report varies across these measures but has been found to be weaker for the SWQ and MASC.

Another other-informant-report measure is the 20-item version the *Child and Adolescent Symptom Inventory – 4th Edition Revised* (CASI-4R) (Gadow & Sprafkin, 2002), which was created to assess anxiety, specifically in individuals with ASD (Sukhodolsky et al., 2008). Notably, most of the people included in the measurement study had ID (Sukhodolsky et al., 2008). Findings demonstrated good internal consistency across children with and without

cognitive impairment and support its use as an outcome measure (Sukhodolsky et al., 2008).

The *Parent-Rated Anxiety Scale for ASD* (PRAS-ASD) (Scahill et al., 2019) is the newest parent-report measure for anxiety in children with ASD, which it was specifically designed to assess. The 25-item scale demonstrated discriminant validity, excellent internal consistency, item response theory (IRT) reliability, and test–retest reliability (Scahill et al., 2019).

The *Autism Spectrum Disorder – Comorbid for Children* (ASD-CC) (Matson et al., 2009). is an additional measure indented for other informants to complete. It is a 49-item scale with established reliability and construct validity used to measure comorbid psychopathology in children with ASD and varying intellectual functioning. When assessing anxiety within the context of ASD, the Worry/Depressed and Avoidant subscales are the most helpful (Rieske et al., 2013). While the Worried/Depressed subscale has demonstrated convergent and divergent validity (Rieske et al., 2013) and moderately good internal consistency (Davis et al., 2011), more research is needed to thoroughly investigate retest reliability, sensitivity, and specificity.

While it has not been tested with individuals with ASD, the *Anxiety, Depression, and Mood Scale* (ADAMS) (Esbensen et al., 2003) is an informant-rated measure that has shown promising psychometrics in with individuals with ID – especially for screening for OCD. It is a brief, 28-item scale of behaviorally based mood and anxiety symptoms. Additional other-informant measures that may be appropriate to use across varying intellectual functioning include the *Developmental Behavior Checklist* (DBC) (Brereton et al., 2006), the *Nisonger Child Behavior Rating Form* (NCBRF) (Aman et al., 1996), and the *Baby and Infant Screen for Children with aUtIsm Traits* (BISCUIT) – Part II (Matson et al., 2009). While these scales are designed to assess a broad range of behaviors, they all include anxiety subscales and have been used in some studies to assess anxiety problems in youth with ASD and ID (e.g., Bakken et al., 2010; Bradley et al., 2004). More research is needed to further investigate the psychometric properties of the anxiety subscales in these measures with individuals with disabilities. In the meantime, they may be helpful as a screening measure, but should be followed by a more comprehensive assessment including interviews and direct behavioral observation.

Clinician-Rated Symptom Measures

The *Pediatric Anxiety Rating Scale* (PARS; RUPP, 2002) was designed as a treatment outcome measure and provides a continuous measure of anxiety symptoms in youth ages 6–17 years based on child and parent reports and clinical judgment. While the measure appears sensitive to change in children with ASD and IQs > 70 (Storch et al., 2012), its psychometric properties with this population are variable. Storch et al. (2012) found excellent test–retest reliability and inter-rater reliability; however, there was also low internal consistency and convergent and divergent validity were only partially supported. Despite promising findings, it should also be noted that given the reliance on fluent language for the child interview, the use of the PARS may be limited to those who are more verbal and/or have a higher IQ (Lecavalier et al., 2014). More research is needed to improve the sensitivity of the PARS, particularly in lower-risk samples, as well as to investigate its utility for assessing anxiety among individuals with IQs < 70.

Clinician-rated scales such as the *Children's Yale-Brown Obsessive-Compulsive Scale Modified for Pervasive Developmental Disorders* (CY-BOCS PDD) (Scahill et al., 2006) and the *CY-BOCS for Children with Autism Spectrum Disorder* (CY-BOCS ASD) (Scahill et al., 2014) have also been developed to measure the severity of repetitive behaviors in children (ages 5–17) who have ASD or other developmental disabilities. These represent modifications of the *Children's Yale-Brown Obsessive-Compulsive Scale – First and Second Editions* (CY-BOCS; Scahill et al., 1997; Storch et al., 2019), which are often considered the "gold standard" measures for assessment of child OCD symptoms. The

CY-BOCS PDD is a semi-structured interview administered to the child's parent (Scahill et al., 2006). The CY-BOCS ASD includes a 23-item symptom checklist and five severity scales: Time Spent, Interference, Distress, Resistance, and Control. It also includes a five-component system for classifying repetitive behaviors in ASD (hoarding and ritualistic behavior, sensory and arranging behavior, sameness and self-injurious behavior, stereotypy, restricted interests) (Scahill et al., 2014). Both measures have established reliability and convergent validity and are sensitive to change (Scahill et al., 2006). Despite strong psychometric properties, it should also be noted that these measures were developed to assess the severity of repetitive behaviors, and given the measure's reliance on compulsions (without assessing obsessions), it can be difficult to accurately determine the presence of OCD. Thus, the original CY-BOCS, ACI, and ADIS/ASA may be more useful when differential diagnosis of ASD and OCD is required.

Direct Observation

Direct behavioral observations are often needed to clarify and validate findings and hypotheses gathered from interviews and questionnaires regarding the controlling variables of anxiety. This is especially the case for youth with developmental disabilities, given the aforementioned challenges with self- and other-informant reports (Hagopian & Jennett, 2008). For individuals with comorbid ID and/or minimal verbal abilities, anxiety must often be inferred from their overt behavior or "fear responses" through direct observation (Rosen et al., 2016). Direct observation allows for more detailed and possibly more accurate information about the behaviors an individual displays when they are anxious as well as the antecedents and consequences related to their anxiety.

When presentation of the avoided stimulus in a controlled manner is possible, the Behavioral Avoidance Test (BAT) can be employed (Ollendick et al., 2013). This is often the case with anxiety that is elicited by a specific stimulus or classes of stimuli (e.g., social phobia, specific phobia, or separation anxiety disorder). The BAT involves assessing the child's avoidance response, subjective level of anxiety, physiological reactions, and/or behavioral responses while progressively exposing them to the feared stimulus (Hagopian & Jennett, 2008). In addition to during the initial assessment, the BAT can also be used during and after treatment to evaluate outcomes.

For children with more generalized anxiety, when it is challenging to identify or control anxiety-provoking stimuli, it may not be feasible to conduct a BAT (Hagopian & Jennett, 2008). In these cases, naturalistic observations during the other portions of the assessment and/or in the child's other environments (e.g., home, school, community) can be used to further assess anxiety. Enlisting care providers to conduct behavioral monitoring (i.e., observe- and record-specific behaviors) in the child's natural setting(s) can be especially effective. This approach can also be used for evaluating treatment response.

Assessment of Skills

As noted previously, there are many challenges associated with the assessment of anxiety among in individuals with developmental disabilities. As such, when determining the appropriate attribution of symptoms (i.e., to either ASD/ID or anxiety) and developing a treatment plan, it is often important to gather additional data about the individual's skills and deficits. Skill areas that should be considered when assessing and treating anxiety in individuals with developmental disabilities include social skills, communication deficits, leisure skill deficits, presence of restricted and stereotyped patterns of behavior, stimulus over-selectivity, and deficits in varying behavior across different contexts.

Treatment of Anxiety in Developmental Disabilities

Given the prevalence of comorbid anxiety among individuals with developmental disabilities, as well as the associated impairment of the comorbid diagnoses, a body of research on effective treatments has emerged. While psychosocial

interventions used to treat anxiety among typically developing individuals may also be effective among individuals with developmental disabilities (see Nadeau et al., 2011; Sukhodolsky et al., 2013), this unique and heterogeneous population warrants special considerations when applying traditional treatment approaches such as exposure therapy and cognitive-behavioral therapy. More research is needed to further investigate the efficacy of various psychosocial interventions for anxiety among individuals with developmental disabilities, but the existing research base provides promising results regarding the use of adapted behavioral and cognitive-behavioral approaches.

Intervention Studies

Behavioral Treatment/Exposure Therapy Approaches

Graduated exposures, otherwise known as exposure therapy (ET) or exposure and response prevention (ERP), is a well-established treatment for anxiety disorders in typically developing children (Whiteside et al., 2020). The goal of graduated exposures is to decrease the negative reinforcement associated with avoidance of anxiety-provoking stimuli by promoting habituation to the feared stimuli. Through gradually and repeatedly exposing child to a feared stimulus, the trigger should elicit less anxiety and anxiety-minimizing behaviors (e.g., avoidance, compulsions) are minimized (Craske et al., 2014).

For children with developmental disabilities, who may have intellectual deficits, executive functioning difficulties, or exhibit symptoms of cognitive rigidity and social skills deficits, graduated exposures have been found to be effective in addressing anxiety symptoms in this population, despite these challenges (Ryan et al., 2017). Modifications should be made to typical graduated exposure protocols to address the unique needs of children with developmental disabilities and anxiety. Recent research has highlighted the effectiveness of involving caregivers in graduated exposures, using reward contingencies that target special interests, and providing teaching and communication strategies in session (e.g., social skills and longer sessions) as modifications to graduated exposures that beneficial for children with developmental disabilities (Wood et al., 2020).

Cognitive-Behavioral Treatment Approaches

Cognitive-behavioral therapy (CBT) is a long-standing treatment that has robust empirical support for use with youth with anxiety (Banneyer et al., 2018; Wang et al., 2017). More recently, research has supported the use of adapted cognitive-behavioral treatment approaches for children with developmental disabilities (Hronis et al., 2019; Hunsche & Kerns, 2019). Adaptions to researched CBT protocols included caregiver/family inclusion for most treatment sessions, parent-delivered contingent reward systems, revised cognitive therapy modules, and modules that were implemented as needed (social and adaptive skills deficits, social and school issues, rewards/consequences, incorporation of special interests, and disruptive behavior management) (Storch et al., 2015b). Exposure therapy remains a cornerstone of these interventions and is discussed previously.

Research has demonstrated the effectiveness of adapted CBT protocols among children with ASD and anxiety (Reaven et al., 2012; Storch et al., 2013; Wood et al., 2009, 2015). Randomized control trials of an adapted exposure-based CBT protocol, Behavioral Interventions for Anxiety in Children with Autism (BIACA), found the treatment to be treatment-as-usual (TAU) effective compared to treatment as usual for children ages 11–16, and superior to TAU and coping cat for children ages 7–11 for children with ASD and anxiety (Storch et al., 2015a, b; Wood et al., 2020). It is important to note that many studies have investigated the use of such protocols with children with ASD and there are few studies that have investigated the used of adapted CBT treatments for use with adolescents with ASD and anxiety disorders (Storch et al., 2015a, b; White et al., 2013; Wood et al., 2015). Group CBT approaches have been developed and investigated

for both children and adolescents with ASD and anxiety. Several randomized controlled trials have demonstrated improvements in anxiety symptoms following the use of these interventions (Chalfant et al., 2007; McConachie et al., 2014; Reaven et al., 2012; Sofronoff et al., 2005; Sung et al., 2011).

There is limited research investigated the use of cognitive-behavioral treatment approaches for children with ID and anxiety. Aspects of cognitive-behavioral treatment approaches such as psychoeducation, cognitive reappraisal, and ERP practices with reinforcement have been shown to be effective in anxiety reduction for children with ASD *and* ID (Moskowitz et al., 2017). Further, Hronis et al. (2019) examined the use of Fearless Me!, an online and group CBT program, for 21 adolescents with moderate and mild ID and anxiety. Their findings suggested that their treatment significantly reduced anxiety, providing preliminary evidence for the use of an adapted CBT program for adolescents with ID (Hronis et al., 2019). Additional modifications to CBT approaches such as including multiple modalities of treatment (e.g., online and face to face), frequent sessions, the use of concrete examples, behavioral intervention plans, and positive behavior supports may be needed to address the unique needs of children and adolescents with ID (Hronis et al., 2019; Moskowitz et al., 2017).

Considerations for Anxiety Treatment in Developmental Disabilities

Given the core symptoms of ASD and ID, as well as the heterogeneity of developmental disabilities, special considerations are warranted when applying standard anxiety treatment approaches to this population. It is important to ensure the materials and presentation are developmentally appropriate. This may involve, for example, more concrete and visual strategies, simplified language, slower pace, more caregiver involvement, or more emphasis on the behavioral components of treatment. With this population, it is also essential to consider the appropriateness of goals given the dual diagnoses. Goals should focus on improving the individual's quality of life instead of or in addition to adhering to social norms, and treatment goals should be socially and culturally valid to the individual and family. The remainder of this section will discuss additional anxiety treatment considerations for youth with developmental disabilities.

Communication and Teaching Strategies

For some individuals with anxiety and ASD and/or ID, social communication and behavioral challenges may warrant additional treatment components to facilitate engagement and ensure progress with behavioral or cognitive-behavioral interventions. Various teaching strategies such as prompting and modeling, while not always considered a primary component of the traditional treatment protocol, can be helpful additions when working with this population. For example, these approaches may facilitate the individual's understanding of how to execute an exposure correctly and the reinforcement contingencies in place. When integrating these strategies with exposure-based approaches, it may be helpful to begin teaching the process through a simulation using a neutral stimulus instead of a feared one to increase the likelihood of successful completion and thus allow for learning. For individuals who are unable to understand verbal instructions, these learning trials may need to be repeated prior to initiating graduated exposure to feared stimuli. Flexibly using different variations of teaching strategies, such as prompting and modeling, is advantageous regardless of developmental and verbal level.

Modeling involves demonstrating what the individual is supposed to do, with the intent of them learning through observation and imitating the behavior. This can be useful to integrate when teaching the individual new skills within the context of anxiety treatment (e.g., coping skills, exposure tasks, social skills). Children with developmental disabilities may not be inclined to observe and imitate the model, so supplementing the demonstration with other visualizations such as pictures or videos may also be helpful.

Verbal, visual, and physical prompts can also be an effective way to facilitate a child's skill development, including within the context of anxiety treatment. The level of prompting should directly reflect the amount of assistance required for the child to complete the skill. As such, they should be lessened over time as the individual learns the process. The type (or types) of prompts used will be determined by what is being taught as well as the child's developmental level and current skill level. For example, when working with individuals who understand verbal prompts and are able to independently complete the task, verbal prompts and cues may be sufficient. Visual prompts such as gestures or pictures can be helpful when working with children who are not able to understand verbal prompts. When working with an individual who does not understand verbal prompts and also is not familiar with the skill, physical prompts (e.g., hand-over-hand guidance) may be necessary to help them practice the movement required.

Teaching and practicing social skills or social communication strategies may be beneficial to integrate into exposure practice, as youth with ASD and/or ID have social and adaptive skills challenges (Klin et al., 2007). Anxiety, which can be described as a "won't do" reaction to situations, where there are unrealistic fears and perceptions of inadequacy that create barriers to situations, is further compounded by social and adaptive skills deficits. These challenges result in a "can't do" response, rendering actual barriers to the youth's ability to navigate anxiety-provoking situations in *addition* to the unrealistic fears and perceptions of anxiety the child is experiencing (Wood et al., 2009). Thus, to effectively treat anxiety, it is important to assess for skill deficits that may compound anxiety and then integrate teaching strategies into treatment to build social and adaptive skills. Incorporating direct teaching and modeling into treatment and integrating these skills with exposures can increase the effectiveness of exposure-based CBT for children with ASD and/or ID (Wood et al., 2015).

Behavioral Strategies

Contingent Reinforcement

Practice is an important component of anxiety intervention – both for cognitive strategies and exposure to feared stimuli. However, it can be especially challenging to motivate children with ASD and/or ID to engage in non-preferred activities. ASD has also been conceptualized as having diminished social motivation (Chevallier et al., 2012). Thus, the intrinsic and social motivation that may be sufficient for a typically developing child to fully engage in anxiety treatment may not be enough for a child with a developmental disability. As such, it is important to consider ways to increase an individual's motivation to engage in practice (Abramowitz, 2013). One such method for increasing motivation is contingent reinforcement, which involves providing rewards for engaging in specific tasks (e.g., exposures) or exhibiting certain behaviors (e.g., coping skills). The result is increased motivation to repeat the task or behavior, which is essential to facilitate the learning process.

There are several important considerations regarding the integration of contingent reinforcement within the context of anxiety treatment. First, it is important to consider what the reward will be. Types of rewards include tangible or physical/material rewards (e.g., toys, money) and intangible or nonmaterial rewards (e.g., praise, time doing a preferred activity) (Kazdin, 2013). It is essential that the reward is meaningful to the child and that they are interested in and motivated by it. Because of this, clinicians should work with the individual and family to choose rewards based on their preferences (Lee et al., 2010). Systematic preference assessments can be helpful in identifying preferred items and rewards (Hagopian et al., 2004). They may consist of interviewing caregivers and/or the individual directly about their preferences, observing the individual identify preferences within a free-choice context (e.g., selecting rewards from a list of options), or utilizing structured preference assessments (Karsten et al., 2011). Preferred rewards are particularly effective when working with individuals with ASD, as this population

often develops restricted interests (Danial & Wood, 2013). Using conversations, activities, or tangible items related to an individual's special interest as rewards is a strategic way to integrate special interests.

The success of contingent reinforcement is also dependent on correct implementation. When using this strategy, it is important to deliver the reward as soon as possible after the child completes the desired behavior (e.g., practicing a coping skill or completing an exposure) (Piazza et al., 2011). This strengthens the child's association between the behavior and the reward, making them more likely to engage in the behavior again in the future. It is also important that the reward is exclusively contingent on attempting the desired behavior. In other words, it should not be accessible freely or through other means. A child is less likely to engage in a challenging task to earn, for example, time on his/her tablet, if he/she know he/she will get to play on his/her tablet after dinner anyways. Finally, it is also important to vary rewards. The strength of the reward should reflect how challenging the desired behavior is for the child. Sometimes it is important to change rewards to reflect an individual's new interest. Varying rewards is essential to maintain their value and effectiveness (Wine & Wilder, 2009).

Caregiver and Family Involvement

Caregiver and family involvement is essential when working with children and adolescents, as family systems often contribute to the maintenance and persistence of anxious behaviors (Abramowitz et al., 2019; Ginsburg et al., 2004). Family members often accommodate anxious behaviors by allowing avoidance of feared situations, permitting escape from anxious situations, assuming responsibilities, and providing reassurance. While they do so in an attempt to reduce the child's anxiety, these accommodations ultimately hinder treatment if not addressed (Storch et al., 2008). This is seen across typically developing children with anxiety and those with developmental disabilities (Frank et al., 2020; Storch et al., 2015a, b). When the family is involved in treatment, the clinician is able to gain more information regarding functional relationships between the child's anxious behaviors and how family members may be reinforcing and maintaining the anxiety. Continued family involvement then allows the clinician to address family accommodation in addition to the child's anxiety directly through intervention, which is likely to cause greater and more lasting progress.

For individuals with developmental disabilities who are often supported by caregivers, their involvement is even more essential. In fact, how much a caregiver is involved in treatment can be based on the level of support the child needs from them. When the caregiver plays a large role in the individual's daily life, he/she is an integral part of anxiety treatment by learning how to respond to the patient's anxiety, providing additional information and support during sessions, and leading skills and exposure practice at home. The level of family involvement will depend on a number of factors, including the child's developmental level and other individual and family factors.

During treatment, family members and caregivers should receive psychoeducation on accommodation and how to appropriately respond to anxious behaviors. They should then receive support in identifying their own accommodating behaviors and replacing them with relevant behavior management principles. It is also important to normalize the accommodation of anxious behaviors and not place blame on the family in order to maintain a positive therapeutic alliance.

Conclusion

Anxiety disorders commonly occur with developmental disabilities. Children with ASD and/or ID and a comorbid anxiety disorder are more likely to experience increased impairment compared to those without anxiety. The heterogeneity in intellectual functioning, communication skills, and behavior among individuals with developmental disabilities contribute to a number of challenges when assessing and treating anxiety in this population. Despite challenges associated with assessing and treating anxiety in this heterogeneous population, accurate and effective

evaluation and intervention methods are vital for supporting and promoting positive outcomes for these individuals and their families.

A methodical and empirically grounded multimodal, multi-informant assessment process is essential when identifying and conceptualizing comorbid anxiety in individuals with ASD and/or ID. Assessment methods should include the use of interviews, questionnaires and rating scales, and direct observations. There are notable measurement limitations, as few measures have been designed specifically for assessing anxiety in ASD and ID. Varied and overlapping symptom presentations of anxiety in developmental disabilities as well as an overreliance on verbally mediated symptoms and self-report measures also contribute to assessment challenges. More research is needed to investigate the psychometric properties and clinical utility of measures designed to address these challenges, especially among minimally verbal youth or those with comorbid ID.

Existing research supports the use of adapted behavioral treatment approaches for treating anxiety in youth with ASD and/or ID. Research also supports the use of adapted cognitive-behavioral treatment approaches for treating anxiety in youth with ASD; however, there is limited research investigating these approaches with youth with ID. Across varying approaches, treatment should be individualized based on the unique needs of the child. Some common adaptations to consider when working with youth with developmental disabilities include increasing caregiver involvement, using contingent reward systems, integrating teaching strategies, and simplifying treatment materials.

While existing research provides some guidance on the assessment and treatment of anxiety in individuals with ASD and/or ID, gaps in the literature remain. Future research is needed to address limitations of previous work, continue to develop additional assessment strategies, and further examine treatment efficacy for anxiety in individuals with developmental disabilities.

