

Alexandros Maragakis
Claudia Drossel
Thomas J. Waltz *Editors*

Applications of Behavior Analysis in Healthcare and Beyond

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Contents

Part I Introduction

Expanding the Role of Behavior Analysts	3
Claudia Drossel, Thomas J. Waltz, and Alexandros Maragakis	

Scope of Practice and Standards of Training Across the Clinical Professions	13
Thomas J. Waltz	

Part II Early Intervention Settings

Early Intervention Services for Children with Autism Spectrum Disorder	45
Rebecca R. Eldridge, Stephanie M. Peterson, Denice Rios, Rebecca L. Kolb, and Nicole A. Hollins	

Early Interventions for Infants at Risk of Autism Spectrum Disorder	77
Hayley Neimy and Martha Pelaez	

School Psychology	113
Edward J. Daly III, Elisabeth J. Kane, Lauren E. Scanlan, and Jessica J. Helen Detrick	

Behavioral Parent Training	135
Michael I. Axelrod and Michael L. Santagata	

Part III Clinical Settings

Intensive Behavioral Intervention Units	157
Adam M. Briggs and Brian D. Greer	

Competency in the Assessment and Treatment of Pediatric Feeding Disorders: Training and Ethical Considerations	175
Jonathan K. Fernand, Michelle Sutherland, and Varsovia Hernández Eslava	

Suitability of Behavior Analysis in Pediatric Primary Care	203
Leah LaLonde, Alexandros Maragakis, Teryn Bruni, and Blake Lancaster	
Outpatient Interventions in Clinical Behavior Analysis	217
Sabrina M. Darrow, Thomas J. Waltz, Claudia Drossel, and Brenton Abadie	
Opportunities and Considerations for Applied Behavior Analysis in Person-Centered Adult Services in Residential Settings	239
Stuart Law, Mark Malady, and Brendan Böhr	
Part IV Specialty Populations	
Behavior Analysis in Acquired Brain Injury	267
Chris M. Schaub	
Behavioral Gerontology	289
Claudia Drossel, Jennifer Bruzek, and Rachel VanPutten	
Specialty Training for Behavior Analysts to Work in Substance Abuse Treatment	317
Kimberly C. Kirby, Matthew J. Dwyer, Connor A. Burrows, Caitlyn R. Upton, Sydney A. Dickerson, and Bethany R. Raiff	
Behavior Analysis of Couples: Intimacy as a Vehicle for Change	341
Emily L. Maher and James V. Córdova	
Part V Non-clinical Settings	
Behavior Analysis in Business	359
Byron Wine and Eli T. Newcomb	
Educational Systems Administration: The Comprehensive Application of Behavior Analysis to Schooling (CABAS®) Model	369
Jessica Singer-Dudek, Dolleen-Day Keohane, and Katherine Matthews	
Behavioral Education	389
Kendra Newsome, Timothy C. Fuller, Staheli Meyer, Kimberly Nix Berens, and Donny Newsome	
Companion Animal Behavior Analysis	415
Megan E. Maxwell, Susan Kapla, Terri Bright, and Kristyn Echterling-Savage	
Index	431

Part I
Introduction

Expanding the Role of Behavior Analysts



Claudia Drossel, Thomas J. Waltz, and Alexandros Maragakis

Abstract Our goal is to highlight the applicability, the implementation, and the utility of behavior analysis across a wide range of socially meaningful domains. While a relatively narrow specialization in neurodevelopmental disorders has become the norm, historically behavior analysts trained broadly and took experimental methods from the lab to health service settings and beyond. The following introduction pays homage to these beginnings and calls attention to the behavior analysts who held concurrent leadership positions within behavior analysis and psychological organizations from 1966 to 1975. Since then, the impact of behavior analysis has grown steadily.

This book showcases behavior analytic work with many populations across a wide variety of settings. Contributors are experts in their fields. They describe their work in relation to the relevant licensing frameworks for their scope of practice and in terms of competencies for their profession, while considering behavior analytic benchmarks for training. We hope that their skillful applications of behavior analysis will surprise you, spur curiosity, and encourage you to learn more about behavior analysis and its applications. This book is an opportunity to see the multitude of possibilities this field holds.

Keyword Behavior analysis · Workforce expansion · Healthcare

The workforce growth of behavior analysis as a standalone profession has accelerated since healthcare insurance reform introduced reimbursement for intervention services for individuals diagnosed with autism spectrum disorder (Burning Glass Technologies 2015). This application of behavior analysis mostly focuses on children and is an important area of practice; yet its reach is relatively small considering the full range of socially meaningful behaviors that could be addressed with behavior analysis.

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As the scope of training in behavior analysis has narrowed to allow specialization in autism spectrum disorders, an overview of other applications is timely and needed. This book provides a broad perspective of behavior analytic applications to inspire and to evoke interest among students and practitioners. It showcases effective work with diverse populations in a wide variety of settings. We anticipate that most readers will be surprised by this breadth, and we hope that this volume will generate excitement among readers and prompt them to learn more about behavior analysis in its diverse applications. In addition to being of general interest, we see this book as a useful supplement to courses in applied behavior analysis at the undergraduate and graduate levels, to give students an opportunity to see the multitude of possibilities this field holds.

Eastern Michigan University's clinical behavioral master's program prepares students for the board certification in behavior analysis (Behavior Analysis Certification Board^(R)). At the same time, we also train our master's students to enter clinical psychology settings, such as community behavioral health or integrated primary care. Our goal to shape behavior analytic repertoires that are versatile and open many doors is associated with large practicum and course loads for our graduate students. We, the editors, often discuss: Should we train narrowly, creating experts in one presenting problem such as autism spectrum disorder, for which a reimbursement system is in place? Or should we train broadly, across a range of presentations? The annual convention of the Association for Behavior Analysis International (ABAI), which some of us have attended for more than a quarter century, provides a home for ideas and explorations in basic and applied science. In its mission statement, ABAI expects its members "to contribute to the well-being of society by developing, enhancing, and supporting the growth and vitality of the science of behavior analysis through research, education, and practice." Here, the emphasis appears to be on broad training, as used to be the case for all behavior analysts.

Since its inception with Skinner's *Behavior of Organisms* in 1938, behavior analysis has implemented a novel methodological approach to psychological science. The late Sidman (1960) formalized the systematic small-n experimental approach in his *Tactics of Scientific Research*, a keystone publication for the experimental analysis of behavior. Behavior analysis is unique, and it redefined the unit of analysis as a behavior-environment unit. Sidman emphasized the steady-state, interpretable baseline against which to compare the effects of experimental manipulations, and through his descriptions, scores of behavior analysts learned about the difficulties inherent in arranging experimental rule-outs and making causal attributions. He argued that experimental procedures were the way by which science progressed, as only they could facilitate the detection of orderly relations or principles of behavior, and that scientific curiosity combined with considerations of reliability and generality were at the heart of behavior analysis.

When studies of the applications of behavioral principles in applied settings began to outnumber laboratory experiments in the 1960s, reciprocal continuity and flow from the basic to the applied realm were a concern. Thus, the *Journal of Applied Behavior Analysis* published in its first issue in 1968 an article by Baer,

Wolf, and Risley that translated Sidman's *Tactics* into language amenable to education and health providers. Defining the subject matter of the journal, the resulting text mirrored Sidman's three guideposts to behavior analytic methods, specifically (1) the scientific importance of the data; (2) their reliability; and (3) their generality. In their summary of Sidman's landmark publication, abridged and adapted to contexts other than the laboratory, Baer and colleagues guided applied behavior analysts: Pay attention (1) to importance to "man [sic] and society," (*applied*), (2) to reliability (*behavioral, analytic, technological, conceptual, effective*), and (3) to the necessity to program for generalization.

In their 1968 article, Baer, Wolf, and Risley tipped their hat to Sidman (1960), yet their reverence to the laboratory gave it an almost mythical status. For example, according to Baer et al. (1968), it was easy to control confounds in laboratory settings, yet Sidman's (1960) extensive text oriented researchers to the difficulties of proper experimental control – even within the operant chamber. Another area of misconception was Baer et al.'s (1987) discussion of rate as a singular research measure. With a burgeoning interest in operant interpretations and requests for broader dissemination within psychology, Skinner (1966, p. 213) defined the experimental analysis by its focus on *probability* of behavior ("A natural datum in a science of behavior is the probability that a given bit of behavior will occur at a given time. An experimental analysis deals with that probability in terms of frequency or rate of responding"). Reading of Sidman (1960) and even a cursory look at the *Journal of the Experimental Analysis of Behavior* demonstrate researchers' reliance on a range of measures of probability, not only rate but also interresponse times (as the inverse of rate) and frequency of dimensions of behavior (e.g., latency, duration, magnitude, force, percent of correct responses, response allocation, time allocation, etc.). Yet, Baer et al. (1987), in a follow-up to their abridged summary of Sidman (1960), appear apologetic that continuous recording had not been feasible in applied settings. From this perspective, seminal articles in behavior analysis, now used as mandatory readings in the curricula and treated as definitive guidelines to the science, failed to reflect the complexity of the operant laboratory research and the degree to which the experimental analysis already had employed a range of measures of probability (see also Sidman 1960). According to Michael's (1980) interpretation, simplification of operant research or behavior analysis is common when the goal is mass dissemination, but the problem arises when we "begin to believe that this is all there is to the field, when our boiled down materials become the basis for undergraduate college instruction, or even graduate instruction" (p. 11). Thus, we strongly recommend reading Skinner (1953) and Sidman (1960), the source materials for Baer et al. (1968), for a more comprehensive understanding of unique characteristics of behavior analysis.