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27 Treatment of Youth Anxiety in the Context of Family Dysfunction and Accommodation

Rebecca G. Etkin and Eli R. Lebowitz

Introduction

Family dysfunction refers to a range of difficulties or disruptions within the family system that negatively impact child and adolescent development and well-being. While family dysfunction is associated with child and adolescent psychopathology more broadly, it also has clear links to anxiety disorders and obsessive-compulsive disorder (OCD). In the sections below, we take a closer look at the different ways in which families may experience dysfunction, and how severe dysfunction may both stem from and contribute to child and adolescent anxiety and OCD. We specifically highlight *family accommodation* in our discussion, as it represents a highly prevalent behavior within families of anxious children and adolescents that is entwined with dysfunction and has relevance to the maintenance and treatment of anxiety.

Following this overview, we turn our focus to the treatment of child and adolescent anxiety and OCD in the context of severe family dysfunction and accommodation. While numerous approaches to treating child and adolescent anxiety and OCD incorporate families, few of these target family dysfunction as the key mechanism of change. We review the evidence-based treatment approaches that stand out for their focus on improving family functioning and/or reducing accommodation as a means to child and adolescent recovery. We conclude with a discussion of future directions for research on the treatment of child and adolescent anxiety and OCD in severely dysfunctional families. Henceforth and throughout, we refer to children and adolescents as "youth" and to anxiety disorders and OCD as "anxiety," unless otherwise specified (i.e., if referring to a specific developmental period or disorder).

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An Overview of Family Dysfunction and Youth Anxiety

Family dysfunction is a broad term that encapsulates a range of family processes, dynamics, and behaviors that are detrimental to the well-being of its members. Family systems theory posits that dysfunction can be traced to problems with the boundaries delineating different family subsystems (e.g., parent–child relationships, the marital relationship) (Minuchin, 1974). Clear and appropriate boundaries promote positive functioning within the family (e.g., effective communication, appropriate warmth and power), which in turn fosters positive youth outcomes. Conversely, boundaries that are overly rigid or overly diffuse may result in dysfunction (e.g., conflict, disengagement, enmeshment) that negatively impacts youth development (Minuchin, 1974; Olson, 2000).

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Research suggests that multiple aspects of family dysfunction may be implicated in the development of youth anxiety. For instance, Peleg-Popko and Dar (2001) found that very high levels of cohesion (i.e., emotional closeness between family members) and low levels of adaptability (i.e., ability of the family system to adjust to situational stressors and developmental needs; Olson, 2000) were related to higher levels of anxiety in young children, including specific fears and social anxiety symptoms. Likewise, Bögels and Brechman-Toussaint (2006) reported findings that highly anxious children (8–12 years old) depict greater imbalance in the cohesion and hierarchy of their families relative to children with average levels of anxiety. A similar picture emerges from prospective studies as well. Pagani et al. (2008) examined trajectories of anxiety and dysfunction over 6 years and found that children (4–11 years old) from the highest anxiety trajectories were 23–31 times more likely to belong to the highest trajectory of family dysfunction (i.e., poor support, communication, acceptance, and problem-solving) than to the lowest. Nomura et al. (2002) found that poor marital adjustment, another common indicator of family dysfunction, was uniquely associated with the development of youth anxiety (6–23 years), resulting in a fourfold increase in symptom severity over the course of 10 years.

There are multiple theorized mechanisms explaining associations between these various aspects of family dysfunction and youth anxiety. For instance, ill-defined boundaries may increase youth's sense of uncertainty about family roles or place them in developmentally inappropriate and challenging roles, such as being triangulated into marital conflict (e.g., Hughes-Scalise & Przeworski, 2014). High degrees of enmeshment or control may promote overreliance on parents, inhibit the development of independence and autonomy, and decrease opportunities for youth to experience challenges and develop the coping and self-regulation skills necessary for managing anxiety (Drake & Ginsburg, 2012). Additionally, family conflict may directly contribute to stress and fear, and discord within one family subsystem (e.g., the marital relationship) can "spillover" into others (Erel & Burman, 1995; Gerard et al., 2006) and threaten youth's sense of emotional security (Davies & Cummings, 1994).

It is also likely that bidirectional associations exist such that youth anxiety elicits problematic responses within family, which in turn contribute to dysfunction (Minuchin, 1985). For instance, withdrawn, nervous, or passive behavior displayed by anxious youth could elicit overinvolved or overprotective parenting that weakens boundaries and reinforces anxious tendencies (e.g., Rapee, 2009; Rubin et al., 1999). Youth anxiety may also contribute to or exacerbate marital problems if parents experience heightened conflict or disagreement about how to respond to the anxiety (Ginsburg et al., 2004; Hughes-Scalise & Przeworski, 2014), or if the anxiety begins to interfere with the degree of quality time parents can spend together or with other family members (Bögels & Brechman-Toussaint, 2006). It is also the case that some anxious youth display irritable, aggressive, or otherwise disruptive behavior, which may contribute to family discord and coercive processes (e.g., Lebowitz et al., 2011a; Shimshoni et al., 2019). For instance, Tanaka et al. (2010) found that family conflict was associated with high levels of child proactive aggression only for highly anxious youth (7–13 years). Authors posit that anxious children in dysfunctional families may learn to use aggression to get their parents to help them, although this strategy likely intensifies the conflict that contributes to their anxiety. In sum, the nature of youth anxiety is such that it may draw out family dysfunction in various ways, and anxiety and dysfunction could become mutually reinforcing.

Zooming in on Family Accommodation

Any discussion of anxiety and family dysfunction would be incomplete without taking a careful look at accommodation. Accommodation refers to behavioral modifications or changes made by family members that intend to alleviate or avoid a youth's symptom-related distress. While originally identified and studied

exclusively in the context of OCD (Calvocoressi et al., 1995), it is now established that accommodation is highly prevalent within families of youth with all anxiety disorders (Lebowitz et al., 2013). Indeed, multiple studies report that that up to 100% of families of anxious youth engage in some degree of accommodation (e.g., Benito et al., 2015; Kagan et al., 2016; Lebowitz et al., 2013, 2015a; Storch et al., 2007; Thompson-Hollands et al., 2014; Zavrou et al., 2019). Most data on parental accommodation have focused on mothers, but other family members including fathers and siblings also accommodate (Alcan et al., 2021; Lebowitz et al., 2011b).

Examples of family accommodation are numerous and varied, but they can generally be classified into two categories. The first is *participation* in rituals or routines related to the disorder. An example is parents excessively showering to alleviate their child's obsessions about contamination and illness (see Lebowitz, 2016). The second is *modification* of family functions, such as altering schedules, routines, or responsibilities because of the youth's anxiety. These categories are not always distinct; for example, parents may drive a child to school each day to prevent him/her from worrying about the separation that occurs when taking the school bus, entailing both participation and modification. The specific accommodations that families engage in typically relate to the nature of the anxiety disorder(s). For instance, speaking in place of a child is a common accommodation in families of youth with social anxiety disorder. However, some of the most common accommodations, such as providing excessive reassurance, are prevalent across disorders (Jones et al., 2015).

Reasons for Accommodation Several factors may influence the degree of family accommodation that are not unlike those contributing to family dysfunction, as described above. One of them is the severity of youth distress and anxiety symptoms. Meta-analyses find that there is a medium effect size for the association between greater youth anxiety symptom severity and more frequent family accommodation (Strauss, Hale, & Stobie, 2015; Iniesta-Sepúlveda et al., 2021; Wu et al., 2016). Settipani and Kendall (2017) found that mothers of anxious youth (7–17 years) presenting to an outpatient clinic indicated that they would engage in greater accommodation in response to hypothetical vignettes depicting highly versus minimally distressed children in anxiety-provoking situations. When youth present with greater anxiety severity, their families may be more likely to feel the need to resort to accommodation to reduce distress enough to facilitate daily functioning. Especially, if the anxiety is so severe that it interferes with essential functions that could have serious consequences if not completed, such as attending school or work, families may feel immense pressure to do anything they can (i.e., accommodate) to ensure these functions can take place.

Relatedly, families accommodate (as they respond in other dysfunctional ways) to minimize hostile, violent, or coercive behaviors that youth may display in the face of their anxiety (Lebowitz et al., 2011b, c, 2015b; Zavrou et al., 2019). In one study of mothers and youth (7–18 years) seeking treatment for OCD, Lebowitz et al. (2015b) found strong associations between coercive–disruptive behaviors and accommodation frequency, distress, and negative consequences. In another treatment-seeking sample of youth with OCD (7–19 years) and their parents, Wu et al. (2014) found that externalizing behaviors predicted distress and negative consequences associated with family accommodation, controlling for symptom severity, and mediated the association between symptom severity and family accommodation. McGuire et al. (2013) also found that the magnitude of dysregulation (emotional, behavioral, and cognitive) displayed by youth (6–17 years) with OCD directly predicted family accommodation beyond obsessive-compulsive symptom severity. When anxious youth behave antagonistically, parents may feel that their hand is forced to accommodate in the desired or expected ways, even if doing so negatively impacts the hierarchy or balance of power within the family and contributes to greater family dysfunction.

Parents' beliefs and feelings about their child's anxiety may also contribute to accommodation. In the study by Settipani and Kendall (2017) and in other studies by Feinberg et al. (2018) and Johnco et al. (2022), mothers were more likely to report that they would engage in accommodation if they held greater negative beliefs about their child's experience of anxiety, including about how harmful it is and their child's ability to cope. Meyer et al. (2018) likewise found that parental beliefs about the necessity of accommodation to prevent youth (7–17 years) from losing emotional and behavioral control were significantly correlated with accommodation frequency, even controlling for severity of anxiety symptoms. These studies suggest that parents who believe anxiety could be harmful to their child might be more likely to accommodate to prevent this potential harm. Seeing a child in distress might also exacerbate parents' own feelings of anxiety or distress, making them more likely to accommodate (Flessner et al., 2011; Settipani & Kendall, 2017). Jones et al. (2015) found accommodation to mediate the association between mother and child anxiety, suggesting that anxious parents may attempt to regulate their own anxiety by accommodating and minimizing their child's anxiety. This may be especially true when parents are highly empathetic and thus attuned to their child's feelings/distress (Caporino et al., 2012; Settipani & Kendall, 2017). Taken together, research suggests that various child and parent factors contribute to the likelihood of problematic accommodation.

The Impact of Accommodation Although accommodation is generally well-intentioned (e.g., parents do not want their child to struggle), research suggests that it is ultimately more unhelpful than it is helpful. As depicted in Fig. 27.1, accommodation does tend to "work" (i.e., alleviate youth anxiety symptoms) in the short term by reducing anxiety or facilitating avoidance. However, in the long term, accommodation maintains or even exacerbates youth anxiety by preventing exposure and reinforcing the notion that the child/adolescent can only cope by relying on parents. For instance, if parents cancel their dinner plans to relieve a child's separation worries, parents may inadvertently confirm that separation is something to be feared and something that the child cannot cope with. Moreover, this accommodation prevents the child from confronting their anxiety and having the opportunity to learn that it will subside or can be handled independently. In fact, although most youth report feeling less anxious when they are accommodated and do not want their parents to accommodate less, they do not believe that accommodation will actually help them to feel less anxious in the future (Lebowitz et al., 2015a).

Accordingly, research consistently demonstrates the detrimental effects of accommodation for anxious youth and their families. As noted above, more frequent accommodation is associated with greater severity of and functional impairment associated with youth anxiety and OCD symptoms (e.g., Caporino et al., 2012; La Buissonnière-Ariza et al., 2018; Storch et al., 2007, 2010). For parents, accommodation is likewise associated with greater feelings of personal distress. Accommodation is often quite demanding, with most parents engaging in accommodations on a daily basis (e.g., Jones et al., 2015; Lebowitz et al., 2013). Certain accommodations may deplete family members' time and resources. For example, a parent who accommodates by sleeping with his/her child each night may get less sleep and have less time to spend with his/her partner or other children. In a case study by Lebowitz and Shimshoni (2018) (further detailed below), a mother had to reduce her work hours in order to accommodate her child's OCD symptoms, which eventually resulted in a loss of family income.

Given such outcomes and the amount of strain accommodation may place on family members, it is easy to see how it could contribute to a broader pattern of family dysfunction. In one study of youth with OCD (8–17 years) and their parents, Peris et al. (2008) found that greater family distress when accommodating, and worse youth consequences in the absence of accommodation, were associated with more family conflict; alternatively, lower levels of distress and consequences associated with accommodation were associated with higher levels of family

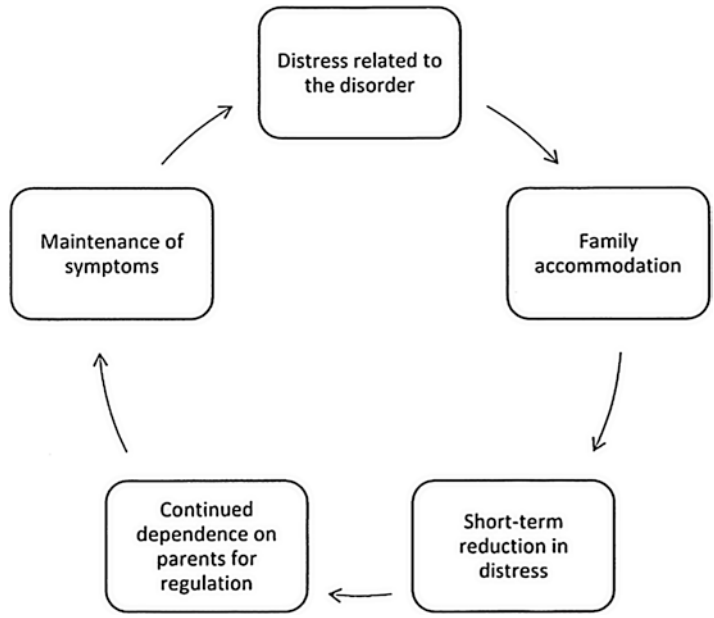

Fig. 27.1 Theoretical model of the cycle through which family accommodation maintains symptoms of youth anxiety disorders

cohesion and organization. In the study noted above, Wu et al. (2014) similarly found that higher levels of accommodation (specifically, participation in youth OCD symptoms) were associated with lower levels of family cohesion, even controlling for symptom severity. More research is needed to even better elucidate the associations between accommodation and other forms of family dysfunction; however, a high degree of family involvement in a child's or adolescent's symptoms will likely lead to blurred boundaries and alterations of typical family structures/roles. It is also likely that families who already struggle with boundaries and conflict may be more likely to accommodate because they have less of a foundation for taking the often-harder route of not accommodating. Although these ideas remain to be tested empirically, at present the research clearly suggests that severe accommodation incurs difficulties for youth, parents, and the family system alike.

Evidence-Based Assessment

Before discussing intervention approaches, it is necessary to touch on evidence-based assessment, which lays the groundwork for evidence-based treatment. In addition to assessing anxiety symptoms, assessment of family functioning may reveal important information about potential sources of difficulty and/or treatment targets. Different aspects of family functioning can be validly and reliably assessed with both behavioral methods (i.e., family observation tasks) and questionnaire measures (for one review see Alderfer et al., 2008). The Family Environment Scale (Moos, 1994), for example, measures different domains of family (dys)function (e.g., cohesion, control, conflict) and has been widely used including in studies investigating the course and treatment of youth anxiety and OCD (e.g., Peris et al., 2012).

In terms of assessing accommodation specifically, there are several available parent- and youth-report and clinician-rated measures. The Family Accommodation Scale (FAS) was the first measure of accommodation, developed for families of individuals with OCD (Calvocoressi et al., 1995). Lebowitz et al. (2013) later modified this measure to create the Family Accommodation Scale – Anxiety (FASA), which is a 13-item parent-report measure that assesses family accommodation for all anxiety disorders. The FASA total score consists of nine items measuring the frequency of accommodation in terms of

participation (e.g., "Have you avoided doing things, going places, or being with people because of your child's anxiety?") and modification (e.g., "Have you modified your family routine because of your child's symptoms?"). These items are rated on a 5-point scale (ranging from 0 "never" to 4 "daily") with higher total scores indicating more frequent accommodation (range = 0–36). The four remaining items assess parental distress associated with accommodation (i.e., "Does helping your child in these ways cause you distress?") and consequences of not accommodating (e.g., "Has your child become distressed when you have not provided assistance? To what degree?"). Research has found the FASA to have good psychometric properties, including internal consistency (αs = 0.87–0.91; Lebowitz et al., 2013, 2019b), test–retest reliability (r = 0.79; Lebowitz et al., 2019b), convergent and divergent validity (i.e., with measures of anxiety and depression), and factorial structure (i.e., two factors representing participation and modification, established by exploratory and confirmatory factor analyses; Lebowitz et al., 2013, 2019b).

The FASA also has a youth self-report version (FASA-CR; Lebowitz et al., 2015a). Like the parent version, nine items forming the total score assess the frequency of accommodation (e.g., "How often did your parent help you avoid things that make you feel anxious?") and four items assess associated distress and consequences. The FASA-CR has three additional items that assess beliefs about accommodation and its efficacy ("When my parent helps me in this way, I feel less anxious"; "If my parent continues to help me in these ways, I will feel less anxious in the future"; "I believe my parent should help me less in these ways, when I'm anxious"). The FASA-CR (total score) has evidence of satisfactory internal consistency (α = 0.79–0.85; Lebowitz et al., 2015a, 2019b), test–retest reliability (r = 0.52; Lebowitz et al., 2019b), convergent validity (i.e., significant associations with other anxiety measures), and factorial structure. There is moderate agreement between the youth- and parent-report total scores (r = 0.54; Lebowitz et al., 2015a).

The development of several other measures of family accommodation have followed. The Family Accommodation Checklist and Interference Scale (Thompson-Hollands et al., 2014) is a parent-report measure that assesses the frequency and interference of 20 specific accommodation behaviors. The Pediatric Accommodation Scale (Benito et al., 2015) is a 14-item clinician-rated measure that assesses the frequency, severity, and impact of accommodation; there is also a corresponding 5-item parent-report measure. The Parenting Anxious Kids Ratings Scale (Flessner et al., 2017) is a 32-item parent-report measure consisting of five factors that assess the degree of conflict, overinvolvement, accommodation, modeling, and emotional warmth/support within the family. Finally, the Parental Accommodation Scale (Meyer et al., 2018) is a 12-item parent-report measure that assesses the frequency of and beliefs about accommodation. Each of these measures has initial evidence of satisfactory psychometric properties.

Evidence-Based Treatment Approaches

Research over the past several decades reveals impressive advances in available efficacious, evidence-based treatment approaches for youth anxiety and OCD (Freeman et al., 2014; Higa-McMillan et al., 2016). Of course, there is variability in the number of youth who respond to such treatments (e.g., 46–79% diagnostic recovery; Silverman et al., 2008), which may be attributable to many factors. For example, in many cases the anxiety itself and comorbid difficulties (e.g., oppositional behaviors or depressive symptoms) may directly interfere with the therapeutic process (e.g., Garcia et al., 2010). The degrees of family (dys)function and accommodation are additional factors that may hinder or support treatment progress (e.g., Ginsburg et al., 2008).

With regard to the latter, Peris et al. (2012) found that higher family cohesion predicted better treatment outcomes for youth (8–17 years) with OCD, and Crawford and Manassis (2001) found that greater family dysfunction and parenting stress predicted less improvement over the course of treatment for children (8–12 years) with anxiety disorders. Kagan et al. (2016) found that pretreatment levels of accommodation were associated with higher clinician severity ratings of the youth's (6–17 years) anxiety following treatment. Garcia et al. (2010) also found that family accommodation predicted treatment outcomes for youth (7–17 years) with OCD, such that those with lower initial levels of family accommodation showed greater improvement over the course of psycho- or pharmacotherapy. Merlo et al. (2009) found that decreases in family accommodation over the course of intensive or weekly family-based cognitive-behavioral therapy (CBT) predicted better youth outcomes (6–18 years), even controlling for baseline levels of OCD severity and impairment.

These findings may be explained by the notion that families who are highly dysfunctional and engage in frequent accommodation might have more difficulty supporting their children in follow-through with treatment, such as engaging in exposures. Likewise, high levels of family accommodation, and potentially other dysfunctional processes like enmeshment, may directly undermine treatment (e.g., by preventing exposures or reinforcing anxious beliefs) or youth's motivation to seek or engage in it (e.g., because they can rely on parents instead of needing to cope) (Lebowitz et al., 2019a; Lebowitz & Shimshoni, 2018).

Although family dysfunction and accommodation are thus poor prognostic indicators, they are "tractable" issues that can be ameliorated within the context of treatment (Lewin, 2014). We next describe evidence-based treatment approaches for youth anxiety disorders and OCD that directly target family dysfunction and accommodation as a means of improving treatment outcomes. The two general approaches include CBT with parent or family involvement, and parent-guidance.

Cognitive-Behavioral Therapy (CBT) with Family Involvement

Variants of CBT have been developed that involve parents or families to varying degrees (e.g., attend part of every session or a few supplementary sessions) and generally focus on psychoeducation and skill-building that might bolster youth's treatment progress (Barmish & Kendall, 2005). For example, in the first randomized controlled trial (RCT) to test the efficacy of CBT for anxiety with parent involvement, Barrett et al. (1996) compared individual CBT to CBT with Family Anxiety Management (FAM), and to a waitlist condition, in a sample of youth with anxiety disorders and their parents (N = 79, 7–14 years). In the FAM condition, parents learned behavior management techniques, strategies for recognizing and regulating their own emotions in response to their anxious child, and skills such as problem-solving and communication. While both CBT and CBT+FAM were associated with significant improvements in youth anxiety symptoms, a greater percentage of youth from the CBT+FAM condition were diagnosis-free following treatment (84% vs. 57%) and at the 6-month (84% vs. 71%) and 12-month follow-ups (95% vs. 70%).

To date, however, the study by Barrett et al. (1996) is something of an outlier in showing that treatment with family involvement has benefits above and beyond individual child CBT (for another exception, see Cobham et al., 2010). On the surface, this pattern of results is puzzling given families' clear role in youth anxiety. However, there are many possible reasons why most parent- and family-involved treatments may not have added benefit. Some of these may be methodological in nature, such as limited inclusion of relevant outcomes measures, or insufficient power to detect for whom these treatments work best (e.g., Caporino & Storch, 2016). Other potential reasons may relate more to the theoretical models guiding the parent involvement. For instance, the aforementioned treatments focus either on training parents as lay CBT therapists or on teaching parents' skills, such as emotion regulation and problem-solving, and may not address

the most salient aspects of family dysfunction that have been found to maintain youth anxiety.

A few treatment approaches address this limitation. One notable example is Positive Family Interaction Therapy (PFIT), which is a six-session flexible treatment module designed specifically for families with complex dysfunction to serve as an adjunct to standard therapy (i.e., individual CBT) (Peris & Piacentini, 2013). PFIT is set apart from the treatments described above in that it emphasizes psychoeducation and skills that relate specifically to the role of the family in OCD, and how family dynamics may undermine youth's engagement in therapy. The psychoeducation component of PFIT includes information about the different ways that families accommodate, how it maintains symptoms, and what makes it difficult to disengage from. Families are taught to how to notice and track their emotions in response to their child's or adolescent's OCD symptoms and practice skills for emotional regulation, distress tolerance, problem-solving, and disengaging from accommodation. Families also learn how to complete a functional analysis of difficult situations related to the child's/adolescent's OCD and engage in exercises designed to promote positive family processes (e.g., cohesion).

In the pilot study for this treatment, 20 youth with OCD (8–17 years) and their families received either manualized CBT with weekly psychoeducational check-ins with parents (i.e., standard treatment; ST) or ST but with PFIT instead of the weekly parent psychoeducation. Following treatment, remission rates were 50% for the youth of families who received PFIT compared to 20% for the youth who received ST. Gains for both conditions were maintained 3 months later. Families who received PFIT also showed significant decreases in family accommodation, conflict, and blame compared to those who received only ST. Subsequently, the efficacy of these two treatment conditions was evaluated in an RCT of 62 youth with OCD (ages 8–17) and their families (Peris et al., 2017). Following treatment, 58% of youth whose families had received PFIT achieved remission compared to 27% of youth who received ST; almost all youth (PFIT: 94%; ST: 82%) retained this status at the 3-month follow-up. As in the pilot study, the families who participated in PFIT demonstrated significant improvements in accommodation and conflict, as well as family cohesion, compared to those families who had received ST only.

Hughes-Scalise and Przeworski (2014) also discuss an approach to treating OCD and comorbid oppositional defiant disorder (ODD) vis-à-vis improving dysfunctional family processes in one notable case study of a 7-year-old boy and his family. Clinicians identified several dysfunctional family processes at the outset of treatment, including enmeshment, marital conflict (and triangulation into the conflict), and poor communication, that they deemed imperative to address for the child to successfully engage in/benefit from treatment. As such, in addition to conducting CBT with the child, clinicians also drew upon principles of family systems theory to improve boundaries, alignment, and hierarchy within the family (e.g., by helping parents reframe each other's behavior, role-play and resolve dysfunctional interactions, implement appropriate consequences for the child's disruptive behaviors). Due to the severity of both the family dysfunction and child symptoms, treatment lasted 18 months with two sessions per week at times (i.e., one focused on CBT, one focused on parent work). However, ultimately with this approach, the child and family showed significant improvement (e.g., symptoms in subclinical range on standardized measures; appropriate hierarchy of authority established within the family).

Summary of the Extant Research on CBT with Family Involvement Although considerable research reveals associations between family functioning and youth anxiety, incorporating parents or families into anxiety treatment does not always have the expected positive effects (e.g., Barmish & Kendall, 2005). Treatments that involve families by teaching specific and personalized skills to reduce dysfunction and accommodation that may be maintaining symptoms or interfering in treatment progress may be most effective, as compared to treatments that focus on general parenting skills and psychoedu-

cation. Family involvement in youth treatment may also be most indicated and effective for those families who struggle with high levels of dysfunction, and may not be useful for all families of anxious youth (Peris & Piacentini, 2013).

Additional research is needed to identify mechanisms of change in these treatments with family involvement; specifically, to determine whether changes in family function or processes account for decreases in youth anxiety (Silverman et al., 2019; Van der Giessen et al., 2019). Additionally, although direction of effects is rarely examined in treatment outcome studies (Silverman et al., 2009), improvements in youth anxiety might positively benefit family function, even if families are not directly involved in treatment (e.g., if youth are less anxious, families experience less conflict and engage in less accommodation; Kagan et al., 2016). Finally, these treatment approaches do not consider whether family involvement *without* youth involvement could result in meaningful gains. This limitation is addressed with the treatment approach described next.

Parent-Guidance: SPACE

SPACE (Supportive Parenting for Anxious Childhood Emotions; Lebowitz et al., 2014a) is a parent-only treatment for youth anxiety disorders and OCD that addresses many of the barriers to and limitations of other individual and family-involvement treatments. Despite being a common treatment modality for externalizing disorders, parent-only approaches for treating youth anxiety are rare, and limited in various ways (e.g., appropriate for a limited age range, only evaluated in open trials; Cartwright-Hatton et al., 2005; Thirlwall et al., 2013). SPACE, in contrast, is appropriate for the treatment of a wide age-range of youth with any primary anxiety disorder or OCD and does not necessitate the youth's direct participation or collaboration in treatment (e.g., agreeing to try CBT techniques).

SPACE also stands out from other treatments in that its rationale and techniques are theory-driven. The basis for targeting youth anxiety through changing parent behavior derives from attachment theory, which posits that the close emotional bond between youth and parents leads youth to seek and parents to provide soothing or protection in the face of distress such as anxiety (Lebowitz et al., 2014a). SPACE is also informed by principles of nonviolent resistance (Lebowitz et al., 2014a; Omer & Lebowitz, 2016), namely, the utility of enacting one's own beliefs and values instead of directly trying to change another person's behavior. Guided by these concepts, SPACE teaches parents how to help youth cope with their anxiety by acting unilaterally to respond to anxiety in ways that are supportive but not accommodating. The specifics of this treatment are described next.

Treatment Overview SPACE is an eight-part manualized treatment that can be individually tailored and delivered flexibly, typically within 10–12 sessions. The first part of treatment centers on explaining the concept of anxiety with a focus on its interpersonal nature. Emphasis is placed on discussing the ways that anxiety leads youth to rely on parents and can weaken boundaries within the family. The first part of treatment also highlights the rationale for parent-based treatment and why past attempts to directly change the child's anxiety have not worked, setting the stage for unilateral action on the part of the parent(s). A central technique that is introduced is responding *supportively* to the child's anxiety. Support is characterized by acknowledging, validating, and normalizing the child's anxiety while also expressing confidence in their ability to cope and manage difficult feelings independently. Supportive responses are contrasted to ones that are less effective due to being too demanding (e.g., telling a child to "get over" their fear, or that there is nothing to be afraid of) or protective (e.g., validating a child's fear but also their need to avoid feeling scared). Parents are instructed in how to form supportive statements and encouraged to use them in response to their child's anxiety.

The concept of accommodation is introduced in the second part of treatment. Families gain insight into why accommodation occurs and how it inadvertently maintains youth anxiety and reliance on parents, and work with the therapist to chart all the ways they accommodate. The remainder of treatment focuses on systematically decreasing accommodation while continuing to increase support. Parents are guided in developing plans to reduce specific accommodations, with parents taking increasing ownership of this process as treatment progresses (parts three through seven). For instance, a plan to reduce the accommodation of providing excessive reassurance might entail parents only responding one time with a supportive statement and then remaining quiet. The plan would *not* entail telling the child to limit their reassurance-seeking, as this would necessitate their collaboration and align with a demanding instead of supportive stance. Parents are coached in using written communication to announce these plans to the child, which in addition to increasing clarity and avoiding miscommunicating (e.g., due to parent or child emotions during the encounter) allows parents to express their intent to act without getting drawn into potentially dysfunctional interactions. The final part of treatment involves reviewing youth progress and changes in parental attitudes and skills, and planning for additional goals and/or relapse prevention.

In addition to the eight parts of treatment, SPACE contains four supplementary session modules that provide parents with tools for coping effectively with various forms of dysfunction that can arise during treatment or impede its progress. One module focuses on increasing parental collaboration by identifying and resolving sources of disagreement parents may have in addressing the child's anxiety or implementing a plan. Another module teaches parents how to recruit and engage individuals from outside of the nuclear family to serve supportive functions, ranging from reinforcing the child's progress to aiding in a plan to reduce accommodation to helping in the face of difficult child behaviors. The remaining two modules address how to manage threats of self-injury and disruptive behaviors that might arise in response to parental changes, without being drawn into a conflict or power struggle or reverting to accommodation. These modules can be introduced at any point in treatment, or not at all, depending on each family's needs.

Supporting Research In an initial pilot study of SPACE conducted with parents of youth with primary anxiety disorders (N = 10, 9–13 years), Lebowitz et al. (2014a) found that 60% of youth responded to treatment based on posttreatment scores on the Clinical Global Impressions Scale (CGI; ratings of "much" or "very much improved") and Pediatric Anxiety Rating Scale (average change in symptom severity of 38.4%). In addition, there were significant reductions in family accommodation following treatment (as measured by the FASA), and client satisfaction was extremely high. Subsequently, Lebowitz et al., (2019a) conducted an RCT comparing SPACE to individual child CBT (with an emphasis on behavioral exposures) in a sample of youth with primary anxiety disorders and their parents (N = 124, 7–14 years). Youth in both conditions showed significant improvement on symptom questionnaires and the CGI. Families in both conditions also showed equivalent reductions in parenting stress and were equally satisfied with the treatment they received. Although family accommodation significantly declined following treatment for both conditions, this change was significantly greater for families who received SPACE.

There is also preliminary evidence that SPACE is beneficial for the treatment of youth diagnosed with primary OCD from a small pilot study (Lebowitz, 2013) and case study (Lebowitz & Shimshoni, 2018). The pilot study included parents of six children who refused participation in CBT. Following 10 weeks of SPACE, parent-reported family accommodation and child OCD symptoms and coercive–disruptive behaviors showed significant reductions compared to pretreatment scores. The case study involved treatment of a 13-year-old White girl with obsessions and compulsions related to a fear of harm-

ing a person of color. Severe and pervasive family accommodation and dysfunction was documented at the outset of treatment. Throughout 12 weeks of SPACE, parents were able to disengage from accommodations that were maintaining the child's symptoms, such as participating in a bedtime routine involving repeated reassurance, not inviting others to the home, driving the child to school, and hiding knives/cutting food for the child. Following treatment, the child no longer met criteria for an OCD diagnosis based on parent- and child-reports on the Anxiety Disorders Interview Schedule and significant reductions on standardized symptom measures.

Summary of the Extant Research on SPACE Despite research indicating that accommodation can impede treatment engagement and progress, in most youth anxiety treatments, parents are included as consultants or co-clients, and change in parenting behavior/family functioning is not the central focus (Forehand et al., 2013). SPACE focuses on the ways that parents can help youth overcome their anxiety and OCD exclusively by changing their own behavior and in so doing, improving family boundaries and dynamics. SPACE importantly and uniquely provides parents with specific guidance on reducing accommodation, which differs from other treatments that, at most, incorporate psychoeducation or general guidance about accommodation and the importance of reducing it (e.g., Freeman et al., 2003; Kagan et al., 2016; Merlo et al., 2009).

Given that SPACE has initial evidence of being as effective as individual CBT for treating youth anxiety, it may be an excellent option for cases in which youth will not directly engage in treatment. It may also be an excellent fit for families who experience high levels of dysfunction given its focus on deescalating conflict and disengaging from coercive process without compromising treatment goals; however, its efficacy for this purpose remains to be empirically tested. As with the cognitive-behavioral approaches described above, future research on SPACE could examine treatment mechanisms or focus on dismantling the different elements of treatment and the impact they have on youth anxiety and family functioning. Future studies could also compare SPACE with additional treatment conditions, including other parent-based or family-involvement approaches, to provide further support for its efficacy.

Future Directions

A long history of research speaks to the importance of considering family functioning in understanding the development and informing the treatment of youth anxiety. Despite this wealth of knowledge, gaps in the literature are evident. There is a need for longitudinal studies of accommodation to confirm hypothesized bidirectional effects with anxiety symptoms over time (see Bertelsen et al. 2022, for a recent notable example). Additionally, few studies have simultaneously included indices of accommodation and other forms of family dysfunction, limiting understanding of how they are related (for notable exceptions, see Peris et al., 2008; Wu et al., 2014). For example, future research could examine the co-occurrence of accommodation and other processes that may adversely impact or result from poor family boundaries (e.g., enmeshment). Such findings could be important to informing family-based intervention efforts or understanding their potential mechanisms (e.g., reducing accommodation could lead to youth anxiety remission vis-à-vis improved family functioning).

At present, SPACE is the only empirically supported treatment that has the main goal of reducing family accommodation and does not require youth participation. Other treatment options for improving symptoms via reducing family dysfunction have exclusively targeted youth with OCD and are designed to be implemented alongside or adjunct to child-based treatment (e.g., PFIT). In the future, these approaches could be adapted to serve as stand-alone treatments involving parents only. It could moreover be tested whether they are appropriate and effective for all youth anxiety disorders, given

their higher incidence than OCD (Merikangas et al., 2010), and given that accommodation and dysfunction can be just as prevalent in the context of anxiety disorders (e.g., Lebowitz et al., 2014b).

Future research could also investigate additional positive and negative prognostic indicators of the treatments described in this chapter. As an example, Zilcha-Mano et al. (2021) examined the degree of agreement/disagreement in youth- and parent-reports of family accommodation in relation to treatment outcomes. Results revealed that greater levels of agreement on low and high levels of accommodation, but not moderate levels, predicted greater reductions in youth anxiety symptom severity following SPACE. Authors posit that agreement on moderate levels of accommodation may not be a sufficient basis for families to be motivated for change compared to agreement on high levels, whereas agreement on low levels indicates adaptive family functioning is already occurring. Agreement/disagreement on other aspects of family functioning could be considered as well. Finally, the literature on accommodation may follow the lead of the broader family dysfunction literature by developing behavioral/observational measures of accommodation, which may be especially useful for informing treatment targets or serving as prognostic indicators.

Conclusion

The nature and severity of family dysfunction are important clinical considerations, given research showing that dysfunction can both contribute to and result from youth anxiety. There are many forms of family dysfunction, and family accommodation is one form that is especially prevalent among families of youth with anxiety disorders and OCD. Despite this knowledge, most youth anxiety treatments have not focused on improving family functioning as a primary target or mechanism of change. Fortunately, research in this area is growing, and accumulating evidence suggests that targeting reductions in family accommodation is an effective way to treat youth anxiety symptoms. Additional research is needed to better understand which youth may most benefit from such family-based treatment approaches and how such approaches work to alleviate symptoms.

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Parent Training for Childhood Anxiety

28

Adam B. Lewin and Kelly Kudryk

The "dry-cleaning model" of child anxiety treatment is unfortunately a myth – it is unreasonable to expect that a child's anxiety disorder will be sufficiently treated by dropping a child off with a therapist, regardless of the clinician's skill. Family change and support is a critical component in the treatment of child and adolescent anxiety. Etiological models suggest that parenting behaviors impact child anxiety (Hudson & Rapee, 2001). However, the optimal role of parents in the treatment of children with anxiety disorders is unclear. What parent-training strategies are helpful for alleviating childhood anxiety? Is parent training a key treatment component or is it ancillary? Are there benefits to parent therapy, e.g., anxiety management training? What is the efficacy of applying non-anxiety-specific behavioral parent-training approaches, such as those employed for disruptive behavior disorders? While the answers are far from unambiguous, this chapter will: (1) discuss the rationale for parent training and parental involvement in psychotherapy for child anxiety, (2) review research in this developing area, and (3) discuss limitations in the extant research and recommendations for practice and future study.

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Rationale for Parent Inclusion

Insufficient Improvement from Current Interventions The rationale for parental inclusion in the treatment of childhood anxiety is multifaceted. Despite the efficacy of current first-line treatments for childhood anxiety disorders, namely individual cognitive-behavioral therapy (CBT) and selective serotonin reuptake inhibitors (SSRIs), these interventions yield only modest improvement (Eisen et al., 2008). For example, the Child–Adolescent Anxiety Multimodal Study (Walkup et al., 2008) produced only a 59.7% improvement rate in anxiety symptoms following a meticulously implemented CBT protocol (the Coping Cat protocol; Kendall & Hedtke, 2006). When the outcome of treatment is based on a "diagnosis-free" criterion, results are slightly less encouraging (56.5% diagnosis-free based on meta-analytic techniques) (Cartwright-Hatton et al., 2004). Treatment responses may be even lower in community samples where patient presentation is more heterogeneous and implementation of treatment is less standardized (Weisz et al., 1992). Given that as many as 50% of youth remain symptomatic following an adequate trial of child-focused CBT (in the absence of significant parental participation) (Ginsburg & Schlossberg, 2002; Wood et al., 2006), family-based approaches are worthy of consideration.

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Family Transmission of Anxiety The heritability of anxiety disorders must also be considered when developing and implementing treatment. Anxious children are more likely to have anxious parents – data from family aggregate and genetic studies suggest a range from 60% to 80% (Chorpita & Barlow, 1998; Ginsburg & Schlossberg, 2002; Hudson & Rapee, 2001; Last et al., 1987; Pauls, 2008; Rutter et al., 1990). For example, Beidel and Turner (1997) examined 129 school-aged children (7–12 years) and found that 33% children of parents with an anxiety disorder met criteria for an anxiety disorder whereas only 9% of children of normal controls met criteria for an anxiety disorder. Both genetic and environmental (learned) mechanisms are likely involved in multigenerational transmission of anxiety (Hettema et al., 2001; Rapee, 1997).

Family-Based Maintenance of Anxiety Parents may model avoidant behavior as well as anxious thinking patterns (e.g., excessive reassurance, distorted cognitions, though-action fusion) to an impressionable child (Capps & Ochs, 1995; Dadds et al., 1996; Eisen et al., 2008; Moore et al., 2004). In a review of the literature, Ginsburg and Schlossberg (2002) suggest that parents of anxious youth (in comparison to parents of non-anxious youth) are (1) more likely to interpret ambiguous situation as worrisome/stressful and (2) more supportive of avoidance-based coping strategies. Moreover, parents may strengthen (i.e., reinforce) the likelihood of anxiety-related behaviors via escape, avoidance, attention, and accommodation of behaviors (Barrett et al., 1996, 2001; Geffken et al., 2006; Kendall et al., 2008; Last et al., 1987; Lewin & Piacentini, 2010; Meiser-Stedman et al., 2005; Smith et al., 2007; Wood et al., 2002). Parent-focused intervention can decrease the likelihood of child anxiety in the shorter term, ~12 months (Cartwright-Hatton et al., 2018; Ginsburg et al., 2015) but not in the longer term, 6 years (Ginsburg et al., 2020).

Parents of anxious youngsters are often overprotective (Last & Strauss, 1990). It is not uncommon for anxious parents to attempt to limit their child's exposure to stressful stimuli, perhaps because they are fearful that the child will lack an ability to cope. However, despite the best of intentions, inadvertent and intentional strategies to mitigate a child's exposure to anxiety may backfire. First, overprotection (among parents of anxious youth) is often accompanied by critical and controlling parental behavior (Cobham et al., 1998; Eisen et al., 2008; Hudson & Rapee, 2001; Messer & Beidel, 1994; Siqueland et al., 1996). At times, parental responses to an anxious child's symptoms may even be harshly antagonistic (Renshaw et al., 2005). Second, in comparison to youth without anxiety, anxious youth describe their parents as less supportive, less warm, and as granting less psychological autonomy (Chorpita & Barlow, 1998). Third, the development of psychological autonomy may be hindered by overprotection, control, and punishment of independence (Hudson & Rapee, 2001). For example, when parents reinforce anxious responding and attempt to manage all of the stress in a child's environment, the youngster's development of adaptive behaviors for coping with anxiety may fail to develop (e.g., emotion-focused coping) (Spence, 1994; Strauss et al., 1987). Further, children may receive insufficient exposure to learning paradigms involving stressful situations. By shielding a child whenever stress is encountered, parents may communicate a message suggesting that the child is incapable of handling anxiety. Finally, parents of anxious youngsters are more likely to exhibit behaviors that communicate a greater perception of threat in the child's environment (Barrett et al., 1996; Dadds et al., 1996; Spence et al., 2000). In a viscous cycle, parental overprotection and communication-of-environmental-threat may reinforce the child's anxious thoughts and behaviors.

Although longitudinal research suggests that aforementioned parental behaviors maintain child anxiety (Lieb et al., 2000), the relationship between child anxiety and parent anxiety is reciprocal (Bögels & Siqueland, 2006; Chorpita & Barlow, 1998; Kendall et al., 2008) and thus even non-anxious parents may be conditioned to exhibit behaviors associated with the proliferation

of child anxiety (Manassis & Bradley, 1994). In other words, both parents and children contribute to anxiety-maintaining factors, e.g., control, criticism, conflict, and overprotection (Bögels & Melick, 2004). Notably, changes in family functioning variables are related to long-term treatment outcomes for anxious youth (Crane et al., 2021), suggesting the importance of treating the family unit to maintain changes produced from intervention.