Behavior analysis is self-interpretive in nature (Hineline 1992) and takes into account the verbal communities of scientist-practitioners and the contingencies operating upon their behavior. Skinner (1956) described his innovations in operant research as coming about from a mix of curiosity, skills, systematic observations, and serendipity. One of his unformalized principles of scientific practice was, "when you run into something interesting, drop everything else and study it."

Correspondingly, Sidman (1960) pointed out that, in addition to its emphasis on the scientific importance of the data, reliability, and generality, the behavior of behavior analysts has two essential characteristics: curiosity and the “interest in anything that turns up.” The behavior of the behavior analyst – whether an operant laboratory researcher or an applied practitioner – must have enough flexibility to allow contact with contingencies. In other words, scientist-practitioners must attend to context and take actions that emerge from the conceptual analysis of that context. When our interventions fail to produce the hoped-for changes, we have to reanalyze the context: A major principle of behavior therapies is that clients do not fail therapies, but therapies fail clients (Linehan 1993) – and most treatment failures are indeed assessment failures (Linehan 2016). Thus, a formulaic approach to matters of human interest, consisting of strict implementation of techniques alone, ignores what is unique about behavior analysis.

Baer and colleagues, in their 1987 follow-up article, recognized that the formulaic approach that derived from their 1968 paper and Baer’s (1981) presidential address, has costs. The metaphor that is relevant here is the following: If you had trouble locating the moon and your friend pointed to it, you still would not see the moon if the focus of your attention was on the finger doing the pointing. You must see past the finger to see the moon. Similarly, you must see past the common techniques of behavior analysis to acquaint yourself with its full scope. Behavior analysis training is complicated, because it requires students to be rule-bound in their knowledge of principles, and those principles are often discussed within the bounds of technology or procedures. Baer and colleagues (1987) worried that codification of procedures would prevent behavior analysts from engaging fully in their subject matter and lead to a behavior analysis by topography rather than function. Ideally, training that results in thorough knowledge of principles and philosophy creates a springboard from which to engage in systematic problem-solving, maintaining a behavior analytic framework, yet expanding it flexibly, depending on the characteristics of each situation.

Discussions of narrow versus broad training and how best to train are as old as behavior analysis itself. There always has been tension in expanding the scope of behavior analysis, on the one hand, and, on the other hand, adhering to experimental logic, as outlined by Sidman (1960) and others (e.g., Staddish et al. 2002), and to the conceptual foundations of behavior analysis. Early behavior analysts – including Skinner who extrapolated from his laboratory to *Verbal Behavior* (1957) – made room for this tension.

To illustrate the breadth of interest in the experimental analysis of common human conditions, as evidenced in the earlier days of the field, we reviewed the service of behavioral scientists in this emerging area of research and practice. The American Psychological Association (APA) Division 12 (Society of Clinical Psychology), Sect. III for the *Development of Clinical Psychology as an Experimental Behavioral Science*, formed in 1966 (Oltmanns and Krasner 1993), and we only identified founding members. The Society for the Experimental Analysis of Behavior (SEAB) has governed the flagship journals of behavior analysis, including the *Journal of Applied Behavior Analysis* (JABA) with its first edition in 1968 and a

current impact factor of 1.540 (2019). The journal *Behavior Therapy*, current impact factor 3.243 (2019), was formed by the Association for Advancement of Behavior Therapy (AABT), later renamed Association for Cognitive and Behavioral Therapies (ABCT) and continuing to serve as the premier association for behavior therapy, began in 1970.

Table 1 provides a record of all individuals who served editorial roles in both journals and/or served as presidents of the relevant organizations. We identified 40 individuals who held roles across these organizations between 1966 and 1975. Very few of these individuals focused their clinical research on autism and developmental disabilities, and those who did typically did not study that area exclusively. Perhaps most surprising to contemporary behavior analysts in BCBA-focused training programs will be that Risley was an editor of *JABA* and served as AABT's but not ABCT's president. From 1968 to 1975, two of the four editors of *JABA* later were presidents of AABT. Also of note is that Azrin, president of AABT in 1975, was the first president of ABCT (1976).

Crosstalk and overlap of roles in experimental, applied, and clinical psychology were common before licensure laws became increasingly restrictive. Just like the Behavior Analysis Certification Board® did not come about in its current nationwide status until almost 70 years after publication of *Behavior of Organisms*, licensure for psychologists used to be generally accessible across specialties. In most states, a doctoral degree in experimental or operant psychology was the basis for license eligibility until the 1980s about 90 years after the first psychology clinic opened its doors at the University of Pennsylvania. In other words, many behavior analysts practiced with general clinical psychology licenses. Asking "what happens when ...," behavior analysts ventured into many domains of psychology, asked new questions, and found novel solutions.

We – the editors – would like to promote broad application of behavior analysis, honoring pioneers' explorations and their impact on other domains of psychology. As behavior analysis across the world has become more connected through social media and other various online platforms, we have noticed consistent questions from students: "Does anyone know if behavior analysis has been used for X clinical presentation?" or "How does someone receive the proper training and supervision to work with Y population?" These questions, coupled with surprise when discussing the implications and utility of behavior analysis beyond the world of autism spectrum disorder or developmental disabilities, were major motivating factors for recruiting experts from a range of areas and compiling these chapters. Behavior analysis has affected research on consumer behavior and substance use (e.g., ABCT's Behavioral Economics (2011) and Substance Use Conferences (2018)), yet the current scope of practice of board certified behavior analysts and reimbursement policies have led to training that primarily focuses on the delivery of behavior analytic technologies for specific populations. While the continued workforce development to address the needs of these populations is important, it is also important to recognize the impact of behavior analysis in a wide range of settings.

We have edited the chapters of this book to facilitate dissemination, often reducing behavior analytic language to increase accessibility to students, including

Table 1 Early Applied Behavior Analysts with Multiple Leadership Roles

	<i>SEAB Journal of Applied Behavior Analysis</i>	<i>AABT Behavior Therapy</i>	<i>APA Division 12 Section III</i>
W. Stewart Agras	Editorial Board 1968–1970 Advisory Editor 1971 Associate Editor 1972–1974 Editor 1975	Editorial Board 1970–1975 AABT President 1985–1986	
Nathan H. Azrin	Editorial Board 1968–1972, 1974–1975 ABA President 1976–1977	AABT President 1975–1976	
Arthur J. Bachrach	Advisory Editor 1968–1969		Founding member
Albert Bandura	Editorial Board 1968–1972	Editorial Board 1970–1973	Organizing committee
David H. Barlow	Advisory Editor 1970–1972 Editorial Board 1973 Associate Editor 1974–1975	Editorial Board 1974–1975 AABT President 1978–1979	
Beatrice H. Barrett	Advisory Editor 1968–1971		Founding member
Jay S. Birnbrauer	Editorial Board 1968–1971, 1974 Guest Reviewer 1972		Founding member
John Paul Brady	Advisory Editor 1970	Associate Editor 1970–1975 AABT President 1970–1971	
Michael L. Commons	Guest Reviewer 1974		Founding member
Gerald C. Davison	Advisory Editor 1968–1971	AABT President 1973–1974	Founding member
Charles B. Ferster	Editorial Board 1968–1972	Editorial Board 1970–1973	Founding member
Donna Gelfand	Advisory Editor 1970–1971 Editorial Board 1973, 1975		Founding member
Michael Hersen	Guest Reviewer 1973	AABT President 1980–1981	
Frederick H. Kanfer	Advisory Editor 1969–1970	Editorial Board 1970–1974	Organizing committee
Alan E. Kazdin	Advisory Editor 1971–1972 Editorial Board 1973 Guest Reviewer 1974 Associate Editor 1975	Editorial Board 1974 Associate Editor 1975 AABT President 1977–1978	
Leonard Krasner	Advisory Editor 1969, 1971 Editorial Board 1973–1974	Editorial Board 1970–1974	Founding member
Malcolm Kushner	Advisory Editor 1968, 1971		Founding member
Peter J. Lang	Editorial Board 1968–1970	Editorial Board 1970–1973	Organizing committee

(continued)

Table 1 (continued)