Bolstering Compliance Cognitive-behavioral therapy for anxiety disorders requires intensive practice in and out of treatment sessions (Kendall & Hedtke, 2006; Lewin et al., 2005a or b; March & Mulle, 1998; Piacentini et al., 2007; Silverman et al., 1999). Parent endorsement and support for treatment procedures are paramount in compliance with therapeutic procedures outside of session (Hudson & Kendall, 2002). Just as it is unrealistic to expect many children to complete homework from school without some level of parental attention/supervision, one cannot rely on youngsters to engage in CBT exercises (e.g., cognitive logs, exposure/response prevention, routine modifications) without parental assistance. Moreover, the most potent aspect of CBT for child anxiety – exposure – can be terrifying and counterintuitive to a child. Exposures involve, in a hierarchical fashion, presentation with (in vivo or imaginally) a feared stimuli or situation. Moreover, the child is asked to reframe from using their established (though ultimately fear-maintaining) repertoire of coping strategies (e.g., avoidance, escape, ritualization, and reassurance seeking). Not surprisingly, children are often less-than-excited about participation in therapeutic exposures. When a child is fearful about engaging in therapeutic exercises (and perhaps doubtful of the potential benefit, especially in the initial stages of treatment), it is unrealistic to expect independent engagement in exposure-based practice. Consequently, parental endorsement of the treatment is critical. This is especially important when a child's motivation is low, insight is poor, and expectation for improvement is minimal. Thus, experts may advocate training parents to participate in session and assisting their child to generalize therapeutic procedures to other environments.

In summary, family aggregation (or hereditary predisposition), in combination with several parenting factors, likely plays a significant role in the development and maintenance of child anxiety. Further, modeling and reinforcement of anxious behaviors, overprotection, conflict, and verbal/nonverbal communication (suggesting that the world is unsafe and that the child is ill-equipped to cope) can impede treatment (Nauta et al., 2003; Spence et al., 2000). Moreover, children may lack the initiative and/or their anxiety may be too pervasive for them to participate in therapy independently. Consequently, it is not unlikely that child-focused therapies will be unsuccessful (Thienemann et al., 2006). Accordingly, the addition of parent training and family interventions targeting anxiety-maintaining behaviors may improve outcomes (Ginsburg & Schlossberg, 2002; Lewin et al., 2005a; Spence et al., 2000; Thienemann et al., 2006).

Parent-Training Approaches for Youth with Anxiety

Despite nearly universal agreement for the necessity of parent involvement in the treatment of youngsters with anxiety disorders, there is a wide variability in approach and application. Ginsburg and Schlossberg (2002) noted that the content of parent-focused interventions typically included psychoeducation, contingency management, and parental inclusion in treatment.

Psychoeducation Parent psychoeducation is a critical aspect of treatment for anxious youth (Lewin et al., 2005b). Although psychoeducation is often disorder specific, the omnibus goal is to provide a cognitive-behavioral conceptualization for the manifestation and treatment of anxiety (Ginsburg & Schlossberg, 2002). Parental education should highlight the biological etiology of anxiety with a goal of reducing parental self-blame (or child blame) for the development of a

child's anxiety. Nevertheless, the role of the child's environment (e.g., the family) in maintaining anxiety must be emphasized. The therapist might explain to the parent that trying to provide comfort and protection, despite being innate parental responses, may worsen symptoms in an anxious child. Subsequently, the therapist should impart knowledge regarding the therapeutic techniques that will be used to extinguish anxiety and augment adaptive coping skills. Additionally, education may focus on the tripartite model (Lang, 1979) to assist parents understand and recognize relations between physiological symptoms, anxious thoughts, and avoidant behaviors. For example, educating a parent that picking up a child (with a stomachache) the day of the child's exam might actually proliferate anxiety.

For psychologically minded parents, especially in family systems where coercive cycles are minimal, psychoeducational aspects of parent training may be sufficient for training the parent to begin to model appropriate behavior and discontinue reinforcement of behavior/overprotection that may perpetuate the child's anxiety. However, at the very least, parent training should attempt to create an anxiety-neutral environment. For parents, psychoeducation may open the first window into the pervasive and debilitating nature of their child's anxiety (Engel et al., 1994; Yeh & Weisz, 2001). Further, this training can provide the essential "sales pitch" to the parent for treatment; as discussed above, the child is unlikely to "buy-in" to treatment without parental endorsement.

Training in Therapeutic Techniques Parent training for youth with anxiety disorders often involves instructing a parent to participate with child-focused therapeutic exercises in-and-outside of session (Barrett et al., 2008; Ginsburg & Schlossberg, 2002; Silverman et al., 2008; Thienemann et al., 2006). Training ranges from teaching the parent to monitor and assist with therapeutic homework as needed (Kendall & Hedtke, 2006; March & Mulle, 1998), to participation throughout therapy (Lewin & Piacentini, 2010; Smith et al., 2007), to training as a lay-therapist (Hahlweg et al., 2008; Thienemann et al., 2006). Silverman et al. (1999) described a model where the therapist's responsibilities are gradually transferred to the parent. Certain factors may contraindicate parent assumption of therapeutic roles. High parental anxiety, caustic parent–child interactions, poor child motivation, and/or oppositional child behavior dictates concurrent or precursor interventions.

Contingency Management Contingency management techniques are commonly included as part of parent training for child anxiety disorders. Contingency management (often called behavioral parent training) involves teaching parents operant principles including: (1) positive reinforcement (e.g., rewarding participation in treatment); (2) negative reinforcement (eliminating escape and avoidance as coping strategies); (3) extinction (ignoring reassurance seeking behavior); and (4) punishment (e.g., removal of privileges or the presentation of a time-out following oppositional behavior). Contingency management techniques can target anxiety specifically or general behaviors (e.g., cooperation, remaining on-task, compliance with assignments). Training should include learning how to identify rewards (that can be used to increase desired behaviors). An emphasis is placed on avoiding power-struggles with the child by (1) being consistent, (2) following-through with contingencies, and (3) refraining from emotionally reactive responses to the child. Implementing contingency management techniques can dramatically shift family roles (from child control (or anxiety-mediated control) to parent control). Despite emotions (e.g., anger, worry, frustration) that a parent or child may be experiencing when delivering/receiving a consequence (e.g., a timeout) or conducting a therapeutic exposure exercise (e.g., withholding reassurance to a child's anxious request), the parent should give the perception of control and level-headedness. The parent should

strive to project confidence in the techniques and control over the situation. Parent and child emotional reactions (to potentially major role changes) can be discussed in session. These techniques are commonly included for most child anxiety disorders including obsessive-compulsive disorder (OCD) and posttraumatic stress disorder (PTSD) (Barrett et al., 1996; Carr, 2004; Dadds et al., 1991; Lewin et al., 2005b; Smith et al., 2007; Wood et al., 2006).

Additional Strategies Other ancillary parent-training approaches may include parent anxiety management, family problem-solving, and communication training (e.g., interventions aimed at improving parent–child interactions). Typically, these strategies do not focus on the specific parenting practices that are hypothesized to contribute to anxiety development and maintenance (Wood et al., 2006). Consequently, these approaches are normally applied only when the characteristics of a particular family dictate their necessity. For example, the therapist might illustrate how a parent's anxious or avoidant behavior may be modeling anxiety. In more severe cases, referral for outside treatment for the parent may be warranted. For example, parents suffering from PTSD are unlikely to be able to assist their child prior to resolving their own symptoms (Carr, 2004). Similarly, families marred by significant conflict may require additional intervention to facilitate their ability to combat anxiety. Targets of training include improving parent–child communication, teaching problem-solving skills, increasing positive parental attention, and decreasing blame/conflict. These family therapeutic modules can be added into the anxiety treatment sessions seamlessly (e.g., Wood et al., 2006). However, long-standing psychiatric illness in children, parents, or both may necessitate more intensive prerequisite or concurrent family therapy. If family therapy cannot be implemented (with an extremely caustic family), e.g., because a parent refuses to participate or all the blame is placed on the child, then this is one of the few situations that individual child therapy with minimal parent involvement may be warranted.

Treatment Studies

As mentioned earlier, child-based anxiety treatments have produced modest results. To improve outcomes, researchers have examined whether parent involvement enhances child-based treatments for childhood anxiety. Many studies have compared CBT for child anxiety with and without significant parental components. It is important to note that the format of treatment, amount of parent involvement, and parent-training content varies between studies (see Table 28.1). Some have reported parent inclusion to be superior (Barrett et al., 1996; Wood et al., 2006), but most found that CBT with parent involvement did not outperform child-only CBT (Kendall et al., 2008; Nauta et al., 2003; Öst et al., 2001). Meta-analyses have concluded the same: no significant differences in treatment outcomes (Carnes et al., 2019; Reynolds et al., 2012).

There is some evidence suggesting that, non-anxiety-specific parent-training approaches benefit youth with anxiety disorders. One study investigated the effectiveness of the Positive Parenting Program (Triple P) with anxious youth (Özyurt et al., 2019). This study reported significant improvement in child anxiety symptoms, functional impairments, and a decrease in the severity of symptoms when compared with waitlisted youth. Cobham et al. (2017) adapted Triple P for youth with anxiety disorders, called Fear-less Triple P. In a randomized waitlist comparison trial of 61 participants ages 7–14, 38.7% of youth in the Fear-less Triple P condition were free from any anxiety diagnosis at the end of treatment, compared to 3.4% of youth on the waitlist (Cobham et al., 2017). Parent–Child Interaction Therapy (PCIT) was also adapted for treatment of anxious youth. The CALM (Coaching Approach behavior and Leading by Modeling) Program was adapted from standard PCIT to treat anxiety disorders in youth ages 3–7 (Comer et al., 2018). Results from a pilot trial of 10 youth suggest that the CALM Program is a feasible treatment for childhood anxiety (Comer et al., 2012). In addition, the CALM Program has been adapted for remote delivery, referred to as the iCALM Telehealth Program (Comer et al.,

Table 28.1 Select controlled parent-training trials for child anxiety

Study	Diagnoses	*N*	Ages	Sessions	Conditions	Parent content[a]	Outcome
Barrett et al. (1996)	GAD, SOP	70	7–14	12	Parent and child CBT together; child-only CBT; WL	1, 2, 3, 4, 6	Parent + Child = Child only > WL*
Barrett (1998)	GAD, SOP	60	7–14	12, Group	Group child-only CBT; group parent and child CBT together; WL	1, 2, 3, 4, 6	Parent + Child > Child only > WL**; Parent + Child = Child only > WL*
Cartwright-Hatton et al. (2011)	N/A	74	2.7–9	10, Group	Group parent training (without child); WL		Parent training > WL*
Cobham et al. (2017)	GAD, SOP, SP, SAD, OCD	61	7–14	6, Group	Group parent training (without child); WL	1, 2, 3, 4, 5	Parent training > WL*
Comer et al. (2021)	SOP, GAD, SAD, SP, OCD	40	3–8.9	12	Parent training (with child); WL	1, 2, 5	Parent training > WL**
Kendall et al. (2008)	GAD, SOP; SAD	161	7–14	16	Child-only CBT; parent and child CBT together; family education (control)	1, 2, 3, 4, 5	Child only = Parent + Child > Family education*
Lebowitz et al. (2020)	GAD, SP, SOP, SAD	124	7–14	12	Parent training (without child); child-only CBT	1, 2, 3, 4, 5, 6	Parent training = Child-only CBT**
Nauta et al. (2003)	GAD, SP, SOP, SAD, PD	79	7–18	12	Child-only CBT; child-only CBT + 7 sessions of parent training (without child); WL	1, 2, 3	Child-only CBT = Child + parent training > WL
Özyurt et al. (2019)	GAD, SP, SOP, SAD	74	8–12	8, Group	Group parent training (without child); WL	1, 2, 3, 4, 5	Parent training > WL***
Wood et al. (2006)	OCD, GAD, SP, SOP, SAD	40	6–13	12–16	Child-only CBT; parent and child CBT together	1, 2, 3, 4, 5	Parent + Child > Child only **

Selected studies must have (1) with/without parent comparison conditions, (2) controlled design, and (3) outcome based on diagnostic status or clinician rating of improvement or clinical symptoms using a well-standardized instrument

Abbreviations: *GAD* generalized anxiety disorder (or overanxious disorder, DSM-III-R), *SP* specific phobia/simple phobia, *SOP* social phobia/social anxiety disorder, *SAD* separation anxiety disorder, *OCD* obsessive-compulsive disorder, *PTSD* posttraumatic stress disorder, *CBT* cognitive-behavioral therapy, *WL* wait list

* = Outcome based on no longer meeting diagnostic criteria; ** = outcome based on clinician ratings of improvement; *** = outcome based on clinician-rated symptom decrease for targeted disorder (e.g., PTSD symptoms)

Parent treatment components: **1** = psychoeducation; **2** = contingency management; **3** = parent anxiety management; **4** = parent–child problem-solving/communication training; **5** = in-session training for parents to deliver CBT components; **6** = parents trained to model of coping behaviors

[a]Based on review of the study and reviews by Ginsburg and Schlossberg (2002) and Silverman et al. (2008)

2021). A randomized controlled trial with 40 youth ages 3–8.9 found that 60% of children who participated in iCALM were classified as responders by the 6-month follow-up (Comer et al., 2021). In addition, there were significantly greater reductions in child anxiety symptoms, fear, discomfort, and anxiety-related social impairment compared to those on the waitlist.

Parent-based interventions, specifically for the treatment of childhood anxiety disorders, have also been developed and tested. One such intervention is the SPACE (Supportive Parenting for Anxious Childhood Emotions) program (Lebowitz et al., 2014). In a randomized controlled trial of 124 youth ages 7–14 comparing SPACE to CBT, it was found that SPACE is as efficacious as CBT (Lebowitz et al., 2020). In addition, parent ratings of family accommodation from those who participated in SPACE were significantly more reduced than CBT (Lebowitz et al., 2020). Another anxiety-specific parent-based program is Timid to Tiger, a group parent-only CBT-based intervention (Cartwright-Hatton et al., 2011). In a randomized controlled trial of 74 youth ages 2.7–9 comparing Timid to Tiger to a waitlist, it was found that 57% of youth were free from their primary diagnosis by end of treatment, compared with 15% of youth on the waitlist (Cartwright-Hatton et al., 2011).

Interpretation and Limitations of Research Findings

There is a consensus that parents impact the development and maintenance of childhood anxiety. Additionally, most experts agree that parent involvement is an important aspect of treatment. However, the extant research has produced mixed findings regarding the necessity of parenting interventions for child anxiety disorders. Across studies and specific syndromes, parent-training approaches have proved superior to control conditions (e.g., waitlist/no-treatment controls, active psychosocial controls) and, at the very least, equivocal to child-focused treatment without substantial parent involvement. Notably, several studies suggest no added benefit (defined by lack of change in diagnostic status and/or lack of clinician-rated symptom improvement) to structured parent training or family therapeutic components.

Despite these results, expert guidelines and consensus support parent inclusion in the treatment of child anxiety (American Academy of Child and Adolescent Psychiatry [AACAP], 2007; AACAP, 1998; Cartwright-Hatton et al., 2004; Ginsburg & Schlossberg, 2002). Individual child CBT, medication, and their combination are evidence-based interventions (Walkup et al., 2008). However, the fact that youth-centered treatments for anxiety have produced reliably strong outcomes does not negate the possibility that resulting changes in the child's symptoms/behavior impact the family system, possibly producing reciprocal family/parenting changes. Consequently, the efficacy of individual child treatments does not supersede potential advantages for parental inclusion.

Although few parenting interventions meet criteria for empirically supported treatments (Chambless & Hollon, 1998; Nathan & Gorman, 2002; Silverman et al., 2008), this is due to methodological and procedural variance rather than lack of efficacy. Many approaches have not been fairly tested and external validity of the findings is mostly absent (Weisz et al., 2005). For example, to be considered empirically supported, interventions must be reproduced using controlled designs (Chambless & Ollendick, 2001) – comparing parenting interventions across studies is like comparing oranges to eggplant. Three different research teams may implement similar interventions, but with slightly different manuals and approaches. Even the definition and application of "parent involvement" or "parent training" or "family therapy" in the treatment is highly variable and inconsistently applied. Whereas some studies include only single parent-training aspects (e.g., contingency management or psychoeducation), other studies are more comprehensive. Across studies, the content covered in parent sessions varies, e.g., parental anxiety management, family problem-solving, the training of parents to be lay-therapists, and improving parent–child communication. Nevertheless, the

conditions may be labeled identically (e.g., family CBT or parent training; see Silverman et al., 2008 for review). Therapist–parent contact ranges from brief, post-session "check-ins" to participation in the entire session. In some trials, there are consistent, individual parent-training sessions while in others, parents and children are seen concurrently.

Moreover, results from treatment comparison trials must be interpreted in the context of their methodological limitations. For example, most of the aforementioned research involves participants recruited to university-based study centers (Bögels & Siqueland, 2006). Subjects may not be representative of family dysfunction and psychopathology found in referred or community samples (Weisz et al., 1992). Additionally, parenting interventions were not tailored to specific family needs (Manassis et al., 2002). To maximize adherence and treatment success with cognitive-behavioral-based therapies for child anxiety, the approaches should be flexible and consider individual family factors and psychosocial stressors (Albano & Kendall, 2002). It is noteworthy that extant research lacks controlled comparisons of child-focused vs. child + parent-focused interventions targeting participants, specifically identified on the basis of having family functioning struggles. Given that parent anxiety management benefited child outcomes for youth of anxious parents (but not of non-anxious parents; Cobham et al., 1998), targeted approaches appear warranted.

Dismantling studies is challenging due to several other limitations. Study designs run the gambit from single subject to randomized controlled trials (RCTs). Additionally, certain studies examine a broad range of anxiety disorders while others focus on a specific syndrome. Other sample characteristics limit interpretation: many of the extant studies do not include older adolescents or children under age 7, limiting generalizability (Bögels & Siqueland, 2006). Parent-focused approaches appear promising for young children (e.g., under age 7) with anxiety (Freeman et al., 2014; Johnco et al., 2015; Lewin et al., 2014; Rudy et al., 2017) although we lack designs comparing methodologies. Criteria for outcome also vary across studies (e.g., symptom improvement of rating scales, diagnostic remission, clinician-rated improvement scales). Additionally, diagnostic remission may not be sufficiently sensitive to treatment effects (especially in comparing two active treatments; e.g., child-only vs. child + parent components), and many of the best designed randomized controlled trials are opting to use clinician-rated improvement as an alternative (Lewin et al., 2012). Further, raters of improvement and diagnostic status vary across studies – e.g., child, parent, therapist vs. independent-observer. Independent evaluators range from undergraduate students to senior psychologists and physicians, limiting generalization across studies. Moreover, given that outcomes are based on parent report (e.g., via a diagnostic interview), the level of parental participation in treatment may influence ratings (Hawley & Weisz, 2005). Comparing group-based treatment to individual family treatments adds to the obfuscation.

On a related note, few studies consider family-based improvement outcomes while evaluating merits of parenting and family-based treatment approaches for child anxiety. Child anxiety occurs within a family system. Although many of the parent-focused approaches in this chapter describe their interventions as family therapy, many of the interventions more accurately depict child-focused procedures with or without some degree of family (or more frequently parental) involvement. In a strict sense, family therapy targets the family system and, depending on the family theoretical approach, family members are seen together, often including multiple parents, siblings, and extended family. The child's anxiety is not the focus of the intervention – the family system that produces symptoms (e.g., child anxiety) is the target. Comprehensive family-based interventions (e.g., Bögels & Siqueland, 2006; Wood et al., 2006) suggest that family therapy may be superior to individual therapy.

However, in many cases, comprehensive family therapy may be an elephant-gun approach to treating a child's anxious symptoms. Although many parents readily endorse that parenting and other family factors may have impacted their

child's anxiety, others are steadfast in the "fix-him" approach and are reluctant to accept parent-training, let alone a family-model of treatment. In fact, parents and children often disagree as to the presenting problem (Hawley & Weisz, 2003). Level of family conflict, communication, accommodation, parent anxiety, and parent psychological awareness might dictate the battery, order, and extensiveness of family interventional techniques.

Simply increasing parental inclusion within child sessions may increase therapeutic alliance (Hawley & Weisz, 2005) and consequently improve treatment outcomes. Although parent contact alone (e.g., education alone; Kendall et al., 2008) is unlikely to be sufficient for treating anxiety, future studies should compare degrees of participation (e.g., parents participate in most/all of every session; parents participate in portions of session; separate parent or family sessions). Exposure and response prevention (ERP) is critical for anxiety reduction in youth (Peris et al., 2015). Consequently, parent training in ERP is likely the most critical element for optimizing outcomes, especially with younger children. There are well over 500 psychotherapies for youth mental health (Kazdin, 2000; Wittenberg, 2006), with over 400 randomized psychotherapy trials (Chorpita et al., 2011). Nevertheless, dissemination and expansion into community settings has not kept pace with development and testing. A focus on disseminating techniques to parents in community settings, based on aggregate findings, could limit the resource bottleneck and reduce barriers related to cost/time. Rather than focusing on specific treatments or programs, teaching parents how to utilize ERP-based tools should be prioritized. Models may include education and brief support for high-risk families: prevention/managing early onset of symptoms with more substantial support from clinicians for pediatric cases meeting diagnostic threshold/not responsive to briefer/lower intensity approaches. The family is clearly the agent-for-change in youth anxiety – implementation science-based research appears the next logical step given a plethora of RCTs.

Conclusions and Directions for Research and Practice

Although the degree to which parent-training interventions augment benefits from child-focused CBT for child anxiety is unclear, it is the consensus that family involvement in treatment is necessary (AACAP, 2007). Although findings are mixed, data suggest that parent- and family-based interventions are at least equivalent, if not superior, to child-focused interventions. Overall, the extant literature is limited by significant methodological variability and may underestimate the impact of parent components in the treatment of child anxiety.

Several research questions remain. First, we lack sufficient analysis of specific parenting and family behaviors that should be considered when deciding the optimal level of family involvement in a child's treatment. Second (and relatedly), future research should evaluate targeted approaches for specific family problems. In other words, clinicians need tools to identify which families may benefit from which interventions. Third, family-based outcomes should be considered. When evaluating the efficacy of parenting and family interventions, diagnostic status may be an insufficient barometer. Finally, research should be expanded into community-based samples, generalizing findings outside of recruited and relatively homogenous samples.

There are several considerations when integrating parent training and family approaches into practice. The first series of recommendations focus on assessment. At the onset of treatment, the clinician should assess child and parent attitudes, attributions, and goals for therapy. Additionally, careful screening for significant parental anxiety and family conflict should be conducted. Throughout treatment, the therapist should monitor for accommodation, modeling, overprotective behavior, and reinforcement of anxiety-maintaining behaviors. The second set of considerations includes specific aspects of therapy. First, whenever possible, it might be helpful to meet with the family together. Qualitatively, greater in-session parent participation appears to have advantages (Hawley & Weisz, 2005).

Second, several parent-focused techniques appear helpful, e.g., psychoeducation, training/modeling of therapeutic techniques, and contingency management training. Anxiety management for parents and communication skills training may benefit particular families. Additional family-based interventions (or individual treatment of parental anxiety) may be necessary, depending on the family psychopathology.

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School-Based Interventions for Child and Adolescent Anxiety

29

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Anxiety disorders are the most common mental health problem among young people, with a lifetime prevalence rate of 32% prior to age 18 years (Merikangas et al., 2010). Left untreated, childhood anxiety is associated with academic and social impairment (Swan & Kendall, 2016), a chronic course into adulthood (Costello et al., 2005), and significant costs to families and communities (Bodden et al., 2008; Pella et al., 2020). Yet, despite the clear importance of early and effective intervention for anxious youth, many remain unidentified, and more than 80% do not receive treatment (Merikangas et al., 2011). Even when anxious youth connect with various health service sectors, such as pediatrics and school mental health, they may not receive evidence-based services. Primary care providers can facilitate children's access to mental health services but often have difficulty identifying anxiety (Aydin et al., 2020), can feel ill-equipped to manage and support child anxiety (O'Brien et al., 2017), and are less likely to refer anxious youth to mental health services than youth with externalizing problems (Wren et al., 2005). Similarly, students identified as anxious through school-wide screenings are less likely than students with other mental health problems to receive follow-up care from a provider (Husky et al., 2011). Logistical barriers, including long wait-lists and high costs, can also prevent families from accessing community mental health care. This failure to deliver adequate care, combined with the high rates, impairments, and costs of child and adolescent anxiety, underscores the critical need for alternate methods of providing anxious youth with effective services.

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Rationale for School-Based Interventions

Schools can play an important role in addressing the unmet mental health needs of anxious youth by potentially increasing access to cost-effective services. Implementing evidence-based interventions in school settings offers a number of advantages over traditional mental health services. Because schools provide unparalleled access to

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youth, school-based services can reduce logistical barriers, such as cost and transportation (Husky et al., 2011). Training school personnel to identify anxiety and implement school-wide screenings may also facilitate early detection and intervention efforts (Fox et al., 2008). In addition, as stigma is among the largest barriers to mental health care, youth and families might be more accepting of mental health services if offered among the many routine services provided by schools (Bowers et al., 2013).

Moreover, the school environment is an ecologically valid setting to implement evidence-based interventions for child and adolescent anxiety. Many common triggers of anxiety occur at school, such as giving presentations, approaching peers, being assertive, using public bathrooms, separating from caregivers, taking exams, and worrying excessively about grades. As a result, school-based anxiety interventions allow students to practice new skills and engage in exposure exercises in everyday situations, thereby increasing the likelihood of generalization. For instance, children can complete exposures in which they read in front of the class or initiate conversations with peers at a school club. Peers and teachers can also be enlisted to assist in exposure tasks (e.g., requesting a peer to start a conversation with the anxious student to ensure repeated practice), and school-based clinicians can join students to provide additional coaching and encouragement (Ryan et al., 2012). In this way, interventions delivered in school can reduce the divide between the clinical setting and the "real world."

School-Based Intervention Outcome Research

Building on research that established the efficacy of cognitive-behavioral therapy (CBT) for child and adolescent anxiety in clinic and laboratory settings (e.g., Cartwright-Hatton et al., 2004; Higa-McMillan et al., 2016), the past 15–20 years have witnessed a substantial increase in studies of anxiety interventions in school settings. These studies initially focused on exploring the *transportability* of CBT interventions in schools. In contrast to more controlled efficacy research, these studies examined whether researchers could implement these interventions feasibly and effectively in the real-world conditions of school settings and with more open inclusion criteria for participants. More recently, a growing area of research has investigated the *dissemination* of school-based anxiety interventions. These studies aim to evaluate whether these interventions can be delivered successfully by school personnel, including school-based clinicians (e.g., school psychologists) and less-specialized school professionals (e.g., teachers) with limited background in CBT. These studies are also critical for understanding factors such as training and supervision models, which may influence whether schools are able to sustain these interventions without significant researcher involvement.

This chapter will present four school-based intervention programs for child and adolescent anxiety. While there are other school-based anxiety interventions in the literature, these four programs were selected because their feasibility and transportability have been demonstrated in multiple randomized controlled trials, and there have been significant efforts to investigate whether they can be delivered effectively by school personnel. Following the overview of these programs, various issues, challenges, and future directions related to the implementation of school-based anxiety interventions will be discussed.

FRIENDS

Program Description

The *FRIENDS* program is a school-based universal anxiety prevention program for school-aged youth (Barrett & Turner, 2001), adapted from the *Coping Koala* (Barrett et al., 1996), which was based on the *Coping Cat*, a cognitive-behavioral treatment for child anxiety (Kendall, 1994). *FRIENDS* is an acronym designed to help children remember the skills learned during the program, which include emotion recognition and

regulation, relaxation skills, cognitive awareness and restructuring, problem-solving, and in vivo exposure. The acronym is as follows: F = Feeling worried; R = Relax and feel good; I = Inner thoughts; E = Explore plans of action; N = Nice work, reward yourself; D = Don't forget to practice; S = Stay cool. *FRIENDS* consists of 10 weekly group sessions open to all children, with two booster sessions occurring 1 month and 3 months after the final group. In addition, four parent sessions are used to inform parents about the program skills and enhance parenting related to anxiety management.

Since the initial development of *FRIENDS* in 2001, a set of *FRIENDS* programs (Fun FRIENDS, FRIENDS for Life, My FRIENDS Youth and Adult Resilience) have been developed to target various age groups. For example, the FRIENDS for Life program targets children ages 7–11 (Barrett, 2012a), whereas the My FRIENDS Youth program is intended for adolescents ages 12–16 (Barrett, 2012b). The different FRIENDS programs overlap in content but differ in their use of developmentally appropriate methods for delivering the intervention skills. Specifically, while programs for younger children (e.g., Fun FRIENDS) focus more on play-based techniques, including puppets, stories, and coloring activities, My FRIENDS Youth utilizes role-plays, group discussions, and written activities.

Outcome Studies

Two early studies (Barrett & Turner, 2001; Lowry-Webster et al., 2001) offered an initial evaluation of *FRIENDS* as a universal program in 10–13-year-olds in Brisbane, Australia. First, Barrett and Turner (2001) compared *FRIENDS* to usual instruction across ten schools randomly assigned to one of the three conditions: teacher-led intervention (TI; $N = 253$), psychologist-led intervention (PI; $N = 152$), or usual instruction (UI; $N = 84$). Children in both intervention conditions, compared to children receiving UI, reported significantly decreased anxiety at post-intervention. Second, Lowry-Webster et al. (2001) compared *FRIENDS* ($N = 392$), delivered by trained classroom teachers, to a waiting list control ($N = 139$) in seven schools. Self-reported anxiety significantly decreased from pre- to post-intervention in both conditions, but the magnitude of change was significantly greater for students who participated in *FRIENDS*. In addition, of those who were classified as "at-risk" for an anxiety disorder based on high-baseline anxiety ratings, only 25% of those in the *FRIENDS* condition remained at risk at posttreatment compared to 55% of the control group.

Consistent with these findings, Lock and Barrett (2003) found that, among 336 sixth (ages 9–10) and ninth graders (ages 14–16) from seven schools in Australia, students who received *FRIENDS*, delivered by psychologists and doctoral students, reported greater decreases of anxiety than those in the control group, a monitoring condition. Moreover, sixth graders reported greater reductions than ninth graders, suggesting that late childhood may be an optimal period to deliver *FRIENDS*. As suggested by the authors, adolescents may be more likely to have coping strategies sufficient for managing anxiety and, thus, benefit less from a prevention program. While limited to child self-report data, all three of these studies showed early promise for the effectiveness of *FRIENDS* as a universal school-based prevention program for anxiety.

Subsequent follow-up studies provided evidence for the long-term efficacy of *FRIENDS* in preventing and reducing anxiety in children and adolescents. For example, in a follow-up evaluation of the aforementioned study by Lowry-Webster and colleagues, differences in child-reported anxiety were maintained 1 year following intervention, and 85% of treated youth who had scored in the clinically elevated range on baseline anxiety or depression self-report measures were diagnosis-free at follow-up, compared to only 31% of the waiting list group (Lowry-Webster et al., 2003). In addition, a follow-up of the aforementioned study by Lock and Barrett (2003) indicated that anxiety reductions associated with *FRIENDS* were largely maintained at 24 and 36 months post-intervention (Barrett et al., 2006). At 36 months post-

intervention, only 12% of the *FRIENDS* group was deemed at "high risk" for anxiety disorder (i.e., scoring in the top 10% on an anxiety self-report measure), compared with 31% of the control group. Moreover, the age difference from the initial study persisted at these two follow-up time points, again suggesting that *FRIENDS* may be more beneficial for elementary school-age children compared to adolescents.

Cultural Adaptations

In the 20 years since these initial studies in Australia, researchers have evaluated the *FRIENDS* programs all over the world, from schools in high-income countries, such as Great Britain (Stallard et al., 2007), Slovenia (Kozina, 2021), Sweden (Ahlen et al., 2012), and Japan (Kato & Shimizu, 2017; Matsumoto & Shimizu, 2016), to low- and middle-income countries, such as Brazil (Rivero et al., 2020), Mexico (Gallegos et al., 2012), Iran (Moharreri & Heydari Yazdi, 2017), and Lebanon (Maalouf et al., 2020). To date, findings have been somewhat mixed. For instance, in an open trial of *FRIENDS* delivered by school nurses in Great Britain, featuring 106 children between ages 9 and 10, decreases in self-reported anxiety and self-esteem were observed from pre- to post-intervention (Stallard et al., 2007) and were maintained 12 months later (Stallard et al., 2008). In contrast, a trial of the *Fun FRIENDS* program delivered by school nurses in Japan (Kato & Shimizu, 2017), with 74 children ages 8–9, found that parents of children receiving *FRIENDS* reported a modest decrease in child anxiety compared to those in the control group, whereas no differences were observed in child-reported anxiety or depressive symptoms. Similarly, Ahlen et al. (2018) found no effectiveness of *FRIENDS for Life*, as led by teachers and culturally adapted for a sample of 695 children (ages 8–11) recruited from 17 schools in Sweden. Although self-reported and parent-reported anxiety and depressive symptoms did not change overall from pre- to post-intervention, nor 3 years after the completion of the program (Ahlen et al., 2019), Ahlen et al. (2018) did find an enhanced effect of the intervention in children with elevated depressive symptoms at baseline, suggesting the intervention could be meaningful for students most at risk.

Of note, Maaloof et al. (2020) recently conducted a school-based randomized controlled trial (RCT) that compared the *My FRIENDS Youth* program to a waiting list control group in 280 middle school students (ages 11–13) from ten schools in Beirut, Lebanon. The program was translated into Arabic, and the intervention workbook was adapted to incorporate more locally salient examples (e.g., surfing changed to playing basketball) and replace English names and role models with more culturally relevant and familiar Arabic names. Results showed that students in the *My FRIENDS Youth* program reported greater decreases in general emotional and depressive symptoms, compared to the control group. In addition, girls in the intervention group reported greater reductions in anxiety symptoms, a gender difference that is consistent with previous research showing that girls tend to respond better to *FRIENDS* (Barrett et al., 2006).

FRIENDS has also been adapted to increase its reach to children from low socioeconomic backgrounds. For example, Iizuka et al. (2015) adapted *FRIENDS* for ethnic minority and low socioeconomic status students in Australia by substituting creative tasks, music, and art activities for those requiring reading and writing. Results showed that the adapted intervention benefited participants who were at risk for mental health problems at baseline, with 30% of the students being no longer at risk after the intervention. Importantly, most students rated the culturally adapted intervention as being highly acceptable and useful. Similarly, Eiraldi et al. (2016) adapted *FRIENDS* to make it more feasible for implementation with low-income children from urban schools in the United States. In creating their *CBT for Anxiety Treatment in Schools* program, or *CATS*, changes were made to the language, cultural fit, methods, number of sessions, and activities in the intervention manual. Although findings have yet to be published, the authors expect that this adaptation will result in a

more engaging and culturally sensitive protocol, while still maintaining the essential ingredients of cognitive-behavioral interventions for anxiety.

Implementation Strategies

Studies of *FRIENDS* have also examined whether the program can be delivered successfully by school personnel. However, findings in this area have been mixed. For example, while the original study by Barrett and Turner (2001) found that *FRIENDS* was similarly effective at preventing anxiety regardless of whether it was led by teachers or psychologists, other studies have found that *FRIENDS* was not effective when delivered by teachers (Ahlen et al., 2018) or school nurses (Kato & Shimizu, 2017). In a larger RCT (N = 1362 students, from 40 schools), Skryabina et al. (2016) found that *FRIENDS* led by healthcare staff external to the school was more effective in decreasing social anxiety and generalized anxiety as compared to *FRIENDS* led by trained school staff or usual instruction. Taken together, these findings suggest that we cannot assume anxiety prevention programs such as *FRIENDS* will be as effective when delivered by trained school staff. Further research will be helpful in identifying factors that may contribute to successful implementation of *FRIENDS* by school personnel. Interestingly, Ahlen et al. (2018) found that children whose teachers attended a larger number of supervision sessions reported greater decreases of anxiety compared to children whose teachers attended fewer sessions and children in the control group, suggesting that supervision might be an important target for enhancing the ability of school personnel to deliver *FRIENDS* effectively.

Parent Training

Bernstein et al. (2005) evaluated a modified version of *FRIENDS* that incorporated weekly parent group training to address the impact of child anxiety on families, help parents understand how family relationships can maintain anxiety, teach parents strategies to encourage their children to face their fears, and/or instruct parents how to manage their own anxiety to be a more effective coach and better model for their children. In this study, 61 elementary school children (ages 7–11), with features or diagnoses of separation, generalized, or social anxiety disorder and mild to moderate symptomatology, were randomized to *FRIENDS*, *FRIENDS* with enhanced parent training (both delivered by experienced CBT therapists), or a no-treatment control. Clinician-, child-, and parent-report anxiety measures demonstrated significant benefits of both active treatments compared to the no-treatment control. Results were mixed regarding the additional benefits for the inclusion of parent training, and findings were largely maintained 3, 12, 24, and 36 months after intervention (Bernstein et al., 2008).

Summary

FRIENDS has been shown to be an effective universal prevention program in schools in Australia, where it was originally developed. Evidence appears more mixed when *FRIENDS* is evaluated in other countries and when it is implemented by trained school personnel, such as teachers and school nurses. *FRIENDS* may be more effective for children most at risk for anxiety disorders and for elementary school children, rather than adolescents. Overall, these studies suggest that *FRIENDS* has the potential to improve access to anxiety interventions across different cultures and in low-resource school settings.

Cool Kids

Program Overview

Unlike *FRIENDS*, which is an adaptation of a treatment protocol, *Cool Kids* was designed to be an indicated intervention for children and adolescents at risk for anxiety disorders (Mifsud & Rapee, 2005). *Cool Kids* consists of eight sessions delivered to small groups of youth during

school hours by a trained mental health provider. Separate child and adolescent protocols are available, and the level of parental involvement varies with the age of participants. More specifically, parents may be provided with two information sessions to learn about, and engage them in, the intervention. Weekly content may also be provided to parents if additional parental involvement is needed. Early sessions focus on rationale for treatment, psychoeducation about anxiety, identifying and restructuring anxious cognitions, and promoting emotion identification and regulation. By session four, students are encouraged to begin engaging in graded exposures, which are emphasized through the remaining sessions, along with skills for problem-solving, social interaction, handling bullying or teasing, and increasing assertiveness.

Outcome Studies

To date, *Cool Kids* has been evaluated in at least three school-based randomized controlled trials: one comparison with a waiting list control group (Mifsud & Rapee, 2005) and two comparisons with attention control groups (Haugland et al., 2020; McLoone & Rapee, 2012). Misfud and Rapee (2005) completed the first school-based evaluation of *Cool Kids* in a sample of 91 children (ages 8–11) with notable anxiety symptoms from nine schools in a low socioeconomic area. Schools were randomly assigned to *Cool Kids* or a waiting list control group. Each intervention group was implemented by a school counselor in conjunction with a community-based mental health worker who had attended a 1-day training in the intervention. No ongoing supervision was provided by the trainers. Children who participated in the active intervention showed significant improvement in anxiety symptoms immediately after intervention and at a 4-month follow-up, based on child and teacher report.

McLoone and Rapee (2012) conducted a novel investigation of *Cool Kids* by comparing the implementation of the program in school and home settings. A total of 152 children (ages 7–12), who either had an elevated score on the Spence Children's Anxiety Scale (SCAS) or were nominated by a teacher, were randomized to school-based *Cool Kids*, home-based *Cool Kids*, or a waiting list control group. The school-based *Cool Kids* was delivered by school counselors in a group format, consisting of ten 1-hour sessions and two parent sessions. The home-based *Cool Kids* was implemented individually with each child by the child's parent(s), who completed two training sessions. Results showed that children who participated in either version of *Cool Kids* experienced greater reductions in child anxiety and anxiety-related interference than the waiting list group, according to parent report but not report by children or teachers.

Most recently, Haugland et al. (2020) compared the effectiveness of *Cool Kids* to a brief CBT intervention and a waiting list control in a sample of 313 adolescents, between ages 12 and 16, who had an elevated score on the SCAS. The *Cool Kids* and brief CBT conditions were implemented in a group format by school personnel (e.g., school nurses) or community mental health workers. The *Cool Kids* intervention consisted of ten 90-minute sessions, held weekly. The brief CBT intervention (*Vaag*) included five 45–90-minute weekly sessions, with a 5-week break between the last two sessions, during which the students completed exposure tasks with minimal contact with the group leaders. Findings showed that students in *Cool Kids* and *Vaag* reported similar reductions in anxiety symptoms, depressive symptoms, and anxiety-related impairment at post-intervention, and that these reductions were greater compared to those reported by students in the waiting list condition. These decreases were maintained at a 1-year follow-up in both intervention groups.

Summary

Cool Kids appears to contribute to reductions in anxiety symptoms and anxiety-related impairment in anxious children and adolescents. These findings are largely in line with a meta-analysis conducted by Mychailyszyn (2017), which demonstrated the efficacy of *Cool Kids* as an indi-

cated intervention for anxiety across investigations in research, community, school, and other settings. It will be important moving forward to examine *Cool Kids* in the context of larger attention control trials and implementation solely by school personnel. In addition, given findings by Haugland et al. (2020) showing similar outcomes from *Cool Kids* and a briefer group-based CBT intervention, further study should explore the utility and effectiveness of potentially delivering *Cool Kids* in a briefer, flexible, or modular format.

Skills for Academic and Social Success

Program Overview

Skills for Academic and Social Success (SASS; Masia et al., 1999; Masia Warner et al., 2018) is a cognitive-behavioral group treatment for social anxiety disorder (SAD) in adolescents in the school setting. SASS is based on Social Effectiveness Therapy for Children (SET-C), an efficacious, clinic-based treatment for children with SAD that emphasizes exposure, social skills training, and peer generalization exercises (Beidel et al., 2000, 2005). SASS features significant modifications for an adolescent population (e.g., developmentally appropriate social skills, addition of training in realistic thinking) and the school environment (e.g., fewer and briefer sessions and incorporation of teachers, parents, and school peers). SASS consists of 12 group school sessions, two individual meetings, two parent meetings, two teacher meetings, four social events attended by group participants and outgoing school peers, and two booster meetings. The 12 school sessions include realistic thinking (cognitive restructuring), social skills training, and exposures that are integrated into the school environment and include the assistance of school personnel or school peers (e.g., ordering and returning food in the cafeteria, starting a conversation with a teacher). In addition, two individual meetings focus on setting goals and problem-solving treatment obstacles. Sessions occur during the course of the school day, with sessions lasting 40 minutes to coincide with a single class period. The parent sessions address psychoeducation about social anxiety and ways to manage children's anxiety and facilitate improvement. Teacher meetings are designed to educate teachers about social anxiety, obtain information about which classroom behaviors to target, and enlist their assistance with classroom exposure exercises (e.g., reading aloud, answering questions in class). Finally, the four social events provide real-world exposures and opportunities for skills generalization. Group members practice social interactions with actual school peers in natural community "hang-outs" (e.g., bowling, school picnic).

Outcome Studies

SASS has been evaluated in a small open trial (Masia et al., 2001), a wait-list control trial (Masia Warner et al., 2005), an attention control trial (Masia Warner et al., 2007), and a large effectiveness trial (Masia Warner et al., 2016). In the wait-list control trial, 35 adolescents with SAD, ages 14–16 years, from two urban parochial schools were randomized to either SASS or a waiting list. Treatment was conducted by a clinical psychologist and a psychology graduate student trained in the intervention. The SASS intervention was superior to the waiting list in reducing social anxiety and avoidance and enhancing functioning, as noted by blind evaluator, parent, and adolescent ratings. Of the SASS group, 94% were classified as responders, compared to only 12% of wait-list participants. In addition, 67% of SASS participants, versus 6% in the wait-list group, no longer met diagnostic criteria for SAD at post-assessment.