	<i>SEAB Journal of Applied Behavior Analysis</i>	<i>AABT Behavior Therapy</i>	<i>APA Division 12 Section III</i>
Ogden R. Lindsley	Editorial Board 1968–1971 ABA President 1985–1986	Editorial Board 1970–1972	
G. Allen Marlatt	Guest Reviewer 1974	AABT President 1991–1992	
Gerald C. Mertens	Guest Reviewer 1973		Founding member
Lee Meyerson	Advisory Editor 1970 Editorial Board 1973–1974		Founding member
Harvey G. Narrol	Guest Reviewer 1974		Founding member
Rosemary Nelson-Gray	Guest Reviewer 1973–1974	AABT President 1981–1982	
K. Daniel O’Leary	Advisory Editor 1969 Associate Editor 1972–1973 Guest Associate Editor 1975	AABT President 1982–1983	
Gerald R. Patterson	Editorial Board 1968–1971, 1973–1975	AABT President 1971–1972 Editorial Board 1974	Founding member
Gordon L. Paul	Advisory Editor 1968–1971	Editorial Board 1970–1975	Founding member
David M. Pomerantz	Guest Editor 1972		Founding member
Herbert Quay	Advisory Editor 1968		Founding member
Todd R. Risley	Editorial Board 1968–1970 Associate Editor 1971 Editor 1972–1974	AABT President 1976–1977	
Alan Ross	Advisory Editor 1972	AABT President 1983–1984	
Kurt Salzinger	Advisory Editor 1969, 1971 ABAI President 2012		Organizing committee
Lawrence D. Simkins	Advisory Editor 1968–1971		Founding member
Arthur W. Staats	Editorial Board 1968–1971		Founding member
Stephanie B. Stolz	Advisory Editor 1968–1970 Editorial Board 1971–1972 Associate Editor 1973–1975	Editorial Board 1974–1975	
Richard B. Stuart	Advisory Editor 1970–1971 Editorial Board 1972–1974	AABT President 1974–1975	
Beth Sulzer-Azaroff	Editorial Board 1971–1973 Guest Associate Editor 1973 Associate Editor 1975 ABA President 1981–1982	Editorial Board 1975	
Leonard Ullmann	Advisory Editor 1969 Guest Reviewer 1974	AABT President 1969–1970 Editorial Board 1970–1974	Founding member

(continued)

Table 1 (continued)

	<i>SEAB Journal of Applied Behavior Analysis</i>	<i>AABT Behavior Therapy</i>	<i>APA Division 12 Section III</i>
Aubrey J. Yates	Editorial Board 1973–1974	Editorial Board 1970–1975	
Joseph Zimmerman	Advisory Editor 1968–1969 Editorial Board 1970–1972, 1974–1975 Guest Editor 1973		Founding member

undergraduates, or professionals from other specialties. Chapters are likely to have sacrificed the details and complexities inherent in research and practice to give brief glimpses and overviews of behavior analysts' activities in healthcare and beyond. However, the chapters of this book will reflect behavior analysts' curiosity and also the challenges that expansion brings about.

This book is a nonexhaustive, consolidated text, describing various settings in which behavior analysts or professionals with behavior analytic training have been able to thrive. The goal is to orient both students and professionals to the multitude of opportunities and the training sequences that may be required to meet benchmarks for competency within a setting or with a specific population. To accomplish this, we have organized the book in three distinct sections. The first section, which includes this chapter, serves as a general introduction to the problem of expanding behavior analysis as such. It is followed by a chapter that highlights the educational requirements and the scope of practice of various clinical professions within the United States. This section will orient readers to the vast variability in the licensures or boarding processes to which these various professions adhere. It will facilitate working with other providers and offer a comparison with requirements familiar to behavior analysts (i.e., ABAI course sequence verification and the BACB's fifth edition task list). This section is then followed by descriptions of early intervention settings in which principles and techniques of behavior analysis are used. This includes clinical settings with which behavior analysts may be familiar (e.g., intensive behavioral intervention units and adult residential services) and settings that are not as commonly found in BCBA-focused training programs (e.g., mental health outpatient services and integrated behavioral health primary care services). The third section includes chapters on domains within which behavior analytic science and service delivery have strong roots, such as the fields of behavioral gerontology and substance use. Finally, the book ends with chapters that are "nonclinical" in the traditional sense, and to which behavior analysts add value and improve services (e.g., business, schools, animal training).

All of our authors were asked to provide information related to training in regard to the fifth edition task list, competencies and training beyond the task list, and how to obtain and provide proper supervision for those interested in a specific field. Therefore, general overlap of some content was intentional, so each of the chapters can stand on its own and provides readers with a quick reference. Thus, after

reading the introductory section, readers can pick and choose fields that interest them most (even though we highly recommend you explore the book in its entirety!). Our hope is that with this book, individuals in the field of behavior analysis will more readily explore other professional settings and expand the scope and reach of applied behavior analysis in society.

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Scope of Practice and Standards of Training Across the Clinical Professions



Thomas J. Waltz 

Abstract To improve the interdisciplinary knowledge and understanding of diverse career paths for behavior analysts, this chapter provides an overview of the education, practical training, and licensure standards for several clinical professions. Medicine is reviewed as the profession which has set the standards for training and professional practice regulation in the United States. Clinical psychology, social work, counseling, school psychology, and licensed behavior analyst career paths are discussed in parallel formats highlighting their training and regulatory similarities and differences. Each profession's relationship with evidence-based practice (e.g., whether compulsory within the profession's ethical standards) and opportunities for coursework and supervised practice grounded in behavioral principles are reviewed. The chapter closes with a discussion of future directions in the licensure of master's level practitioners in health services psychology, an area with a broad scope of practice emphasizing improving functioning in all areas of behavioral and mental health.

Keywords Education · Evidence-based practice · Licensure · Standards · Training

Scope of Practice and Standards of Training Across the Clinical Professions

Behavior analysts increasingly work within health teams. Knowledge of the shared and distinctive contributions of other professions is an important competency in the clinical professions (Callahan 2019). Because standards for training and defining the associated scope of practice vary substantially from profession to profession, it is useful to understand the training and practice background of other service providers. An overview of the training and practice standards of diverse professions also is an opportunity to highlight the opportunities for training these professions have in behavior analysis. Finally, the content of this chapter is intended to help answer a question that is commonly posted in ABA discussion groups, "I'm interested in working with _____ (clinical presentation outside of autism and developmental/

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intellectual disabilities), can you do that as a behavior analyst?" The answer to the question is almost always yes and that behavior analysts have been working in diverse areas for over 60 years in a variety of professions that are covered in the multiple chapters of this book. This chapter will focus on educational and licensure regulatory frameworks for these professions so these career paths can be better understood.

Behavior analysts are not unique in their emphasis on training. All health service professions establish general knowledge and practice-based competency benchmarks and have additional expectations for specialization within their respective subfields. Professional regulatory frameworks outline the relationships between professional associations, educational program credentialing bodies, and state licensing boards. These regulatory frameworks aspire to protect public health and safety by identifying competent professionals and by putting mechanisms in place to motivate adherence to professional standards. The purpose of this chapter is to provide a review of training requirements for clinical specialty areas and the scope of practice of several applied behavioral science professions. Six professions are reviewed: medicine, psychology, social work, counseling psychology, school psychology, and licensed behavior analysts. Medicine is included as the most mature of the regulated professions, with credentialing procedures and standards that significantly influenced the documentation of competency benchmarks of other health care professionals (Knebel and Greiner 2003).

For the purposes of this chapter, evidence-based practice will be conceptualized broadly:

evidence-based practice is the integration of the best research evidence with clinical expertise and patient values. Best research evidence refers to clinically relevant research, often from the basic sciences of medicine, but especially from patient-centered clinical research into the accuracy and precision of diagnostic tests (including the clinical examination); the power of predictive markers; and the efficacy and safety of therapeutic, rehabilitative, and preventive regimens. Clinical expertise means the ability to use clinical skills and past experience to rapidly identify each patient's unique health state and diagnosis, individual risks and benefits of potential interventions, and personal values and expectations. Patient values refers to the unique preferences, concerns, and expectations that are brought by each patient to a clinical encounter and must be integrated into clinical decisions if the patient is to be served. (Institute of Medicine 2001, p. 47)

The above definition has many elements that are familiar to behavior analysts: it grounds clinical practice in research evidence and takes a patient-centered, ideographic approach to assessment and interventions. Each of the following sections will begin with an overview of the profession followed by its educational requirements, including potential post degree requirements for licensure eligibility. Of special interest are the standards of the profession's credentialing bodies and whether these standards cover knowledge and skills familiar to behavior analysts. The definition, role, and ethical guidelines for evidence-based practices within the selected professions will be reviewed. Finally, each section will end with a summary of the training requirements and scope of practice for each profession.

Medicine

Medicine is one of the earliest professions in the United States that enacted state-level licensing laws and established state regulatory boards. As already noted, licensure intends to protect the public by ensuring properly trained and competent professionals can be identified and accessed. Furthermore, state licensing boards provide disciplinary oversight of the profession. In medicine, several accrediting organizations oversee the professional development of trainees, spanning the foundational education throughout medical school, residency, and board certification in one or more areas of practice as an independent provider.

The doctor of medicine and related medical degrees are categorized as professional doctorates, reflecting advanced professional training beyond the master's level. These degrees are differentiated from research doctorates as professional doctorates do not require the completion of a dissertation or equivalent project, or training that prepares students to make original contributions to a field of study (National Science Foundation 2018). Medicine was the first profession to use the title of doctorate for advanced academic pursuits, without requiring original research or scholarship that expands the boundaries of knowledge in a field.

Education

In addition to undergraduate grade point average and experiences relevant to the helping professions, selection criteria of medical schools are strongly influenced by applicants' performance on the Medical College Admissions Test (MCAT). This test assesses the knowledge-based competencies of candidates in four areas: (1) biological and biochemical foundations of living systems; (2) chemical and physical foundations of biological systems; (3) psychological, social, and biological foundations of behavior; and (4) critical analysis and reasoning skills. Section three was added to the MCAT to address the important role behavior plays in medical presentations and the need for physicians to have basic competencies in behavioral and social sciences. Scores of admitted applicants are aggregated and published, allowing prospective applicants to self-assess their likelihood of admission. Forty-one percent of medical school applicants matriculate into a program (Association of American Medical Colleges 2018).

Once matriculated, medical students generally take 2 years of courses/seminars followed by a 2-year clerkship (unpaid) where students explore areas of specialty practice. Intensive formal evaluations of professional knowledge via the United States Medical Licensing Examination (USMLE) is conducted as students progress toward licensure. The examination occurs in three steps. The USMLE Step-1 exam is typically taken at the end of the second year, concluding the heavy coursework phase of the curriculum. It is an extensive knowledge-based exam with seven 60-minute test blocks administered over eight hours. The USMLE Step-1 exam scores are weighed heavily in candidates' applications to residency placements. The

USMLE Step-2 exam is typically taken in the fourth year of the program prior to graduation. This, too, is an extensive knowledge-based exam with eight 60-minute test blocks administered over nine hours.

Training in the behavioral sciences is typically targeted directly to the content covered in the USMLE exams. A typical program will have a seminar in this content area that lasts for six to eight weeks. All physicians are expected to develop competence in behavioral counseling (Schlaff 2013). The foundational knowledge assessments in the USMLE aim to capture this area of competence. On the practical side, many programs require a minimum of a four-week rotation in a psychiatry service.

Postdoctoral Residency and Licensure

After completing medical school, physicians obtain a limited license in most states and then complete a variable number of years of postdoctoral residency (paid) to meet eligibility criteria for full medical licensure. A fully licensed attending physician supervises all clinical decisions made during residency.

In addition, physicians must complete between 3 and 8 years of residency to be eligible to apply for board certification in a specialty area. Residents take the USMLE Step-3 exam in their first or second year of residency. This is a 2-day exam with six 1-hour blocks of testing on the first day and nine hours of testing on the second day. The content of the exam is designed to evaluate physicians' ability to apply their knowledge clinically and demonstrate their readiness for independent practice. Upon successfully completing the Step-3 exam residents are eligible to apply for full licensure as a medical professional at the state level, provided they meet that state's postdoctoral residency training requirements. States vary in the number of residency years required before a physician becomes eligible for a full license.

Practical medical education relies on multiple exemplar trainings within an apprenticeship model. For this reason, the clinical experience expectations during residency are unusual among the health professions. In 2003, the Accreditation Council for Graduate Medical Education (ACGME) limited the working hours of residents to a maximum of 80 hours a week (considering a four-week average). Prior to the establishment of these regulations, 90- to 100-hour work weeks were common, and residents could be required to work 36-hour shifts. Current regulations maintain the maximum 80 hours of clinical work and education a week (averaged over four weeks) with eight hours off between shifts and having one of every seven calendar days off (ACGME 2018). Continuous work periods cannot exceed 24 hours and any 24-hour shift must be followed by 14 hours off (ACGME 2018). Resident physicians typically obtain over 4000 supervised experience hours annually during residency.

Upon completing residency requirements in a specialty area, physicians may become board-certified in their area of specialty. While board certification is voluntary, most health systems exert pressure on providers to have formal specialization, to meet the needs of a fragmented approach to patient presentations. Multiple boards

oversee over 140 specialties and subspecialties in medicine. Board certification requires additional testing, the form of which varies by board and by specialty area. Post licensure continuing education requirements are standard, but vary by state and by specialty board. Many specialty boards require regular recertification to motivate and monitor knowledge and skills in accordance with current practices.

Residents interested in specializing in psychiatry will generally receive training in neurology, addiction medicine, emergency mental health, and inpatient mental health. Programs in the United States generally last 4 years and vary in the extent to which residents receive training in nonpharmacological interventions. Historically, psychotherapy training was psychodynamic in orientation. Today, 95% of programs offer some exposure to evidence-based behavior therapies with supervision (Weissman et al. 2006); however, the billing model for mental health services has prioritized pharmacological interventions and medication checks, and thereby de-incentivized psychiatrists from serving as professionals who directly implement anything other than brief psychosocial/behavioral interventions (Olfson and Marcus 2010).

Ethical Standards Regarding Evidence-Based Practice

The American Medical Association (AMA) ethics code does not mandate consideration of evidence-based practice. Its principles broadly encourage a commitment to ongoing medical education and reliance on solid evidence to facilitate sound decision-making with patients (Brotherton et al. 2016). Board certification in psychiatry (e.g., the American Board of Psychiatry and Neurology) promotes reliance on evidence and quality improvement practices as well as familiarity with a wide range of psychosocial interventions, some of which are evidence-based behavior therapies. Board certified psychiatrists do not have a separate or supplemental ethics code to the AMA code. The American Psychiatric Association issues clinical practice guidelines to support evidence-based practice.

Summary

Medical education involves a multistep rigorous assessment process that begins with requiring all entrants to demonstrate foundational knowledge and reasoning skills prior to entry. During medical school extensive testing via the USMLE Step-1 and Step-2 must be completed. Post degree, USMLE Step-3 must be completed and upon completion of residency requirements most physicians also complete additional testing to fulfill requirements for board certification.

Behavioral science training makes up a small part of the overall physician training curriculum; yet, physicians are expected to develop behavioral counseling competencies to effectively guide patients in health-related behavior change. Psychiatry training programs strongly emphasize the somatic side of care and have limited opportunities for obtaining advanced proficiency in evidence-based behavioral

therapies. While physicians enjoy a broad scope of practice and a third-party payer system that places their services at the center of healthcare in the United States, physicians receive little or no formal training in behavior analysis and must gain competencies in this area through independent efforts. The economics of practice reimbursement result in medical professionals focusing on providing somatic interventions and making referrals to other providers for behavioral interventions.

Clinical Psychology

Clinical psychologists work in a wide range of areas including clinical practice, consulting, public policy, and research. As clinical psychology is progressively integrated into larger health systems, this profession is increasingly referred to as health services psychology. The American Psychological Association (APA) Commission on Accreditation (CoA) defines health service psychology as “the integration of psychological science and practice in order to facilitate human development and functioning” (American Psychological Association 2018, p. 2). This definition is broad and includes research and practical activities related to health promotion and disease prevention, consultation, assessment, and treatment. While doctoral programs in clinical psychology are only accredited by the APA CoA in health service psychology, other areas in psychology such as counseling psychology and school psychology have separate credentialing bodies and can elect to seek CoA accreditation in health services psychology. The APA CoA accreditation standards are the same whether a training program identifies as clinical psychology, counseling psychology, or school psychology. This section on clinical psychology will focus on health services psychology accreditation and the subsequent sections on counseling and school psychology will focus on separate accreditation standards specific to those fields even though some programs will have APA CoA accreditation in health services psychology.

As clinical practitioners, health services psychologists provide services independently in private practice or are integrated into a wide variety of medical service settings (e.g., primary care, oncology, physical medicine and rehabilitation). The profession has a broad scope of practice working with individuals of all ages, all ability levels, and all manner of mental and physical health presentations.

The APA CoA takes a stage approach to professional development (doctoral education, internship, postdoctoral supervision, and continuing education). The foundation for broad and general competencies begins in doctoral education that emphasizes demonstrating graduate-level knowledge of psychological science and the development of nine areas of competency: research, ethical and legal standards, individual and cultural diversity, professional values, attitudes, and behaviors, communication and interpersonal skills, assessment, intervention, supervision, and consultation and interprofessional/interdisciplinary skills (the American Psychological Association 2018). Areas of advanced competency will be discussed below.

The dominant model of training in health services psychology is the scientist-practitioner model. This model was developed at the Boulder Conference in 1949 which emphasized that psychologists are competent in the independent investigation of behavior as well as engaging in practice areas such as case formulation, assessment, intervention, consultation, and program evaluation (Belar and Perry 1992; Raimy 1950). Training programs embracing this model require original research contributions in the form of theses and dissertations. These programs emphasize the role of science in the course of applied work. These training programs primarily award a doctorate of philosophy (PhD) degree.

Two alternative training models are present in the field. The practitioner-scholar model parallels the emphases found in other professional degrees, such as medicine. Here, the training emphasis is on advanced clinical skills and integrative scholarly skills. Many programs governed by this model award the doctorate of psychology (Psy.D.) degree.

The final and more recently introduced model for training is the clinical science model, which intensifies the scientist-practitioner model by requiring programs to demonstrate the application of science in their graduates' post degree practice. The accreditation system for this model provides training programs more flexibility in their training activities to obtain their goals (Levenson 2017), particularly additional foci on activities that would have been found in experimental (rather than clinical) programs traditionally. Like most scientist-practitioner models, the majority of these programs award the PhD.

A small number of states provide limited licenses to practice psychology at the master's level. Since the term "psychologist" is restricted for doctoral level practice, practitioners at the master's level are described as "psychological associates." At present, master's level practice in health services psychology is rare. While it will not be addressed any further in this section, it is relevant to a discussion on future directions of health teams and training models.