The second investigation compared SASS to a credible attention control in 36 adolescents, ages 14–16, with SAD (Masia Warner et al., 2007). The attention control omitted therapeutic elements specific to reversing social anxiety but was matched on other relevant therapy variables. It was designed to match SASS in structure with the inclusion of the four social events conducted

without the outgoing school peers. The content consisted of psychoeducation about social anxiety, relaxation techniques, and support. At posttreatment, SASS was superior to the attention control in reducing social anxiety and improving overall functioning. Only 7% in the attention control, versus 82% in SASS, were treatment responders. In addition, 59% of the SASS group no longer qualified for a diagnosis of social phobia, versus 0% of the attention control. SASS was also superior to the attention control 6 months beyond the cessation of treatment.

To examine whether SASS could be implemented effectively by school counselors without specialized training in CBT, Masia Warner et al. (2016) conducted an RCT with 138 ninth through 11th graders from three public high schools. Students were randomized to one of three conditions: SASS as delivered by school counselors (C-SASS), SASS as delivered by clinical psychologists with experience in CBT for youth anxiety (P-SASS), and Skills for Living (SFL), a nonspecific, manualized school counseling group program. School counselors completed a 5-hour training workshop and co-led a 12-week SASS training group with a clinical postdoctoral fellow. Following this, school counselors received weekly consultation during independent SASS implementation. Both immediately posttreatment and at a 5-month follow-up, treatment response was significantly greater in C-SASS (65% and 85%) and P-SASS (66% and 72%) than in SFL (18.6% and 25.6%). In addition, C-SASS and P-SASS participants had lower severity of SAD at both time points than students who completed SFL. Diagnostic remission was also higher for C-SASS (22% and 39%) and P-SASS (28% and 28%) than SFL (7% and 12%) at posttreatment and follow-up. No differences between C-SASS and P-SASS were observed on the main clinical outcomes.

Summary

Masia Warner and colleagues have demonstrated the specific benefits of treating SAD in the school setting. School counselors were able to implement the SASS program with positive student outcomes comparable to clinical psychologists when provided with training and supervision. These findings point to a model for promoting access to services by preparing frontline school professionals to deliver evidence-based care for underserved youth with SAD, which may extend to other anxiety disorders.

School-Based Treatment for Anxiety Research Study

Program Overview

The School-Based Treatment for Anxiety Research Study (*STARS*; Ginsburg et al., 2020), as well as the related Baltimore Child Anxiety Treatment Study in the Schools (*BCATSS*; Ginsburg et al., 2008, 2012), were conducted to evaluate a treatment program for child anxiety disorders that was delivered in school districts by school-based clinicians. The *BCATSS* was initially adapted for, and conducted in, an inner-city environment that is typically underserved. However, the initial evaluation of the CBT treatment used in the *BCATSS* has evolved into a broader examination of the use of CBT in school-based anxiety treatment that can be used in different socioeconomic school settings. In contrast to most other school interventions, the treatment (henceforth known as the *STARS* program) is delivered in an individual rather than group format. *STARS* consists of 12 sessions conducted during regular school hours. Sessions are approximately 30–45 minutes in length in order to coincide with a single class period. The program was designed for delivery by school counselors, social workers, and psychologists following a brief training on the manual. A unique feature of the *STARS* program is that, while the protocol is manualized, it employs a modular approach that allows the therapist to decide which of the core cognitive-behavioral strategies should be addressed in any given session. The treatment modules include psychoeducation, contingency management, relaxation, exposure, cognitive restructuring, problem-solving, and relapse prevention.

Outcome Studies

In a small open pilot study of nine African American adolescents with generalized anxiety disorder (GAD), social anxiety disorder (SAD), or specific phobia, Ginsburg and Drake (2002) compared their school-based cognitive-behavioral treatment to an attention control group. Three out of four treatment completers (75%) no longer met criteria for an anxiety disorder at the end of treatment, while only one of five youth (20%) in the attention control group remitted to nonclinical status. Results supported the feasibility and possible benefits of this approach.

To evaluate the effectiveness of the *STARS* program further, Ginsburg and colleagues conducted two attention-control trials with a larger number of participants in which they compared *STARS* to usual care provided by schools. Ginsburg et al. (2012) randomly assigned 32 students (ages 7–17) from the Baltimore City public school system to *STARS* or a treatment as usual (TAU) group that did not involve CBT strategies. Students were primarily African American, and all had a primary diagnosis of GAD, SAD, separation anxiety disorder, or specific phobia. A total of 11 social workers and counselors were also randomly assigned to serve as an implementer of one of the two treatment conditions. Both conditions were associated with reductions of anxiety symptoms, based on child and parent report, by posttreatment and a 1-month follow-up, and no differences were found between the conditions.

Ginsburg et al. (2020) conducted a randomized attention control trial that compared *STARS* to school-based TAU in 216 children (ages 6–18) throughout Connecticut and Maryland, along with 62 school psychologists and school social workers. All students had a primary anxiety disorder diagnosis. The sample was less diverse in race/ethnicity, with 62% of the students identified as Caucasian. Independent evaluators who observed the TAU condition found that very few sessions incorporated CBT skills and that the TAU providers were low in competence when providing CBT skills (Ginsburg et al., 2019a). Findings indicated that *STARS* and TAU were both effective in decreasing anxiety symptoms, with 42% and 37% of students classified as responders, respectively. No differences were observed between the conditions when examining child-reported anxiety from pretreatment to posttreatment. However, *STARS* was shown to be more effective in reducing parent-reported child anxiety symptoms, as well as for students with a higher severity of anxiety symptoms (Ginsburg et al., 2020).

Ginsburg and colleagues have also explored the implementation of CBT in schools by school nurses. Recognizing that children and adolescents with anxiety frequently seek assistance from their school nurses, Ginsburg and colleagues sought to develop an intervention that could increase access to evidence-based care at school and allow school nurses to address factors contributing to student anxiety. The resulting 8-week intervention, the *Child Anxiety Learning Modules (CALM)*, focuses on the core components of CBT, such as psychoeducation, cognitive-restructuring, relaxation strategies, exposure, problem-solving, and relapse prevention. In order to provide flexibility for nurses and individualized treatment for students, *CALM* is a modular program and does not require a specific number of sessions. To date, *CALM* has been evaluated in an open trial (Muggeo et al., 2017) and an RCT (Ginsburg et al., 2021). The open trial (Muggeo et al., 2017) was composed of 11 children with GAD, separation anxiety disorder, or social phobia. There was a significant decrease in child-reported and parent-reported child anxiety from pre- to posttreatment, with 45% of children no longer meeting criteria for an anxiety disorder. Ginsburg et al. (2021) expanded on this initial trial by randomly assigning 54 children with elevated anxiety symptoms to *CALM* or a control condition, *CALM-R*, which focused on relaxation skills. Anxiety symptoms decreased across both groups from pre-intervention to post-intervention; however, no differences were observed when comparing *CALM* and *CALM-R*.

Looking ahead, Ginsburg and colleagues are in the process of examining whether teachers can successfully identify and address problematic anxiety in their students. Given that anxiety commonly manifests in the classroom, Ginsburg and

colleagues propose that teachers are well positioned for helping students with anxiety and have thus developed the *Teacher Anxiety Program for Elementary Students (TAPES)*, a school-based CBT intervention delivered to individual families by teachers. Over the course of 8 weeks, teachers conduct five 30-minute joint meetings with each student and their parent(s) to deliver each module of *TAPES*, which include relaxation skills, exposure, and cognitive restructuring. Teachers participate in an initial full-day in-person training in *TAPES*, as well as receive 30 minutes of weekly expert consultation while implementing the intervention. In an RCT funded by the US Department of Education, a racially, ethnically, and socioeconomically diverse sample of 60 elementary school students with elevated anxiety symptoms, along with 40 teachers, have been randomly assigned to the *TAPES* intervention or a control condition in which teachers attend 3 hours of a typical professional development seminar on student anxiety. The study is ongoing (see Ginsburg et al., 2019b for additional information).

Summary

Studies by Ginsburg and colleagues show promise for increasing accessibility to individual CBT for anxiety disorders in urban and inner city schools through delivery by school personnel. However, their CBT programs yielded similar outcomes to TAU (Ginsburg et al., 2012, 2020) and a relaxation-based program (Ginsburg et al., 2021). School personnel may have found it challenging to deliver a modular individual treatment for multiple anxiety disorders. In contrast, a systematic manualized group treatment for a single disorder, such as the *SASS* treatment for SAD described previously, may be easier for school personnel to learn and implement with skill and fidelity. In addition, group treatments, which allow students to engage in social skills and exposure exercises with their peers, might be more beneficial for students with certain types of anxiety, such as social anxiety. Future research should explore the relative effectiveness and fidelity of individual and group CBT interventions when implemented by trained school personnel.

Implementation Issues and Future Directions

Based on the promising findings described thus far, the delivery of evidence-based interventions in schools has potential to help remediate the high rates of child and adolescent anxiety. Moving forward, several issues and challenges will be important to address in order to advance the implementation of school-based mental health services.

Multi-Tiered Systems of Support

Youth who experience anxiety are unfortunately not always eligible to receive interventions within the school context. For instance, even though the Individuals with Disabilities in Education Improvement Act (IDEIA, 2004) requires that students with severe anxiety are evaluated and provided with an Individualized Education Plan (IEP), these services are only provided if their anxiety significantly affects their educational performance. Students who demonstrate significant anxiety but not an educational deficit may be able to receive school-based accommodations and supports as part of a 504 plan (Conroy et al., 2021). However, IEP and 504 plans can be challenging for families to obtain and available only to students with severe anxiety (August et al., 2018). In addition, while IEPs and 504 plans offer supports, many of these supports for anxiety are not evidence-based and often include accommodations that do not address the root of the problem (e.g., exposure to anxiety-provoking situations) but instead inadvertently maintain student anxiety (e.g., accommodations that allow for continued avoidance of anxiety-provoking situations; Conroy et al., 2020; Harrison et al., 2013). For example, one recent survey of school mental health professionals found that most respondents reported using accommodations or supports that promote avoidance of anxiety-provoking

situations, such as letting youth sit in class but not participate (Conroy et al., 2020).

As concerns have been raised about limited access to evidence-based mental health services in schools, there has been increasing advocacy for schools to move away from a traditional medical model of school-based mental health treatment and toward a preventative model using a Multi-Tiered Systems of Support (MTSS) framework. An MTSS framework uses data to make informed decisions about students' levels of functioning and appropriately allocate resources and deliver interventions at varying levels of intensity (August et al., 2018). This approach allows for students who may have significant anxiety, but do not demonstrate the required educational impact for an IEP or 504 plan, to receive early interventions and supports that can prevent their anxiety from becoming severe enough to cause academic difficulties. MTSS typically includes three tiers: *Tier 1*, which involves universal prevention for all students; *Tier 2*, which focuses on small group interventions for those at risk for, or displaying signs of, anxiety; and *Tier 3*, which consists of individualized treatment for students who do not respond to previous interventions. While the school-based anxiety interventions described in this chapter are aligned with at least one tier, such as *FRIENDS* (a universal intervention) and *STARS* (an individualized treatment), further research is needed to evaluate a full MTSS three-tiered model for child and adolescent anxiety in schools. A research methodology developed by August et al. (2018), *Sequential Multiple Assignment Randomized Trials* (SMART), may be useful in this effort to evaluate the adaptive intervention strategies at the core of the MTSS model. If effective, this model would allow educators to select, adapt, and implement evidence-based interventions that are appropriately mapped to the needs of anxious students within a school.

Identification of Anxious Youth

One challenge to effectively implementing an MTSS program for child and adolescent anxiety is how to identify youth who require intervention. As anxiety disorders often go unnoticed and unidentified (Papandrea & Winefield, 2011), it is important that schools utilize a multi-method, comprehensive approach to understand the needs of students. A first step in this approach is typically to conduct universal screenings for anxiety and other related problems that involve administering evidence-based assessment tools to students, parents, and/or teachers. This universal screening process allows educators to make data-informed decisions about how to effectively allocate the limited resources available within a school, select appropriate interventions, and identify which students would benefit from interventions (Dowdy et al., 2015; Nickerson, 2019). Although universal screenings are commonly used by targeted prevention programs successful in promoting social and emotional well-being in youth (Durlak et al., 2011), and may be an affordable option for schools (Simon et al., 2013), questions do remain regarding their efficiency and cost-effectiveness. Future studies should explore the relative utility and affordability of other methods of identifying students, such as teacher referral, reviewing school records, and behavioral observations (Dowdy et al., 2015).

Progress Monitoring

In addition to the initial assessment of anxiety to identify those who require additional supports, it is important that a progress-monitoring procedure be in place to evaluate progress and determine whether youth may require more intensive supports if they are not responding to evidence-based interventions provided through their MTSS system (Conroy et al., 2021). One tool that can be helpful to monitor progress is the use of Daily Behavior Report Cards (DBRC), which provide clear and explicit goals for students to meet each day and monitor students' progress toward those goals (Riley-Tillman et al., 2008). This can serve as a method to not only measure students' response to intervention but also provide feedback to students on their performance, celebrate their successes, and communicate progress to

caregivers to reinforce within the home setting. Other potential methods for monitoring clinically meaningful change may include student and parent ratings of clinical improvement, though there are concerns of reporting biases, such as social desirability (Fox et al., 2017). Therefore, further research should investigate strategies that facilitate honest and accurate reports of progress in the context of school-based anxiety interventions.

School Culture and Climate

Successful entry of novel mental health programs into the school system requires an awareness of the school climate and the attitudes of key stakeholders. Federal and state initiatives have emphasized the importance of positive and supportive school climates as a necessary ingredient for effective schools, and many states have implemented social–emotional learning standards to ensure that social and emotional skills are prioritized (Zins & Elias, 2007). Despite such initiatives, school culture and climate can pose significant barriers to implementing school-based interventions for anxiety disorders. For example, as academic instruction is the primary mission of schools, school administrators and parents may question the value of programs that do not directly advance these goals. Therefore, it is important that interventions avoid interfering with class instruction. Sessions for group interventions can be rotated weekly to ensure that students do not miss the same class repeatedly, and conducting interventions individually can provide flexibility to schedule sessions during non-academic periods.

Service Providers

Another important consideration in the effective implementation of school-based mental health services is identifying a skilled and interested provider within the school. As highlighted in this chapter, an increasing number of school-based anxiety intervention studies have utilized trained school personnel as service providers, with several showing that school personnel can implement these interventions effectively. However, school personnel in these studies were provided with training, ongoing supervision, and other support from researchers. It remains uncertain whether school personnel can continue these services successfully without researcher involvement and/or financial support and resources from school leadership. School-based clinicians, such as school counselors, school psychologists, and school social workers, often have highly demanding caseloads and may lack sufficient time and funding to offer additional mental health services. Indeed, limited time and financial resources, along with the overall shortage of trained mental health professionals within schools, have been identified by school personnel as among their main barriers to implementing mental health interventions in their schools (Wang et al., 2020). In addition, if school staff who provide services for anxious students are emotionally exhausted by their work, they may be more likely to utilize non-evidence-based intervention strategies (Conroy et al., 2020). Therefore, further research is needed to examine the sustainability of anxiety intervention programs delivered by school-based clinicians over time without the ongoing involvement of researchers.

Family–School–Community Partnerships

Building capacity within the school setting to recognize and treat mental health challenges is critical to ensuring that MTSS programs can be effective in supporting anxious youth (Sanchez et al., 2018). Researchers have suggested that one method to achieve this is for schools to develop strong family–school–community partnerships. For example, mental health professionals outside of the school setting can help to support and address some of the challenges of implementing evidence-based interventions through consultation with school professionals (Conroy et al., 2021). Given that outside mental health professionals have expertise in evidence-based anxiety interventions, educators have expertise in implementing school-based services and the educational setting, and families have expertise on their

children, collaboration among school, family, and community is central to promoting student success. This consultative framework is in line with the National Association of School Psychologists professional standards that emphasize family–school–community partnerships as one of the main domain areas for professional practice (NASP, 2020), and further study is needed to explore its utility in the context of school-based interventions for child and adolescent anxiety.

Cost-Effectiveness

Sustaining the delivery of school-based mental health services for youth anxiety will require such services to be cost-effective for schools. However, the cost-effectiveness of school-based interventions for anxiety remains unclear. To our knowledge, only one published study has examined this question, finding that the *FRIENDS* universal prevention program was not cost-effective when delivered to elementary school students in England (Stallard et al., 2015). Further research is thus needed to understand the relative cost-effectiveness of different models of intervention, such as a comparison of universal prevention programs with more targeted programs for youth with anxiety risk factors, symptoms, and/or diagnoses. For instance, universal prevention programs may be more efficient given costs associated with mental health screening; however, if programs have better clinical outcomes when providing services only to youth with anxiety, the benefits of more targeted prevention and treatment programs may outweigh the initial cost of detection.

Innovative Formats

Further study is also needed to develop and evaluate approaches to delivering effective school-based interventions while limiting costs. For example, online programs for child and adolescent anxiety could be well suited for the school setting. Students could complete online sessions on their own during the school day and check in with school-based clinicians for components that require support. This would ease the burden on school personnel while still ensuring that students receive adequate intervention. While computer-assisted CBT has been shown to be efficacious in treating youth anxiety in a clinical setting (Khanna & Kendall, 2010) and a community setting (Crawford et al., 2013), studies of online anxiety interventions in school settings, such as *e-Couch* (Calear et al., 2016) and *Positive Search Training* (Waters et al., 2019), have shown limited effectiveness thus far.

In addition to innovative technologies, other cost-effective strategies for schools, such as brief and modular interventions, should be explored. Brief interventions that require less time from school-based clinicians may hold promise, as evidenced by an initial trial of the *DISCOVER* program, a 1-day CBT workshop for stress, anxiety, and depression that was superior to a waiting list condition in a sample of adolescents from inner-city schools in the United Kingdom (Brown et al., 2019). Modular CBT designs, which allow clinicians to select strategies to meet children's individual needs, may also offer a more efficient means of treating anxious students than a full intervention program. Support for this approach comes from an RCT evaluating a modular version of the *Building Confidence* CBT program in a sample of children with anxiety disorders from two elementary schools in the United States. This modular program outperformed a wait-list condition on treatment response, diagnostic outcomes, and caregiver-reported anxiety after the intervention (Chiu et al., 2013) and 1 year later (Galla et al., 2012).

Given that youth often experience both anxiety and depression, it may be more efficient to offer CBT techniques in a transdiagnostic format (i.e., targeting both difficulties) as a way to increase the reach and impact of the intervention. One example of this approach, the *Emotion* universal prevention program, was associated with greater reductions of anxious and depressive symptoms compared to usual care in children from schools in Norway (Martinsen et al., 2019), though some outcomes were not maintained 1 year later (Loevaas et al., 2020). Therefore, fur-

ther study is needed to examine the utility and effectiveness of transdiagnostic interventions.

Diversity and Social Justice

School-based interventions for anxiety are not a one-size-fits-all approach but must be sensitive to the unique characteristics of students within a school. Despite the high rates of anxiety disorders in students of color, mental health service utilization by this population is especially low (Gudiño et al., 2009). The benefits of school-based mental health services have been limited by racial and ethnic disparities in access and enrollment, particularly for internalizing conditions (Bear et al., 2014; Gudiño et al., 2009). Additionally, racially and ethnically minoritized youth may be presented with unique challenges, such as racism and discrimination, which can exacerbate anxiety symptoms and place them at higher risk for negative outcomes (Graham et al., 2016). The racialized stressors experienced by Black youth may also create anxiety symptoms that are not typically included in commonly used measures of anxiety (Anderson et al., 2019). As a result, it is important that school-based interventions for anxiety disorders are culturally sensitive and that screenings for anxiety address risk factors associated with racialized stressors (Conroy et al., 2021). Masia Warner and colleagues are currently working on developing culturally sensitive, feasible, and acceptable methods to identify impairing social anxiety among Black American high school students. They are also revising SASS to enhance its usability, acceptability, and cultural sensitivity for students of color in under-resourced schools. Additional research of this type will be necessary to engage historically marginalized students in school-based services.

Conclusion

Research over the past 15–20 years has demonstrated that schools are a promising setting for reaching children and adolescents with anxiety who may be unable to access evidence-based care. Studies indicate that training frontline school personnel, such as teachers and school counselors, to deliver cognitive-behavioral anxiety interventions may be feasible and effective. Several issues and challenges related to the implementation of school-based interventions for child and adolescent anxiety will be important to address in the future. These include the need to explore a Multi-Tiered System of Support involving evidence-based, cost-effective, and adaptive strategies for identifying and addressing anxiety in schools, a means of fostering family–school–community partnerships, and culturally sensitive services that engage historically marginalized youth. Continued research in these areas will be essential for developing a sustainable model for promoting effective care for anxiety in school settings.

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Social Disability and Impairment in Childhood Anxiety

30

Laura John-Mora, Abigail M. Ross, and Jordana Muroff

Anxiety disorders cause severe impairment and disability with respect to an individual's quality of life and social functioning, especially when untreated (Strawn et al., 2020). Worldwide prevalence of any anxiety disorder in children and adolescents is estimated at 6.5% (Polanczyk et al., 2015). Meanwhile, rates of childhood anxiety disorders in the United States are estimated to be between 15% and 20%, representing the most prevalent form of psychopathology in children and adolescents (Kessler et al., 2012a or b; Merikangas et al., 2010). Further, the median age of onset for anxiety disorders in the United States is 6 years, which is significantly earlier than the age of onset for other major mental disorders (Kessler et al., 2005a or b). Impairment that is associated with anxiety is significant. In the National Comorbidity Survey (NCS), approximately 8.3% of adolescent and 22.8% of adult respondents reported severe impairment, suggesting that impairment worsens over time and with age (Harvard Medical School, 2007; Kessler et al., 2005a or b). Given that anxiety is the most prevalent class of disorders (Kessler et al., 2005a or b), it is critical that the resulting impairment is understood, addressed, and prevented where possible.