Behavior analysis and therapy is explicitly included in the APA's model act for state licensure of psychologists (APA 2010). APA has repeatedly affirmed that applied behavior analysis practice and supervision fall within the scope of practice of psychologists who have received relevant training (APA 2017; APA Practice Organization 2012). Licensure as a psychologist provides behavior analysts with the broadest scope of practice outside of medicine.

Education

Selection for entry into clinical psychology programs is competitive. Applicants are evaluated in terms of their academic aptitude (grade point average, writing samples), fit of their interests and training with potential mentors and the training program, and professional letters of recommendation. In addition, most programs require completion of an exam that mirrors the MCATs: the Graduate Record Exam (GRE). The GRE takes less than four hours to complete and assesses analytical writing, verbal reasoning, and quantitative reasoning skills. Research-oriented PhD

programs tend to offer full or partial tuition support, have small classes, and an acceptance rate of less than 10% (Norcross et al. 2010). Practice-oriented PsyD programs have much larger classes, tend not to offer tuition support, and have an acceptance rate of about 50% (Norcross et al. 2010). In general, programs are designed to be completed within 4–5 years inclusive of internship, and most students complete their program within 5–7 years.

The curriculum for doctoral programs includes 90 or more credit hours of content courses, research credits, and credits anchored to practical training experiences. APA accredited doctoral training programs have become the standard for those seeking a health services psychology career as a licensed psychologist. Trainees must demonstrate knowledge in five basic content areas of psychology: affective aspects of behavior, biological aspects of behavior, learning and cognitive aspects of behavior, developmental aspects of behavior, and social aspects of behavior. A sixth basic knowledge category is history and systems of psychology. Advanced knowledge areas include research methods, quantitative methods, and psychometrics. Additional coursework tends to focus on ethics, assessment, intervention, and advanced practice and research issues (the American Psychological Association 2018). Training in an accredited program with a coordinated 1-year internship meets the predoctoral requirements for licensure throughout the United States.

The Inter-Organizational Task Force on Cognitive and Behavioral Psychology Doctoral Education has published guidelines for cognitive behavioral training in doctoral psychology programs (Klepac et al. 2012). These guidelines emphasize (1) philosophy of science, (2) ethical decision making, (3) research design knowledge and competencies, and (4) clinical knowledge and competencies. Functional analysis and case formulation grounded in behavioral principles are considered foundational for developing clinical competency in cognitive-behavioral practice.

Some doctoral programs offer ABAI Verified Course Sequences, and doctoral students can meet the academic requirements for the Board Certified Behavior Analyst (BCBA) credential. Requirements for supervision by a licensed psychologist throughout training, however, complicate working toward the BCBA credential: most students seek supervised practicums in multiple settings or with multiple supervisors. Very few professionals hold both a psychology license and BCBA credential. This is, in part, due to the BCBA being a master's level board certification (which may include a "D" designation if an approved dissertation was completed), while the full psychology license is restricted to the doctoral level. Furthermore, as noted above, applied behavior analysis is explicitly included in the scope of practice of appropriately trained licensed psychologists, rendering separate credentialing by the BCBA superfluous for licensed psychologists.

Doctoral education in clinical psychology typically involves one year of coursework before trainees begin accruing supervised practical experiences. Some doctoral programs award a master's degree prior to the doctoral degree. All programs require structured scholarly and research activities, often in the form of a master's thesis, as part of the research training in preparation for the dissertation project. In Ph.D. programs, students are required to propose, execute, and defend the results and interpretation of a dissertation project.

In the course of their degree and prior to internship, doctoral students in psychology complete 1000 or more hours of program approved practicum training, with structured supervision in intervention and assessment services. The final year of doctoral training requires a 1-year clinical internship (2000 hours), with students competitively matched to internship positions across the nation – similar to medical residents. Both APA and the Association of Psychology Postdoctoral and Internship Centers (APPIC) provide oversight of clinical internships. Students typically apply to 10 or more potential sites, attend interviews, and participate in a national match program as part of the internship process. Internships provide opportunities for both generalist and specialized skills in assessment, treatment, and program evaluation. Some internships include supervised research and/or administrative experiences. All accredited internships are paid positions.

Postdoctoral Training and Licensure

The Association of State and Provincial Psychology Boards (ASPPB) is the organization that supports state and provincial psychology licensing boards. It develops and owns the Exam for Professional Practice in Psychology (EPPP). The exam has 225 items which must be completed in four hours and fifteen minutes. The exam covers eight knowledge domains: biological bases of behavior, cognitive-affective bases of behavior (including principles of learning), social and cultural bases of behavior, growth and lifespan development, assessment and diagnosis, treatment, intervention, and prevention and supervision, research methods and statistics, and ethical/legal/professional issues. A passing score for EPPP is required for licensure eligibility in most states. The ASPPB provides an interactive guide to licensure requirements at <http://psybook.asppb.org/>.

The ASPPB has recently released an EPPP Step 2 exam which aims to capture skills competency in professional psychology practice. This computer-based exam has 170 questions and is four hours and 15 minutes in duration. About half of the questions are based on video or other clinical material presentations. ASPPB anticipates that this exam will eventually be incorporated into state licensing board requirements.

Postdoctoral training requirements vary from zero to 4000 or more hours depending on the state. Postdoctoral training may focus on advanced generalist practice or may include specialty training. Most jurisdictions accept research experiences with applied emphasis as part of these hours. The ASPPB interactive guide noted above can serve as a reference for viewing the current postdoctoral training requirements of many states. Materials posted on state licensing board websites provide updated information. Some states require applicants to complete jurisprudence exams, covering case law that impacts practice. A few states require additional oral exams covering jurisprudence, intended scope of practice, or other issues deemed important by the state licensing board. Post licensure continuing education requirements are common, but the exact number of hours and specific areas of content vary by state.

Post licensure psychologists can apply for board certification through the American Board of Professional Psychology (ABPP). The Behavioral and Cognitive Psychology specialty board of the ABPP formalizes advanced proficiency in one or more of the following relevant practice areas: applied behavior analysis, behavior therapy, cognitive-behavior therapy, and cognitive therapy. The multistep process toward board specialization involves a credentials review, professional statement of practice and curriculum vitae, a practice sample (video plus written case conceptualization), and an oral examination. Board certification can fulfill many of the continuing education requirements that may be required for maintaining licensure as a psychologist. ABPP credentialed psychologists can serve as fieldwork supervisors for individuals seeking the Board-Certified Assistant Behavior Analyst and the Board-Certified Behavior Analyst credentials if they demonstrate proficiency in applied behavior analysis during the ABPP process (American Board of Cognitive and Behavioral Psychology 2014).

Once licensed, clinical psychologists can independently assess, diagnose, and treat any presentations that fall within the boundaries of their competence. This means licensed psychologists can provide a wide range of billable services, appropriate to their training. Importantly, the ability to assess and diagnose is key for advocating, implementing, or referring to evidence-based behavioral interventions, as standard diagnostic reports issue treatment recommendations and related referrals.

Ethical Standards Regarding Evidence-Based Practice

The APA ethics code does not mandate consideration of evidence-based practice. It specifies that clinicians should only practice within the boundaries of their competence and that assessment instruments should only be used and interpreted considering relevant research evidence for their contextually conscribed validity. In 2005, APA adopted a definition of evidence-based practice modeled after language used by the Institute of Medicine as "...the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preferences" (APA Presidential Task Force on Evidence-Based Practice 2006, p. 284). The organization pledged to support healthcare policies that promote evidence-based practice. Other relevant ongoing initiatives related to APA policy include the development of clinical practice guidelines (see <https://www.apa.org/about/policy/approved-guidelines>) which, once issued, are updated approximately every 5 years.

APA has subdivisions by specialization. Division 12, Society for Clinical Psychology, maintains a clearinghouse of information on peer reviews of evidence-based practice in psychology, with committees continually updating resources (see <https://www.div12.org/psychological-treatments/>). Several APA divisions have partnered with the National Institutes of Health to provide resources to support interdisciplinary communication across the applied health professions regarding evidence-based behavioral practices for a range of clinical presentations (see <https://ebbp.org/>).

Summary

Clinical psychology involves intensive academic, practical, and research training enroute to licensure at the doctoral level. The profession has the broadest scope of practice outside of medicine for addressing behavioral and mental health presentations. Evidence-based practices are promoted from within the profession, and many of these practices and packaged treatments were established with behavioral principles and functional analysis as their guiding foundations.

Behavioral science training makes up a variable part of clinical psychology program training curricula. Some programs provide only a modest amount of training in behavioral principles while others place them at the center of their curriculum. Those with relevant training include behavior analysis within their scope of practice and are not required to obtain any additional certifications beyond licensure to exercise that scope of practice. Many behavior therapists use behavioral principles, functional analysis, and a radical behavioral philosophy to guide their work with individuals, couples, and groups with a wide range of concerns and goals. This profession provides behavior analysts with their broadest scope of practice.

Social Work

Social work is a profession that aims to promote individual and community well-being. It furthers these aims by working with individuals, their families, and larger social systems in which they participate. The Council on Social Work Education (2015) identifies nine competencies targeted by their programs: demonstrate ethical and professional behavior; engage diversity and difference in practice; advance human rights and social, economic, and environmental justice; engage in practice-informed research and research-informed practice; engage in policy practice; engage with individuals, families, groups, organizations, and communities; intervene with individuals, families, groups, organizations, and communities; and evaluate practice with individuals families, groups, and communities. These nine competencies are viewed as the foundation for generalist practice in social work, and minimal competencies in these areas can be achieved at bachelor's level. This chapter will focus on master's level clinical social workers (MSWs) as their scope of practice is broad and includes clinical interventions. This profession's focus on policies and systems has resulted in social workers successfully entering a wide variety of practice environments as licensed providers of services. In general, training in social work is consistent with a broad knowledge base related to the services within social and medical service systems as well as policy and resource frameworks that influence access to care in these systems.

Education

Most MSW programs require a bachelor's degree in a social science or a specified number of credits in the social sciences (e.g., 20 credit hours), or some lower amount in combination with liberal arts and humanities courses. Some programs require candidates to take the GRE. Many programs have discontinued using the GRE as part of the admissions process because it has not been predictive of candidate success and may have the effect of discriminating against minorities (Donahue and Thyer 1992).

The majority of MSW programs can be completed in four full-time semesters (30–60 credits). However, time to degree may vary substantially based on whether candidates have completed baccalaureate coursework in the nine foundational competencies of the profession mentioned above. Students begin field placement experiences starting in their second semester and a minimum of 900 hours of supervised field education is required for accredited programs (Council on Social Work Education 2015).

Training in the behavioral sciences is not a central focus of social work curriculum. A foundational competency involves using research-informed practice and there is an obligation to keep current with research evidence related to their professional practice (National Association of Social Workers 2005, 2017). The lack of behavioral science training makes obtaining proficiency in evidence-based cognitive-behavioral therapies a challenge, since foundational training in behavioral principles is limited. Eclectic practice is the norm with 97.5% of licensed clinical social workers reporting using some form of evidence-based practice and 75% of the same sample reporting using therapies that are unsupported (Pignotti and Thyer 2012).

It is common for programs to offer general courses in clinical social work practice. Less than a quarter of social work programs report that their decision to include specific therapy models in their curriculum was based on the evidence for the treatment models (Grady et al. 2010). Relatedly, between 52% and 85% of MSWs who have graduated since research-informed practice has been included in the professional competencies for the profession report lack of educational preparation and practical training to use evidence-based practices (Grady et al. 2018; Wike et al. 2019). The breadth required in the core competencies of the profession presents practical challenges with obtaining in-depth training in evidence-based behavioral therapies during their educational training. Post degree experience is typically needed for meaningful proficiency to develop.

Postdegree Experience and Licensure

Licensure at the master's level requires 3000 hours or more of post degree supervised experience depending on the state (National Association of Social Workers 2005). In addition, individuals need to pass the Association of Social Work Boards exam. The exam has 170 questions and has a four-hour time limit. There are four

variations of the exam. There is one for bachelor's practitioners, a general master's exam, an advanced generalist exam, and a clinical exam. While the content covered in each of the exams addresses four themes, different levels of emphasis and details within these themes vary by the specific exam. For example, the exam for clinical social workers covers four areas of content: human development, diversity, and behavior in the environment; assessment, diagnosis, and treatment planning; psychotherapy, clinical interventions, and case management; professional values and ethics. The exam requires social workers to have some knowledge-based familiarity with behavioral theories of human development, and cognitive and behavioral interventions.

After licensure, most jurisdictions require social workers to obtain 20 hours of continuing education credits every 2 years. Certification is a voluntary process of documenting minimal proficiency in specific areas of clinical practice. There are no national standards for the knowledge and proficiencies developed during certification. Many universities offer certificate programs that may include workshops, courses, and/or field experiences. The National Association for Social Workers (NASW 2019) has a specialty certification program that includes sub-specializations across ten thematic areas. In general, 20 hours of continuing education in a thematic area of specialization are required for the NASW specialty credential.

Ethical Standards Regarding Evidence-Based Practice

The NASW ethics code encourages evidence-based practice: "Social workers should critically examine and keep current with emerging knowledge relevant to social work and fully use evaluation and research evidence in their professional practice (NASW 2017, p. 27)." NASW does issue practice standards and guidelines to disseminate current and emerging best practice trends. As the majority of psychosocial therapeutic interventions for behavioral and mental health presentations are developed in clinical psychology research programs, social workers typically have to rely on continuing education experiences and ongoing independent professional development efforts to develop competencies in evidence-based interventions and their underlying foundations in behavioral science.

Summary

MSW programs provide clinicians with a broad base of training. Among the front-line clinical professions, social workers are unique in their training for understanding the breadth of services within social and medical service systems as well as the policy and resource frameworks that influence access to services in these systems. The Association of Social Work Boards exam reflects this breadth of practice and is required for obtaining licensure.

Behavioral science training makes up a small part of the typical MSW training curriculum. The majority of programs focus on broad generalist competencies for

clinical work. A select few programs specifically aim to provide intensive training in evidence-based therapies (e.g., the Columbia School of Social Work's Intensive Dialectical Behavior Therapy Training Program). Most program graduates rely on continuing education opportunities and certificate programs to improve their knowledge and skills related to evidence-based psychotherapy practice.

Counseling and Counseling Psychology

Counseling can be divided into two pathways: a master's level counselor pathway ("counseling") or a doctoral psychology pathway ("counseling psychology"). In general, counseling as a profession initially focused on providing academic guidance in schools and vocational guidance in both school and community settings. This is reflected in the history of Division 17 of the American Psychological Association which was titled Division of Personnel and Guidance Psychologists until 1951 when it became the division of Counseling Psychology (Roger and Stone 2019). Counselor training has historically been situated in colleges of education and has had a strong focus on theories of human development. The field has aimed to view individuals within their sociocultural context and has focused on the enhancement of mental health as well as the prevention and remediation of mental health problems (Rude et al. 1988). In general the field has placed greater emphasis on individual wellness rather than psychopathology (the American Counseling Association 2019). The scope of counseling practice has expanded over the years to include addiction counseling, career counseling, clinical mental health counseling, clinical rehabilitation counseling, college counseling and student affairs, and marriage and family counseling (the Council for Accreditation of Counseling and Related Educational Programs 2015).

Education

Counseling training programs can produce master's and doctoral level professionals although many institutions only offer master's level training. Eligibility requirements for master's programs are highly variable and generally more liberal than doctoral programs in counseling psychology or clinical psychology. Many programs do not review GRE scores as part of their admissions process and will accept applicants with any area of bachelors-level education although individuals with a background in psychology often have an advantage. The minimum requirements for a master's degree is 30 credit hours and most programs have curricula with 48 or more credit hours. Starting in July 1, 2020 programs accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) will need to have a minimum of 60 credit hours (CACREP 2015). Licensing requirements vary by state and may not reflect the standards suggested by

CACREP. Historically, most master's programs have been 24 months or less in duration for full-time students.

CACREP accredited programs require foundational knowledge to be demonstrated in eight core domains: professional counseling orientation and ethical practice, social and cultural diversity, human growth and development, career development, counseling and helping relationships, group counseling and group work, assessment and testing, and research and program evaluation (CACREP 2015). Many programs have students take the Counselor Preparation Comprehensive Examination (CPCE) to demonstrate these competencies before graduating from the program, and often prior to beginning their practicum and fieldwork/internship placements in their second year. The CPCE has 160 questions (20 per domain) and has a 4-hour time limit. While programs and field placements may involve generalist counseling practice, they may provide specialty training in addiction counseling, career counseling, clinical mental health counseling, rehabilitation counseling, clinical rehabilitation counseling, school counseling, college counseling and student affairs, and marriage, couple, and family counseling.

Students in CACREP accredited master's programs are required to complete a one semester 100 hour practicum placement in advance of a 600 hour fieldwork/internship placement (20 hours per week). The practicum is typically completed at the same site as the fieldwork/internship placement and serves to orient the student to the placement through didactic training and shadowing clinical practices at the site. The fieldwork/internship placement typically focuses on one of the eight specialty training areas listed above. Competency-based assessments are provided by supervisors at these training sites and passing evaluations are required for program graduation.

Doctoral training programs in counseling can operate under two different frameworks. Doctoral programs in counseling psychology, accredited by the APA CoA in health services psychology follow coursework, practicum, internship, and postdoctoral experience guidelines identical to those discussed in the section on clinical psychology on the way to licensure.

Students in CACREP accredited doctoral programs have typically completed a master's in counseling psychology, and doctoral training requires an additional 48 credit hours beyond the master's. Doctoral training focuses on five core areas: counseling, supervision, teaching, research and scholarship, and leadership and advocacy. The practicum and internship training at the doctoral level have similar standards as the master's sequence: 100 hours of practicum followed by 600 hours of internship. The added stipulation for doctoral internships is that the supervised experiences include at least three of the five core doctoral areas.

Counseling programs tend to be eclectic in theoretical orientation with a strong emphasis on human development, humanism, and practical problem solving. Counselors may have received a basic introduction to an A-B-C-based functional analytic framework, but additional proficiency in behavior analysis within the training programs is uncommon. In general, counseling programs encourage students to view clients from multiple theoretical perspectives.