Anxiety is the sixth leading cause of all disability worldwide (Baxter et al., 2014). Impairment among adults with anxiety manifests itself through considerable economic costs related to medical care as well as decreased work productivity (Greenberg et al., 1999). In families with clinically anxious children, societal costs have been estimated to reach 20 times those incurred by families in the general population (Bodden et al., 2008). Anxiety disorder induced impairment in children includes difficulty in the school environment (Strauss et al., 1989; de Lijster et al., 2018), problematic social interactions (Essau et al., 2000; Crawford & Manassis, 2011), distress in family life (Turner et al., 1987; Bernstein et al., 1996; Senaratne et al., 2010), and can result in the inhibition of the successful completion of discrete developmental and planning tasks (Rodrigues et al., 2019).

Numerous studies indicate that adolescents with anxiety disorders struggle with loneliness, difficulty in interpersonal relationships, lower social competence, and feelings of impairment in school settings (e.g., Asselmann et al., 2017; de Lijster et al., 2018; Settipani & Kendall, 2012). Social problems and peer adversity have also been linked to the development and prolongation of anxiety (Settipani & Kendall, 2012), suggesting that specific behaviors associated with social maladjustment in anxious children have an

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impact on the way they are perceived by peers, leading to lower rates of positive peer responses (Gazelle, 2008).

Evidence from a number of studies (e.g., Mychailyszyn et al., 2010; Owens et al., 2012; Weems et al., 2013) suggests that anxiety is often associated with a range of academic difficulties for school-aged children and youth. In a 2014 study examining school-specific dimensions of the Child Anxiety Impact Scale – Parent Version (CAIS-P; Langley et al., 2004, 2014), Nail et al. (2014) found that close to 50% of participants had an impairment in four out of seven academic items (completing assignments, concentrating on work, doing homework, getting good grades, giving oral reports, taking tests/exams and writing in class). The most common impairment reported was difficulty concentrating on schoolwork, which suggests this is a symptom associated with most anxiety disorders (Nail et al., 2014).

Though the manifestation of anxiety-related impairment in children differs from that in adults, systematic examinations of this phenomenon are not reported as extensively in the child and adolescent literature as in the adult literature (e.g., McKnight et al., 2016). A clear articulation of what is meant by "impairment" has yet to be established with respect to child anxiety disorders. Standards for judging anxiety as "dysfunctional" in nature vary across environmental contexts, cultural values, family attitudes, and developmental stages (Egger & Angold, 2006). For example, parents of very young children may not judge avoidance of being alone, a symptom of separation anxiety, to be "impairing" behavior. In addition, measures of anxiety-related functional impairment in children are limited and tend to be focused on symptom severity rather than domains of disability (Piacentini et al., 2007).

In this chapter, the concept of impaired functioning is conceptualized as an absence of normative adaptation (or poor performance) with respect to (1) school performance (related to work completion, attendance, tardiness, and homework completion), (2) a range of developmentally appropriate self-fulfillment activities, including the ability to care for oneself, and (3) interpersonal capacities, including navigation of family, peer, and romantic relationships (Bird et al., 2005; Langley et al., 2014). This chapter describes both the scope and manifestation of anxiety disorder-specific impairment in social functioning in children and adolescents according to diagnostic and statistical manual of mental disorders, fifth edition (DSM-5) diagnostic categories and concludes with a discussion of impairment related to notable comorbidities, subthreshold anxiety problems, developmental stages, measurement, and social context.

Disorder-Specific Impairment

Separation Anxiety Disorder (SAD)

Separation Anxiety Disorder (SAD) interferes with an individual's ability to cope with separation from home or primary caregivers without persistent and excessive worry, distress, and physical symptoms such as nausea, vomiting, stomachaches, headaches, and other physical symptoms (American Psychiatric Association [APA], 2013). Issues related to attachments during childhood can affect an individual's ability to tolerate anxiety, self-soothe, regulate affect, individuate (Milrod et al., 2014), and ultimately may lead to an anxious attachment style that may constrain the ability to develop and foster social supports (Roberson-Nay et al., 2012). SAD is associated with disability and significant impairment in academic, family, and social domains of functioning, as well as reduced quality of life (Aderka et al., 2012).

In children and adolescence specifically, SAD prevalence rates range from 3.5% to 6.7%, with a mean onset age of 8 years (Black, 1995; Merikangas et al., 2010; Beesdo et al., 2010). In youth with SAD, full onset of anxiety symptoms generally emerges by age 12, with behavioral inhibition present early in the disorder development trajectory (Strawn et al., 2020). Children who exhibit maladaptive functioning and symptoms of SAD early in development may have difficulty learning the skills needed to cope with intense emotions and anxiety, which may ulti-

mately amplify the effect of the disorder across the lifespan (Kossowsky et al., 2013).

Evidence of a developmental trajectory from stranger anxiety in infancy to childhood SAD has begun to emerge (Kossowsky et al., 2013). Maladaptive functioning early in life may impede development of coping skills for anxiety and other strong emotions, creating a setback in healthy development and potentially leading to prolonged impairment and disorder. A growing body of research suggests that childhood SAD can function as a precursor to mental and physical health problems, persistent distress in social settings, ongoing somatic symptoms, and academic issues (Battaglia, 2015). While SAD is associated with increased risk of secondary anxiety and mood disorders (Milrod et al., 2014), the association between childhood SAD and panic disorder (PD) is particularly significant (Battaglia, 2015). Results from a meta-analysis of 20 epidemiological studies indicate that children with SAD are nearly 3.5 times more likely to develop PD later in life (Kossowsky et al., 2013), suggesting that a diagnosis of SAD may in fact be indicative of early onset PD in youth (Doerfler et al., 2008; Roberson-Nay et al., 2012).

SAD has also been shown to be associated with impaired academic performance (Battaglia et al., 2017) and increased rates of suicidal ideation (Pini et al., 2021). School refusal has been reported in approximately 75% of children with SAD (Masi et al., 2001), yet may be more prevalent in youth with comorbid SAD and PD. Findings from a study comparing a sample of youth with SAD only ($n = 63$) to counterparts with comorbid SAD and PD ($n = 31$) revealed a later age of onset of SAD and more extensive psychopathology and global functional impairment in children and adolescents with comorbid PD and SAD, suggesting that children with both SAD and PD likely experience more impairment with anxiety, self-criticism, and social interactions (Doerfler et al., 2008). Given that an estimated 75% of adults seeking treatment for anxiety disorders reported a history of childhood SAD (Manicavasagar et al., 2010), early identification, diagnosis, and treatment of SAD is crucial.

Panic Disorder

Children and adolescents with PD are likely to avoid everyday settings such as school, shopping centers, restaurants, elevators, and parks due to excessive fear of future panic attacks (Elkins et al., 2014). Panic attacks are associated with a number of problems, the most frequent being avoiding social situations due to anticipatory fear of another attack and intensely unpleasant physiological symptoms such as chest pains, palpitations, trembling, nausea, and chills/hot flashes (Essau et al., 2000; Elkins et al., 2014). The acute physical symptoms that accompany panic attacks (e.g., nausea, chest pains, heart palpitations, etc.) can create additional distress, which may increase future impairment.

Though PD is less prevalent compared to other psychiatric disorders in the general population, between 12% and 25% of the general population suffers from a panic attack at least once in their lifetime (de Jonge et al., 2016; Grant et al., 2006; Kessler et al., 2006), with nearly two-thirds experiencing recurrent attacks (de Jonge et al., 2016). The 12-month prevalence among adults and adolescents in the United States is between 2% and 3%, with a median age of onset of 20–24 years (Kessler et al., 2005a or b, 2012a or b). Onset of PD in childhood and adolescence is associated with other comorbid anxiety disorders, depression, and suicidal ideation and attempts (Beesdo et al., 2009; Masi et al., 2000a or b; Elkins et al., 2014), with earlier onset of the disorder associated with a more severe impairment and chronic progression of symptoms across the lifespan (Merikangas et al., 2010; Ramsawh et al., 2011).

The cognitive model of panic (Clark, 1986) proposes that cognitive symptoms related to PD differ by age and developmental stage. Fear of dying has been reported in children and young adolescents, whereas fear of going crazy and depersonalization is more prevalent in older adolescents (Masi et al., 2000a or b). Awareness of early-onset PD and a more precise definition of early signs and possible clinical subtypes may reduce clinical impairment and improve the prognosis of individuals with PD (Masi et al., 2006).

Accurate and timely identification is essential, given that untreated PD leads to lower quality of life and considerable disability (Comer et al., 2011). Among adults, marital strife, occupational deficiency, poor sense of health, and persistent use of medical services are common quality of life issues associated with PD, even after symptom remission (Davidoff et al., 2011).

Although PD prevalence is low in the child and adolescent general population relative to other disorders, a significant proportion of children and adolescents diagnosed with PD present with comorbid generalized anxiety disorder (GAD; Masi et al., 2004), obsessive-compulsive disorder (OCD; Goodwin et al., 2001; Masi et al., 2005), and SAD (Biederman et al., 1997; Bradley & Hood, 1993; Doerfler et al., 2007; Masi et al., 2000a or b). Though a sole PD diagnosis is not as impairing as social anxiety disorder (see below) with respect to social functioning in children and adolescents (Quilty et al., 2003), clinician-ratings reveal that children and adolescents with both PD and social anxiety are more severely affected in global impairment than children with other anxiety disorders (Last et al., 1992). If untreated, PD shows the lowest rate of recovery and highest risk of development of new disorders relative to other anxiety disorders (Last et al., 1996). However, adolescents suffering from PD may also avoid public spaces and engage in school refusal behavior due to fear of future panic attacks; current interventions do not seem to have a significant positive impact on school attendance in these cases (Hella & Bernstein, 2012).

Agoraphobia

Added as a stand-alone diagnosis in the DSM-5 (APA, 2013), agoraphobia (AG) is characterized by anxiety or intense fear that is triggered by exposure (real or anticipated) to at least two of five specified situational domains: standing in line or being in a crowd, being outside of the home, being in open spaces, being in enclosed places, or public transportation. AG causes clinically significant distress or impairment. When linked to PD, AG may manifest through phobic avoidance of situations or places related to the panic attack or where escape or obtaining help during an attack is either difficult or embarrassing (Masi et al., 2006). While PD with AG is associated with increased reports of disability and impairment among adults (Bonham & Uhlenhuth, 2014), there is little research available regarding comorbidity of AG, related avoidance behaviors, and symptom severity in children and adolescents diagnosed with PD (Kearney et al., 1997) and even less on children/adolescents with AG only due to the recent decoupling from the DSM-IV PD diagnostic category. While separating AG from PD creates a diagnostic option for characterizing school refusal among youth who do not meet criteria for other disorders (Chou et al., 2015), there is also evidence to suggest that the revised AG diagnostic criteria may leave a considerable proportion of youth experiencing substantial impairment due to agoraphobic symptoms without a specified DSM-5 anxiety diagnosis (Cornacchio et al., 2015), potentially presenting barriers to service access.

Social Anxiety Disorder

Social anxiety disorder (SA) in childhood is associated with significant impairment, most notably in the educational domain, manifesting primarily through early departures from school, school refusal, acquisition of lower levels of educational training, and academic underachievement (Keller, 2003; Kessler, 2003; Aderka et al., 2012). Children with SA exhibit impairment in their relationships, have fewer peer relationships, limited involvement in outside activities, and more somatic symptoms (e.g., headaches and stomachaches) than their counterparts who do not carry the diagnosis (Beidel et al., 2000; Khalid-Khan et al., 2007). SA affects most areas of life, particularly educational attainment, career/work productivity, and development of functional romantic relationships (Wittchen et al., 2000), also known as romantic competence (Bouchey, 2007). The level of impairment found in children and adolescents with SA is particularly high; evidence suggests it is one of the most

impairing psychiatric disorders (Alonso et al., 2004), affecting primarily social and educational settings as opposed to the family domain (Aderka et al., 2012). Severe cases of SA may result in failure to speak in feared social situations, even if normative expressive language development is present, and result in the development of selective mutism (Khalid-Khan et al., 2007, see below). In adolescence and early adulthood, SA has been associated with increased rates of acute suicidal ideation, attempted suicide, and drug and alcohol dependencies (Keller, 2003; Kessler, 2003; Herres et al., 2019; Rapp et al., 2017; Wittchen & Fehm, 2003); SA may be a unique risk factor for active suicidal ideation/attempts among Latinx adolescents (Rapp et al., 2017). SA is highly comorbid with other anxiety disorders, including PD or AG (Sareen & Stein, 2000), major depressive disorder (MDD) and attention deficit hyperactivity disorder (ADHD) in addition to GAD and specific phobias (Chavira et al., 2004a or b).

SA is the most commonly occurring anxiety disorder, with lifetime prevalence rates estimated between 12% and 13% (Kessler et al., 2005a or b; Kessler, 2003). SA typically occurs during late childhood or early adolescence. Epidemiological studies indicate that over 50% of individuals have retrospectively reported onset by age 13 years (Chavira & Stein, 2002), 75% prior to 16 years, and 90% by age 23 (Kessler et al., 2005a or b). Findings from a 5-year, prospective longitudinal study of 3021 community cases exploring the evolution of SA revealed that the majority of cases emerged in the early teenage years, and that by 19 years of age either a progressive deterioration in functioning or a persistent course of illness had been established (Narrow et al., 2002).

There is evidence to suggest that SA presentation and associated impairment varies by developmental stage. Findings of a recent meta-analysis also indicated that younger adolescents (ages 12–13 years) have higher levels of social anxiety than youth at other ages, and that social anxiety generally affected social performance/social adaptation, defined in this study as self-perceived social acceptance, self-perceived social rejection, and classmate ratings of popularity (Maes et al., 2019). Similarly, a study of 594 adolescents ages 12–18 revealed a negative relationship between social anxiety and social adaptation (Peleg, 2012). Notably, a positive association between social anxiety and social rejection, and a negative association between social anxiety and social acceptance and popularity was found in 12–13-year olds. The same pattern emerged for 14–15-year olds, but with a weaker correlation; however, there was no significant correlation between social anxiety and social adaptation for participants ages 17–18 years (Peleg, 2012). Higher levels of social anxiety may lead to avoidance of social scenarios and reductions in social connections; peers may not make efforts to initiate friendships when they observe the anxious adolescents' avoidance, which in turn increases the adolescent's sense of social rejection, low popularity, and isolation, leading to further impairment (Peleg, 2012).

Of the anxiety disorders, SA may exert the greatest impact upon academic functioning (de Lijster et al., 2018). For example, in the Netherlands, a nonclinical sample of 312 children ages 10–12 was assessed via both teacher and child reports for classroom functioning and symptoms severity (Muris & Meesters, 2002). Using the Spence Children's Anxiety Scale (Spence, 1998) with children and a sociometric ranking procedure that included teacher assessments of learning attitude, quality of the teacher–student relationship, quality of peer relationships, and self-esteem reports, findings revealed that higher levels of social anxiety symptoms per child-report were associated with increased difficulties in classroom functioning (including general classroom functioning, greater difficulty with peer relations, and lower self-esteem). Similarly, school-aged children with SA feared and avoided a significantly greater number of social situations and were significantly more likely to have trouble initiating friendships and to prefer to spend time alone (rather than with peers) compared to a sample of children carrying a diagnosis of GAD (Bernstein et al., 2008). In this sample, symptom severity in the sample with SA only was inversely associated with greater deficits in social skills, leadership skills, academic

functioning, and directly related to attention difficulties and learning problems. Bernstein et al. (2008) hypothesize that the attention problems may occur due to distraction by worries about answering questions in school, fears of reading in front of the class, or fears of talking to peers, and that learning problems may be exacerbated by anxiety about asking for help, taking tests, or writing/speaking in front of class.

DSM-5 modifications to SA, which include removal of the "generalized" SA specifier along with the addition of the "performance-only" SA specifier, may have unique implications for youth with impairment due to SA. Among a sample of 200 youth seeking treatment for SA, Kerns et al. (2013) found higher levels of symptom severity and comorbidity in the sample of youth who met DSM-IV criteria for generalized SA compared to those with non-generalized SA. Almost twice as many children met criteria for generalized SA compared to non-generalized SA, and no youth in any group presented with DSM-5 performance-only SA. Findings are consistent with epidemiologic studies, indicating that over 50% of youth with SA exhibit fears that are generalized, whereas less than 1% exhibit performance-only fears (Burstein et al., 2011).

Selective Mutism

Reclassified as an anxiety disorder in DSM-5, selective mutism (SM) is characterized by a consistent failure to speak in specific social situations where there is an expectation for speaking (e.g., at school), despite the production of speech in other circumstances or situations (APA, 2013). Children with SM present with a low frequency of words, low volume, and less spontaneity, which is similar to patterns found in individuals with SA (Muris & Ollendick, 2015), yet distinctions between the two disorders have been found on measures of verbal and nonverbal inhibition (Milic et al., 2020). While epidemiological studies estimate that less than 1% of the population is afflicted with SM and thus it is considered to be relatively rare (Bufferd et al., 2011; Chavira et al., 2004a or b; Keeton & Crosby Budinger, 2012), the lack of speech interferes substantially with social communication and educational functioning, thus presenting substantial impairment across these domains. Although age of onset is typically between 2 and 4 years, on occasion the condition may not be detected until elementary school (see Viana et al., 2009 for a review). A recent meta-analysis revealed exceptionally high rates of SM comorbidity (80%) with other anxiety disorders, most notably SA (69%), followed by specific phobia (19%), SAD (18%), GAD (6%), and OCD (6%) (Driessen et al., 2020). Children with a previous diagnosis of SM often continue to have communication issues later on in life (even in adulthood), demonstrating ongoing issues with school or work performance as well as higher rates of psychiatric disorders (Muris & Ollendick, 2015).

Specific Phobia

Specific phobia has been found to lead to significant social and academic difficulties due to overwhelming distress and increase a child's risk of adult psychopathology (Cowart & Ollendick, 2012). Specific phobias often emerge during childhood but tend to peak during adulthood and persist into old age, with phobias lingering anywhere from several years to decades for 10–30% of individuals (Eaton et al., 2018). Mean age of onset for specific phobia is 6 years, and children afflicted usually suffer a chronic course of the disorder if untreated (Wehry et al., 2015). Globally, lifetime prevalence rates of specific phobias range from 3% to 15%, with the most common fears/phobias related to animals and heights (Eaton et al., 2018; Wardenaar et al., 2017). Early age of onset, higher rates of other disorders, and more severe symptom severity and impairment have been found in adolescents with multiple phobias (Burstein et al., 2012). Though less prevalent than other specific phobias, school phobia may be the most noticeable and result in the most social impairment in a variety of domains; children and adolescents suffering from school phobia may feel unable to perform classroom tasks and experience isolation and

alienation from peers; such perceptions may contribute to prolonged school absence and inhibit completion of developmental tasks (Okuyama et al., 1999).

Very few studies have examined the frequency, symptom duration, and associated social impairment of specific phobias in child and adolescent populations. According to findings from a global study of adults, social phobia was accompanied by severe role impairment reported in 18.7% of cases, with the lowest level of severe impairment in the relationship domain (7.9%) and the highest level in the home domain (10.3%) (Wardenaar et al., 2017). While functional impairment may be at least partially due to a restricted lifestyle caused by the hallmark fear and avoidance related to specific phobias (Wardenaar et al., 2017), other studies have suggested that a high rate of co-occurrence with other disorders may account for some of the observed functional impairment in specific phobia (Comer et al., 2011).

Essau et al. (2000) report that in a clinical population of adolescents meeting criteria for specific phobia, the most frequent phobia reported was blood (39.6%), followed by animals (28%), natural environments (26%), and specific situations (23.7%). Panic symptoms were significantly associated with each phobia during the worst episode, the most frequent of which were that of palpitation, trembling/shaking, and sweating. All cases with any subtype of specific phobia were impaired in school, leisure, and social activities during the worst episode of their disorder (Essau et al., 2000). Given that it may be possible to interrupt the developmental course of phobias when a clear progression from fear to avoidance, and finally to diagnosis can be observed (Eaton et al., 2018), future research should focus on early identification and intervention strategies.

Generalized Anxiety Disorder

Children presenting with generalized anxiety disorder (GAD) have been characterized as "worriers" and "little adults" due to their excessive, adult-like worries. Their worries can interfere with accomplishing daily responsibilities, establishing and maintaining healthy peer and family relationships, and managing academic tasks. GAD symptoms can impose marked distress and interfere with social, emotional, and educational functioning; the disorder has been linked to an impaired quality of life across the lifespan, as well as higher rates of comorbid adult mental health disorders (Imran et al., 2017). Though most people with GAD experience symptoms onset in late adolescence, their 20s, or early 30s (Wittchen, 1994; Beesdo et al., 2010), childhood GAD afflicts approximately 10–15% of the population with a mean age of onset of 8.8 years (Last et al., 1992; Costello et al., 2005a or b). While GAD affects approximately 1% of children and 3% of adolescents in the general population (Burstein et al., 2014; Gale & Millichamp, 2016), prevalence rates are as high as 59% in child anxiety clinics, and between 1 and 10% in general child psychiatric clinics (Imran et al., 2017).

Common themes of worry in children with GAD include perfectionism, punctuality, health and safety of themselves and others, catastrophic world events (e.g., weather disasters, war), family finances, and events in the distant future (e.g., college) (Layne et al., 2009). Though children with GAD exhibit age-appropriate worries (e.g., grades, homework, friends), such worries occur in excess of peers their same age. In one nonclinical sample of children ages 8–13, children who met criteria for GAD or overanxious disorder (OAD) endorsed an average of six worries compared to control children who endorsed an average of only one worry (Muris et al., 1998). In the same study, children meeting criteria for GAD/OAD could also be distinguished from control children due to a higher frequency of their primary worry, a stronger degree of interference in daily functioning, and more difficulty controlling their worry, indicating that frequency and intensity of worry differentiate children with GAD from those carrying other anxiety disorder diagnoses. Worries can translate into worry behaviors, such as avoidance of potentially negative events or activities, procrastination in either decision-making or behavior, and extensive time spent in preparing for potentially negative

outcomes of events or activities (Andrews et al., 2010).