The field has not adopted a definition of evidence-based practice even though CACREP indicates trainees should learn evidence-based counseling strategies. The definitions of evidence-based treatments/interventions utilized in health services and clinical psychology do not fully fit with all the areas of practice in the counseling profession since substantial areas of the practice target normal development and problems not meeting the criteria for clinically significant impairment. Thus, the breadth of the field has led to challenges. Similarly, placement of counseling psychology programs outside of broader psychology departments, which are typically housed in colleges of arts and sciences, limits trainee exposure to basic behavioral science. While there has been general consensus of counseling psychology to embrace the scientist-practitioner model (Rude et al. 1988), the foundation for this orientation is distinctively rooted in applied science and less emphasis is placed on basic psychological science.

Postdegree Experience and Licensure

Licensure regulations vary from state to state and professional counseling boards are typically separate from professional psychology boards as independent licensure as a psychologist occurs only at the doctoral level. It is typical for counselors to need 3000 hours or more of post degree supervised experience in a limited license capacity before being eligible for licensure at the master's level. The examination requirements for licensure may also vary, however, a National Board for Certified Counselors (NBCC) exists and hosts two examinations: the National Counselor Examination (NCE) and the National Clinical Mental Health Counseling Examination (NCMHCE).

The NCE is a 200-item multiple-choice examination that covers all eight of the core domains covered in CACREP accredited education programs. It also includes questions from five work behaviors identified as important from a national job analysis conducted by the NBCC. These work behavior domains include: fundamental counseling issues, counseling process, diagnostic and assessment services, professional practice, and professional development, supervision and consultation. There are 20 questions each for the 8 core CACREPP domains and the remaining 40 questions cover the work behavior domains. The exam must be completed with three hours and 45 minutes.

The NCMHCE examination consists of 10 clinical mental health counseling cases and assesses three broad areas of competency: assessment and diagnosis, counseling and psychotherapy, and administration, consultation and supervision. The test aims to demonstrate that counselors are able to apply the knowledge they have learned to clinical cases and are fit for independent practice.

Continuing education requirements are common but vary from state to state.

Ethical Standards Regarding Evidence-Based Practice

The American Counseling Association's (ACA) code of ethics does not reference evidence-based practice. It does encourage counselors to "...not use techniques/procedures/modalities when substantial evidence suggests [they cause] harm, even if such services are requested (ACA 2014, p. 10)." The ACA issues competency standards documents for several areas of practice (e.g., animal assisted therapy) but the relationship between these standards and relevant research programs is unclear. As many doctoral-level counseling psychologists receive training in health services psychology, and may be licensed as psychologists they may be held to APA ethical standards by their state licensing boards.

Summary

Counseling provides broad opportunities for independent practice at the master's level in the field of human services. This scope of practice is at odds with professional psychology's long-standing position that psychology is a doctoral level practice profession. Were the counseling profession to exclusively focus on guidance for issues related to normal adjustment and development there would be little confusion. Counseling's scope of practice creep in many states has rendered it difficult for the public to be able to distinguish between licensed counselors and licensed psychologists.

Behavioral science training makes up a small part of the typical counseling training curriculum. However, masters level behavior analysts practicing in areas of early intervention who are interested in retraining in a credential with a broader scope of practice will find counseling programs easier to gain admission in than doctoral programs in clinical psychology.

School Psychology

School psychologists provide a continuum of services for students, families, teachers, and school administrators to improve the academic achievement, promote positive behavior and mental health, support diverse learners, create safe and positive school climates, strengthen family-school partnerships, and improve individual student and school-wide assessment for academics and behavior (National Association of School Psychologists 2019). School psychologists are credentialed at two levels: as specialists (i.e., Educational Specialist or EdS, Psychology Specialist or PsyS) or at the doctoral level (PhD, EdD, and PsyD).

Education

Candidates applying for school psychology programs will have to complete the GRE (most programs) and have a bachelor's degree in psychology or another field related to human services. Standards for graduate training in school psychology are established by the National Association for School Psychologists. A school psychologist specialist degree consists of 3 years of full-time study with 60 or more credit hours. A minimum of 54 of the 60 credit hours needs to be earned outside of the supervised specialist-level internship experience. The curriculum aims to teach school psychologists to provide comprehensive services across 10 general domains: data-based decision making and accountability, consultation and collaboration, interventions and instructional support to develop academic skills, interventions and mental health services to develop social and life skills, school-wide practices to promote learning, preventive and responsive services, family-school collaboration services, diversity in development and learning, research and program evaluation, and legal, ethical, and professional practice (National Association of School Psychologists 2010b). The curriculum requires several practicum courses/experiences that provide students with the practical foundations they need for supervised practice during internship. Courses provide at least some exposure to behavioral principles, but the extent of their inclusion throughout the curriculum varies from program to program. A 1-year, 1200-hour internship is required. A minimum of 600 hours of the internship must be completed in a school setting.

Doctoral training programs in school psychology can operate under two different frameworks. Doctoral programs accredited by the APA CoA follow coursework, practicum, internship, and postdoctoral experience guidelines identical to those covered in the previous section on clinical psychology on the way to licensure. Some programs are accredited by APA CoA and NASP. NASP guidelines for a doctoral degree in school psychology require a minimum of 4 years of full-time graduate study with a minimum of 90 credit hours. A minimum of 78 credits must be exclusive of the credits earned for internship and dissertation. The program is additive on the NASP requirements for specialist with increased requirements for the internship experience. A 1-year, 1500-hour internship is required (+300 from the specialist requirement). A minimum of 600 hours of the internship must be completed in a school setting.

Postdegree Experience and Licensure

Doctoral level school psychologists who have completed APA accredited programs and internships follow the same post degree experience and licensure regulations for health services (clinical) psychologists. In many jurisdictions (rules vary by state) they may also be required to complete the post degree credentialing process that is specific to school psychologists. At present, independent practice of psychology (as opposed to counseling) is only licensed at the doctoral level in the United States. States, however, have a waiver system in place that allows appropriately

credentialled school psychologists (specialist or doctoral) to work in educational settings. For most states, obtaining the Nationally Certified School Psychologist (NCSP) credential is sufficient for being recognized as an eligible provider to schools through the licensure waiver program.

Candidates graduating from the NASP accredited programs will have met the education, practicum, and internship requirements for the NCSP. Candidates must also receive a passing score on the School Psychologist Praxis Examination. Praxis exams are a family of exams used to assess the subject specific knowledge for individuals seeking employment in education settings. These exams are more commonly known as *teacher certification exams* and the examination of school psychologists using this framework reflects the regulatory norms for professionals working in schools. The School Psychologist Praxis exam has 140 questions and a 140 minute time limit. The exam covers the 10 general domains of services school psychologists provide that are emphasized at all phases of the training for the profession.

To maintain their NCSP credential school psychologists need to complete at least 75 hours of continuing education training every 3-year period. Specific school districts or states may mandate training in specific content areas in order to maintain the eligibility to work in school settings.

Many states do not have licensure for specialist level school psychologists. Instead, school psychologists are regulated under a certification program similar to the certifications state teachers are required to hold and their practice is regulated under that administrative structure rather than a state psychology licensing board. In these circumstances, the state-level certification programs specify the degree requirements, practicum hour experiences, and other relevant training required for obtaining certification. These requirements are typically similar to NASP training guidelines.

Ethical Standards Regarding Evidence-Based Practice

The NASP principles of professional ethics specify that “School psychologists use assessment techniques and practices that the profession considers to be responsible, research-based practice (NASP 2010a, p. 7).” Similarly, NASP engages in national level policy advocacy for evidence-based assessment and intervention practices to be accessible through schools (NASP 2020). Behavioral principles and functional analysis serve key roles in evidence-based practice provision in school settings.

Summary

School psychology has a broad scope of practice limited to education settings for those who are not concurrently licensed as doctoral-level psychologists. For those primarily interested in applying behavior analysis in school settings, school

psychology is an excellent option. There are several school psychology programs with a strong history of integrating training in behavior analysis into the curriculum.

Licensed Behavior Analysts and Board Certified Behavior Analysts (BCBAs)

The Association of Professional Behavior Analysts (APBA) serves as the professional advocacy organization for current licensure efforts in behavior analysis across the United States and this organization coordinates efforts with the Behavior Analysis Certification Board (BACB), the organization that issues the BCBA credential. The APBA model licensure act for behavior analysts defines the practice as follows:

The design, implementation, and evaluation of instructional and environmental modifications to produce socially significant improvements in human behavior. The practice of applied behavior analysis includes the empirical identification of functional relations between behavior and environmental factors, known as functional assessment and analysis. Applied behavior analysis interventions are based on scientific research and direct and indirect observation and measurement of behavior and environment. They utilize contextual factors, motivating operations, antecedent stimuli, positive reinforcement, and other procedures to help individuals develop new behaviors, increase or decrease existing behaviors, and emit behaviors under specific environmental conditions. The practice of applied behavior analysis excludes diagnosis of disorders, psychological testing, psychotherapy, cognitive therapy, psychoanalysis, and counseling. (APBA 2018, pp. 4–5)

While the model licensure act goes on to say that ABA practice should not be restricted to any particular consumers, client populations, or settings the entire training and supervision infrastructure for credentialing as a behavior analyst has focused on intellectual and developmental disabilities, particularly individuals diagnosed with Autism Spectrum Disorder following insurance reform efforts that have increased funding for behavior analytic interventions with this population (Iwata et al. 2011; Johnston and Shook 1987; Shook et al. 2002; Ursitti 2008). Aspirational articles have been written regarding expanding the consumer base for BCBAs providing behavior analytic services (e.g., Leblanc et al. 2012), however, since behavior analysis is a latecomer to licensure as an independent profession, such expansions risk overlap with practice areas regulated by other professions. Such overlap might eventually be met with legal challenges, or – alternatively – with tighter restrictions at other license levels. Further complicating the matter is that the vast majority of BCBAs have been trained working in intellectual and developmental disabilities. As supervised practice is a requirement for the BCBA credential, there are scant opportunities to gain supervised experiences with more diverse consumer bases considering the existing supervisor workforce.