Though three (of the six) associated symptoms listed in criterion C of the DSM-5 (i.e., restlessness, fatigue, concentration difficulty, irritability, muscle tension, sleep disturbance) are required for a diagnosis of GAD in adults, only one is required for diagnosis in children (APA, 2013). A number of studies, however, indicate that children diagnosed with GAD commonly endorse more than one symptom. One study revealed that a sample of children with GAD endorsed an average of 3.4 associated symptoms, with restlessness the most common (74%) and muscle tension the least common (29%) (Tracey et al., 1997). A subsequent study of 47 children diagnosed with GAD (ages 9–13 years) revealed a consistent pattern of symptom presentation (Kendall & Pimentel, 2003). Both studies revealed that the number of associated symptoms increased with age. A more recent study comparing children with GAD to anxious children without GAD revealed similar results; children with GAD reported an average of 3.4 associated symptoms whereas anxious children without GAD reported significantly fewer associated symptoms (Layne et al., 2009). Consistent with previous research, the most common associated symptoms reported by children with GAD included restlessness/trouble relaxing, trouble concentrating, and trouble sleeping with 67% of children reporting these symptoms.

Though worries of children and adolescents with GAD are characterized by continuous self-doubt, elevated sensitivity to criticism, and chronic need for reassurance (Wagner, 2001), they are more often accompanied by somatic symptoms or physical complaints. Physical complaints were reported in over 70% of subjects in a sample of 58 children diagnosed with GAD (Masi et al., 1999a or b). In a subsequent study of 162 clinically referred children, those with anxiety and/or depression reported significantly higher rates of somatic complaints, most often headache, than subjects with other mental disorders (Masi et al., 2000a or b). Additional research indicates that severity of somatic symptoms may increase with age; older children (ages 12–17 years) with GAD reported more somatic symptoms than younger children (ages 5–11 years) and somatic symptom incidence was reported more frequently among children with GAD than among those without the diagnosis (Ginsburg et al., 2006). Somatic symptoms were significantly associated with anxiety severity, impaired global functioning, avoidance, and interference with family relationships; however, the presence of somatic symptoms was not associated with impaired peer relationships (Ginsburg et al., 2006).

The differential worry content evident in children with GAD has implications for social functioning. Though results of one study exploring the presentation of GAD in a nonclinical sample of children (7–11 years old) indicate that the most common domain of worry endorsed both by children with GAD (as well as anxious children without GAD) was the health of significant others (55 and 45%, respectively), children with GAD were significantly more likely to worry about their performance and family issues than were children without GAD diagnosis (Layne et al., 2009). These results are consistent with the characterization that children with GAD are excessively preoccupied with grades, how they are perceived by others, and family matters. Results of another study of school-aged children revealed a GAD diagnosis to be positively related to stronger social skills and negatively related to attention problems when compared to a sample of children with SA (Bernstein & Layne, 2006). The authors hypothesize that this association may be due to the fact that GAD in children is often characterized by a perfectionism, an overly conscientious work ethic and an eagerness to please others, especially adults (Bernstein & Layne, 2006).

Like SA, GAD is also highly comorbid with other psychiatric disorders (Masi et al., 2004; Layne et al., 2009). In the study by Layne et al. (2009), only 14% of participants carried GAD as their only diagnosis; 63% of the sample carried comorbid anxiety diagnoses. Masi et al. (1999a or b) note that co-occurrence with specific phobia, SAD, and SA is more often the rule than the exception; several studies reveal that up to 60%

of anxious children meet criteria for two of the aforementioned three disorders and 30% meet criteria for all three (e.g., Birmaher et al., 2003). Similarly, in the clinical sample of Masi et al. (2004), the prevalence of a stand-alone GAD diagnosis was 7%; 75% were diagnosed with at least one other anxiety disorder. Results of a study examining impairment in children ages 6–11 years who were classified into one of three groups ("pure" GAD, comorbid GAD, and "healthy" controls) showed that both clinical groups were significantly less adaptive in the family domain, but those in the comorbid group evidenced higher levels of impairment across all domains (Alfano, 2012).

There is some evidence to suggest that the type of disorder that co-occurs with GAD varies with age, with younger children (5–11 years) more likely to experience co-occurring SAD or attention deficit hyperactivity disorder, whereas older children (12–19 years) more frequently experience comorbid MDD or simple phobia (Strauss et al., 1988a or b or c). Older children with GAD also reported significantly higher severity of anxiety and depression symptomology and a higher total number of anxiety symptoms on self-report measures, indicating that manifestation of GAD impairment varies by developmental stage (Strauss et al., 1988a or b, or c). Other research indicates that intensity of symptoms also differentiates children with GAD versus simple phobia (Weems et al., 2000), but that the most common comorbid disorders are social phobia and SAD (Keeton et al., 2009).

Critical Considerations and Future Directions

Comorbidities and Related Disorders

While anxiety disorders frequently co-occur with one another, there is extensive evidence to indicate high levels of comorbidity with disorders in other DSM-5 diagnostic classification categories. Two disorders previously categorized as DSM-IV anxiety disorders, obsessive-compulsive disorder (OCD) and posttraumatic stress disorder (PTSD), have been reclassified into new diagnostic categories of obsessive-compulsive and related disorders (OCRD) and trauma- and stressor-related disorders, respectively (APA, 2013). While a review of all OCRD and trauma- and stressor-related disorder impairment is beyond the scope of this chapter, high comorbidity rates of OCD (e.g., Storch et al., 2008) and PTSD (e.g., Galatzer-Levy et al., 2012) with DSM-5 anxiety disorders remain prevalent and associated with greater functional impairment and disability, and thus, are reviewed briefly here. In addition, diagnoses of depression, autism spectrum disorder (ASD), and ADHD also evidence increased social and functional impairment when co-occurring with anxiety disorders and are described briefly below.

Frequently characterized by prominent avoidant behaviors and increased family accommodation (e.g., Lebowitz et al., 2016), pediatric OCD in particular is associated with a chronic yet fluctuating course that both confers heightened risk for later psychiatric and psychosocial morbidity and causes significant impairment at home, at school, and in social settings (Krebs & Heyman, 2014). As Piacentini et al. (2003) note, difficulties with tardiness to school or bedtime routines may be due to compulsions around bathing and dressing. Eating in restaurants and attending public places may be inhibited by contamination concerns. Attention and concentration associated with reading, listening, having a discussion, school-related tasks (e.g., doing homework) may be impaired by counting rituals, negative intrusive thoughts, and/or checking and repeating compulsions. The ability for youth to develop friendships and romantic relationships may also be hindered by severe OCD symptoms (Piacentini et al., 2003).

Pediatric OCD has a significant effect on the emotional well-being of family members themselves. Caregivers of youth diagnosed with OCD report high levels of stress, anxiety, and sadness; youth suffering from OCD report high levels of frustration and anger, suggesting that OCD causes significant impairment in overall quality of life and family functioning (Coluccia et al., 2017; Stewart et al., 2017). Unsurprisingly,

family impairment has been associated with family accommodation, with specific obsessions (contamination and religious) associated with greater symptom severity (Stewart et al., 2017). These results corroborated previous research that indicated family accommodation is not only common but also associated with more severe symptoms, additional impairment, and less positive treatment outcomes (e.g., Peris et al., 2012; Peris & Piacentini, 2013; Storch et al., 2007, 2012).

Although less well-studied, family accommodation is also associated with PTSD (see Reuman & Thompson-Hollands, 2020 for a review). While a relatively small proportion of individuals who have experienced trauma develop PTSD (see Bonanno et al., 2015 for a review), anxiety sensitivity (AS), defined as the fear of anxiety-related sensations due to beliefs that such sensations will yield negative social, psychological, and physical outcomes (Reiss & McNally, 1985), has been shown to be associated with increased PTSD symptom severity in youth who have experienced a traumatic event (Leen-Feldner et al., 2008; Kılıç et al., 2008). Adverse childhood events (ACEs) are highly prevalent among adults with anxiety disorders (van der Feltz-Cornelis et al., 2019), with sexual abuse and family violence in childhood posing the greatest risk for later anxiety disorder development (see De Venter et al., 2013 for a review).

In addition to extant research documenting comorbidity with depressive and other mood disorders (e.g., Cummings et al., 2014), there is evidence to suggest that the extent of comorbid anxiety and depression is underestimated in youth, despite its association with greater symptom severity, distinctive presentations, and treatment challenges (Melton et al., 2016). Family factors may play an important role, as findings from a clinic-based sample of 193 youth presenting with comorbid anxiety and depression reported higher levels of family dysfunction than youth with only anxiety (Guberman & Manassis, 2011).

Studies also indicate a high prevalence of comorbidity with anxiety among youth with ASD and ADHD in particular, and that impairment in these circumstances may manifest differentially. For example, the presence of at least one anxiety disorder occurs in approximately 40% of youth presenting with ASD and is generally associated with increases in repetitive behaviors, resistance to change, and social skills deficits (Zaboski & Storch, 2018). Comorbid anxiety in youth with ASD has also been associated with more frequent occurrence of self-injurious behaviors, depression, and increased parental stress (Kerns et al., 2015). In particular, SA frequently co-occurs with ASD, and has been found to negatively impact social motivation, social skills, and functioning (Spain et al., 2018). While social impairments associated with ASD could actually contribute to the development of SA, as certain symptoms (e.g., social withdrawal) may result from challenges with social communication, it is also possible that certain core symptoms of ASD (e.g., impairments in social interactions or for example reduced eye contact) could be misconstrued as SA symptoms (Briot et al., 2020).

Similarly, anxiety disorders, which may affect approximately 25–33% of youth with ADHD, have a significant impact on the clinical presentation, prognosis, and treatment outcomes of ADHD (Biederman et al., 1991; Jensen et al., 1997; March et al., 2000; D'Agati et al., 2019). While it is possible that impaired concentration due to anxiety may be misdiagnosed as ADHD (Abramovitch et al., 2013), children with comorbid ADHD and anxiety present with increased impairment and lower levels of social competence compared to children who only have anxiety or ADHD (Bowen et al., 2008). In a study of 310 youth (ages 10–14) with ADHD, symptoms of social anxiety and anhedonia were found to be associated with lower levels of social acceptance and diminished social skills (Becker et al., 2014). Comorbid ADHD and anxiety have also been associated with higher levels of oppositional defiant and conduct disorder symptoms in children with comorbid anxiety and ADHD compared to counterparts with ADHD or anxiety alone, per parent and teacher reports (Humphreys et al., 2012).

In addition to disorders reviewed above, examination of social impairment among other

disorders in both the OCRD and trauma- and stressor-related disorders classification categories is warranted. Given the prevalence of comorbidities with disorders in other DSM-5 diagnostic classification categories and the associated burden of impairment, future research on anxiety interventions should include samples of children and youth with comorbid diagnoses and address social impairment specifically (Sciberras et al., 2014).

Subthreshold Anxiety

Anxiety-related impairment extends beyond disorder-specific anxiety. While the discussion of impairment in this chapter has focused on impairment within the context of specific anxiety disorders, subthreshold levels of anxiety have also been associated with impairment and distress. Common in both childhood and adolescence, subthreshold anxiety symptoms cause marked and daily impairment and distress (Ollendick & Hirshfeld-Becker, 2002; Van Oort et al., 2009). There is evidence to suggest that symptom onset may be predicted as early as the preschool years by inhibited temperament and maternal overinvolvement (Hudson et al., 2018), with early behavioral inhibition identified as a risk factor for SA and SAD specifically (Hirshfeld-Becker et al., 2007; Garcia-Lopez et al., 2020). Other research indicates that subclinical or subthreshold levels of SA, OCD, and PD predicted full onset of the disorders within 7–9 years (Wolitzky-Taylor et al., 2014). These results are consistent with previous research, indicating that individuals with subthreshold conditions in childhood suffer from impairment and increased risk for continuing mental health problems, including disorder development (Angold & Costello, 1996; Gonzales et al., 1994; Sherbourne et al., 1994.; Spitzer, 1995; Valleni-Basile et al., 1996; Williams et al., 1995). Given the persistent and debilitating course of anxiety disorders, it is critical to enhance prevention and early detection efforts to minimize progression of associated impairment.

Anxiety and Developmental Stages

In order to develop effective intervention and prevention tools, an understanding of specific risk and protective factors across developmental stages is necessary. Depending on the child/adolescents' age and stage of development, specific symptoms may cause impairment in particular domains and the degree of impairment may increase or diminish. Specifically, a study examining the developmental trajectories of specific anxiety disorders (i.e., SAD, social phobia, GAD, PD, OCD) among a community-based sample of children and adolescents over a 5-year period found that anxiety seems to diminish in early adolescence and then slightly increase during middle (i.e., separation anxiety, social anxiety, GAD) and late adolescence (i.e., PD, OCD), beyond the effects of depression (Van Oort et al., 2009). Other studies have shown that, while the prevalence of SAD and select specific phobias tend to decrease with age, SA, GAD, PD, and AG are significantly more prevalent in adolescents (ages 13–18) compared to younger children (see Beesdo et al., 2009).

As noted in the disorder-specific and comorbidities sections above, there are particular developmental considerations relevant to each of the anxiety disorders with regard to assessment, symptom manifestation, and functional outcomes, all of which have implications for treatment and the extent to which family members are involved. Given the substantial evidence that childhood anxiety disorders predict the presence of anxiety and other mental health problems in adolescence and adulthood and the considerable impairment that accompanies these disorders, it is crucial to understand more about the developmental trajectory of anxiety to inform intervention and prevention efforts (Allan et al., 2013; Bittner et al., 2007; Gregory et al., 2007; Brückl et al., 2007; Lewinsohn et al., 2008; Haller et al., 2015; de Lijster et al., 2019).

Anxiety Measures and Impairment

While substantial evidence demonstrates that anxiety impairs children's global functioning, it is imperative that there are developmentally sensitive instruments to assess specific areas of impairment. A number of assessment tools for childhood anxiety disorders have been developed (e.g., Merlo et al., 2005; Silverman & Ollendick, 2005) such as the Multidimensional Anxiety Scale for Children – 2nd Edition (MASC 2; March, 2013), the Modified State-Trait Anxiety Inventory for Children (STAIC-M; Spielberger, 1973), Revised Children's Manifest Anxiety Scale – second Edition (RCMAS-2; Reynolds & Richmond, 2008), the Screen for Child Anxiety Disorders (SCARED; Birmaher et al., 1999), and the Fear Survey Schedule for Children – Revised (FSSC-R; Ollendick, 1983). These anxiety measures tend to focus on symptom severity, differential diagnosis, and evaluation of treatment outcomes, with limited attention to impairment or specific anxiety disorders in detail (Piacentini et al., 2007). More recently, the Youth Anxiety Measure for DSM-5 (YAM-5; Muris et al., 2017), which includes both parent and child self-reports, has been developed to assess anxiety symptoms according to DSM-5 diagnostic classifications.

Measurement of anxiety-related impairment in children and youth is relatively limited. Whiteside (2009) developed a three-item adaptation of the Sheehan Disability Scale (Sheehan et al., 1996), in which children and parents use a 0–10 scale to rate the degree to which the child's symptoms interfere with general functioning at home, at school/work, and with friends. Originally developed to assess anxiety-related functional impairment in school, social, and family domains, the Child Anxiety Impact Scale – Parent Version (CAIS-P; Langley et al., 2004) has been modified in recent years; in addition, the authors developed a child version (CAIS-C; Langley et al., 2014) to address the frequently occurring problem of inconsistent reports between child-ratings of their anxiety-related impairment and parent-ratings of their child's anxiety (e.g., Choudhury et al., 2003; Piacentini et al., 2003). The Child OCD Impact Scale (COIS-R; Piacentini et al., 2003, 2007) assesses specific functional impairment among children and adolescents with OCD.

Several clinician-administered tools such as the Pediatric Anxiety Rating Scale (PARS; Research Units on Pediatric Psychopharmacology Anxiety Study, 2002) assess anxiety over the past week and associated symptoms and impairment. In addition, the GAD section of the ADIS-5 (Brown & Barlow, 2014) includes clinician, child, and parent impairment ratings based on the child's report of how their GAD worry negatively impacted time with friends, in school, and at home, *as well as the extent to which one* engages in specific worry behaviors initially proposed for inclusion in DSM-5 (see Andrews et al., 2010), but ultimately not adopted.

To date, only three large scale reviews of social functioning measures for children and adolescents have been conducted. Orvaschel and Walsh (1984) reviewed a total of 31 "adaptive functioning" instruments for use with preschool and school-aged children. Canino et al. (1999) examined 13 measures of "functional impairment" categorized by global impairment, domain-specific measures, and symptom-specific measures. The systematic review conducted by Crowe et al. (2011) revealed 86 measures of "social functioning" in children and adolescents. While none of these reviews focused on anxiety-related impairment exclusively, findings from all reviews underscored the need for development of more appropriate measures of impairment that (1) differentiate symptom severity from functional impairment in children, (2) clarify the relationship of anxiety to normative developmental functioning, and (3) consider a child's ability to adapt to varying demands occurring within domains of home, school, community, and interpersonal peer relationships. It is also very important that measures of impairment include a breadth of domains and problems across child and adolescent development, and a number of versions capturing multiple perspectives (e.g., child, caregiver, teacher) in order to more accurately evaluate specific manifestations of impairment and the extent to which it occurs.

COVID-19 and Sociocontextual Factors

Risk and protective factors for anxiety-related impairment may also manifest differentially across population subgroups and in response to sociopolitical phenomena. Although there is some evidence to suggest that the COVID-19 pandemic has exacerbated rates of anxiety and depression in children and adolescents (Courtney et al., 2020), the long-term impact that the pandemic has had on anxiety-related social impairment in youth, both across various developmental stages and with respect to specific anxiety and related disorder trajectories, is not yet evident. Given that handwashing and other forms of personal hygiene have been so heavily emphasized as an important protective tool against the spread of COVID-19 infection, it will be important to examine the extent to which these behaviors manifest in relation to germ phobia or contamination-related obsessions and compulsions. Similarly, it will be essential to differentiate behaviors consistent with appropriate public health social distancing precautions from those that might be clinically significant and/or warrant an AG diagnosis. In a similar vein, the social isolation accompanying necessary public health precautions such as quarantines, lockdowns, school closures, and other mitigation measures designed to slow the spread of COVID-19 may have impacted social adaptation by limiting opportunities for socialization at critical developmental points for many children and adolescents (Singh et al., 2020). Early studies on the impact of the pandemic on child and adolescent mental health have revealed reduced affect in children due to feeling deprived of opportunities to meet friends, play outdoors and participate in school activities in person, higher levels of attention-seeking, "clingy" behaviors, and dependence on parents (Lee, 2020; Liu et al., 2020; Zhai & Du, 2020). While findings suggest that the pandemic may yield higher rates of anxiety and related disorders, particularly among youth belonging to communities disproportionately impacted by the pandemic and/or who have lost a parent or caregiver to COVID-19, it will be important to anticipate, understand, and address potential impairment as early as possible.

Although there is substantial evidence documenting associations between both direct exposure to discrimination and worsening mental health symptoms (e.g., Cuevas et al., 2020; Cuevas & Boen, 2021; Priest et al., 2013; Priest & Williams, 2018; Williams et al., 2018) as well as adverse effects of secondary exposure to racist discrimination among children and youth specifically (e.g., Heard-Garris et al., 2018), most studies on anxiety disorders and related impairment in children and adolescents have failed to acknowledge the complexity of racism and cultural exclusion that may influence development of anxiety disorders, anxiety-related impairment, and disability over time. While a few studies do report cultural phenomena in relation to child anxiety symptoms (e.g., parental acculturative stress – see Leon, 2014) or examine anxiety in relation to post-migration adjustment among undocumented adults (e.g., Garcini et al., 2017), most studies of youth do not examine or report variation in anxiety-related social impairment among racial subgroups, assess or measure discrimination within the context of other mechanisms of racism, or account for ways in which sociopolitical phenomena may be experienced differentially and contribute to anxiety-related impairments in social functioning. Given that there is some evidence for differential anxiety symptom trajectories among youth by race (e.g., Arora et al., 2017), ethnicity (e.g., Okamura et al., 2016), and by race in response to negative life events specifically (see Lewis et al., 2012), it is imperative that investigations of anxiety-related impairment and social disability both measure and account for these factors.

Summary

This chapter provides a review of the literature focused on impairment related to childhood anxiety disorders. While anxiety disorders are highly prevalent and known to be disabling, there is still limited research in the area of impairment, which is due, in part, to the availability of relevant

measures. It is essential that development be an important consideration when assessing impairment, as a child's level of functioning is appropriate at specific periods of development, but not others (Hoagwood et al., 1996). Assessing anxious children and adolescents' functional level and ability to negotiate their environments are key to determine the need for treatment (Hoagwood et al., 1996), prevent possible deterioration, and inhibit the development of additional mental health problems. Future research must include measures of social impairment caused by anxiety, examine social impairments caused by different anxiety disorders in more detail and with greater specificity, and account for sociopolitical contexts in which these impairments occur. Future research on anxiety-related disability needs to examine what factors predict impairment for children versus adolescents, and whether differences exist based on environmental stressors, in addition to demographic variables including race, ethnicity, gender, sexual orientation, and socioeconomic status. Studies that examine impairment in relation to environmental/contextual factors (including both sociocultural phenomena and family factors), developmental issues, and include more diverse samples will provide fundamental knowledge that can inform development of effective universal, targeted, and indicated prevention and intervention efforts.

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