It is also important to note that there are areas of behavior analytic practice that do not require licensure. For example, behavior analysts consulting in industrial/organizational settings or in organizational business management practices are not

required to be licensed. Some areas do have opportunities for voluntary certification (e.g., animal behavior training, see the chapter on companion animal behavior analysis in this volume). The remuneration sources for these other types of services have not produced the kinds of incentives observed for the building of BCBA training programs for addressing the need for services for individuals diagnosed with Autism Spectrum Disorder.

The majority of BCBA training programs are housed in colleges of education (Waltz 2018). Colleges of education have a history of nimbly developing master's programs for the education workforce, as many states have provided salary adjustments for teachers holding advanced degrees in their areas of instruction. In contrast, psychology has long held that the doctorate is the minimal educational requirement for independent practice (APA 2010). As a result, departments of psychology were poorly positioned to develop independent BCBA master's programs within the existing highly regulated infrastructures targeting doctoral-level clinical practice. These structural and regulatory environmental differences within academic units contribute to BCBA training programs having limited opportunities to gain supervised experience working with diverse presentations outside of intellectual and developmental disabilities.

Education

The BACB certification structure includes credentials for sub-bachelor's, bachelor's, and master's level certifications. A doctoral designation can be added to the credential as well. At the entry level, Registered Behavior Technicians (RBTs) must have a high school degree or GED, complete 40 hours of training consistent with the BACB's RBT Task List which covers issues of measurement, assessment, skill acquisition, behavior reduction, documenting and reporting, and professional conduct and scope of practice. These skills are generally covered in the context of serving as a front-line technician providing discrete trail training for individuals receiving services for Autism Spectrum Disorder. These technicians must pass a competency exam before receiving the RBT credential. This exam is comprised of 85 multiple-choice questions that must be completed within 90 minutes.

Beginning January 2022, all applicants for the board certified assistant behavior analyst (BCaBA) and BCBA credentials will need to demonstrate coursework in line with the fifth edition of the BCBA/BCaBA task list (BACB 2017). At the intermediate level of the profession, BCaBAs must complete a minimum of 15 credit hours of coursework covering BACB compliance code and disciplinary systems and professionalism, philosophical underpinnings of behavior analysis and concepts and principles, measurement, data display and interpretation, experimental design, behavioral assessment, behavior-change procedures, selecting and implementing intervention, and personnel supervision and management. Upon completing the requisite coursework, degree (can be in any field of study), and supervised field experience hours (1300 hours if supervision hours compose 5% of the supervisory periods, 1000 hours if supervision hours compose 10% of the supervisory periods)

candidates can take the BCaBA exam. This exam has 140 questions that must be completed within four hours.

The BCBA is the top-level credential and requires a minimum of 21 credit hours of graduate-level coursework. The coursework content domains are identical to those listed above for the BCaBA credential with more hours allocated to several categories (BACB 2017). As with the BCaBA credential, supervised fieldwork experience hours can be accrued upon matriculation into an academic program. BCBA candidates must complete either 2000 hours of supervised fieldwork (5% of hours are in supervision) or 1500 hours of concentrated supervised fieldwork (10% of hours are in supervision). Upon completing the requisite coursework, degree, and supervised field experience hours candidates can take the BCBA exam. This exam has 160 questions that must be completed within four hours.

Individuals with a doctoral degree may apply for a BCBA-D designation. The BCBA-D designation does not grant any privileges beyond the standard BCBA credential and BCBA-Ds function in the same capacity as BCBA. The BCBA-D designation can be applied for by doctoral degree holders that either come from an Association for Behavior Analysis International accredited doctoral program or by completing a behavior analytic dissertation (i.e., the dissertation has content consistent with the current BCBA task list), and a) completing at least 4 doctoral courses in behavior analysis, b) have two peer reviewed behavior analytic journal articles, or c) document that one's supervision experience during doctoral studies exceeded the minimum standards for the BCBA credential.

Postdegree Experience and Licensure

RBTs are annually required to complete a competency assessment with their supervisor(s) and a renewal application (Behavior Analyst Certification Board 2020). Ongoing supervision is required for the RBT and supervision should be for a minimum of five percent of the hours spent providing services each month. If RBT's are required to register with a state-level professional board, they may have additional requirements imposed by the state for either initial certification/licensure or renewal of professional status.

BCaBAs are required to have supervision for five percent of the hours spent providing services per month for the first 1000 hours of post certificate practice. Subsequently they are required to have supervision for two percent of the hours spent providing services. Recertification occurs in 2-year cycles and BCaBAs are required to obtain 20 CEUs per cycle (4 in ethics, 3 in supervision if they supervise others) (BACB 2018). If BCaBAs are required to register with a state-level professional board, they may have additional requirements imposed by the state for either initial certification/licensure or renewal of professional status.

BCBA holders are not required to have any post certification supervision, however, they are expected to seek supervision if they expand their practice to new settings or populations. BCBA recertification occurs in 2-year cycles and they are required to obtain 32 CEUs per cycle (4 in ethics, 3 in supervision if they supervise

others) (BACB 2018). If BCBA's are required to register with a state-level professional board, they may have additional requirements imposed by the state for either initial certification/licensure or renewal of professional status.

Ethical Standards Regarding Evidence-Based Practice

BCBA's are responsible for the quality of care provided within their supervised caseloads. The Professional and Ethical Compliance Code for Behavior Analysts specifically states that "Behavior analysts rely on professionally derived knowledge based on science and behavior analysis when making scientific or professional judgments in human service provision, or when engaging in scholarly or professional endeavors (BACB 2014, p. 4)." Furthermore, the Code specifies that clients have a right to effective treatment and providers have an obligation to advocate for and educate clients about scientifically supported interventions. The APBA issues practice guidelines on a wide variety of issues related to service provision.

While the other professions that advocate for evidence-based practice in this chapter adopt a broad definition similar to that issued by the Institute of Medicine, the BACB code is extremely specific in its emphasis on services "that are explicitly based on principles and procedures of behavior analysis (BACB 2014, p. 23)." Any services provided that fall outside that definition, even if they meet Institute of Medicine standards for evidence-based practice, cannot be implemented by a BCBA. If a BCBA wishes to provide evidence-based services that are not explicitly based on the principles and procedures of behavior analysis they must provide the following disclaimer along with a description of the service: "These interventions are not behavior-analytic in nature and are not covered by my BACB credential (BACB 2014, p. 16)."

Summary

Licensure for behavior analysts has become widespread in the United States and the BCBA credential is the most commonly cited requirement for state licensure eligibility. Alternative credentialing bodies such as the Qualified Applied Behavior Analyst (QABA) Credentialing Board certify pre bachelors, bachelor's, and master's level clinicians providing ABA specifically with individuals with ASD but this credential has less frequently been cited. The supervision structure for licensed behavior analysts is overwhelmingly placed in intellectual and developmental disability focused services at this time and the growth in the field has primarily been targeted to third-party reimbursement changes secondary to autism insurance reform. Furthermore, behavior analysis as an independent practice has come late to the licensure game and as a result many state laws provide relatively restricted definitions of behavior analytic practice. The legality of broader scopes of practice within existing laws is untested at this early stage of professionalization.

Licensed behavior analysts have the largest amounts of mandated coursework and supervision in behavior analysis of all the professions reviewed in this chapter. Despite this strength, the profession's idiosyncratic definition of evidence-based practice isolates it from the broader healthcare professional community. These are exciting times in the development of this profession, and it will be interesting to see how it evolves.

Discussion

There is a diversity of standards for licensure eligibility across the professions reviewed. Medicine has the highest supervised practice and examination standards and the standards for this profession are often what other professions get measured against. Health services psychology has the highest standards of those professions that include social-behavioral interventions within their scope of practice and health services psychology has the broadest scope of practice and the clearest within-profession advocacy processes for identifying social-behavioral interventions that are evidence-based for a variety of presenting concerns.

Table 1 provides a summary of the scope of practice, training, and credentialing standards for the professions reviewed. As has been noted by others (Kazemi and Shapiro 2013), the BCBA credential as a requirement for licensure in behavior analysis does not place the training of independent practice behavior analysts at the top of the training hierarchy. Academically, fewer credit hours are required than the other master's-level professions (i.e., social work, counseling, and school psychology). The pre degree supervised experience requirements compare favorably with other master's-level professions, but not the post degree requirements. This more limited amount of academic training and focused experience requirements makes sense if licensed behavior analysts are being trained to have a narrow scope of practice with individuals with intellectual and developmental disabilities. However, if the aspiration of the field is to provide training suitable for a broader scope of practice, a broader scope of training will be necessary.

Future Directions

APA has decided to move toward accrediting master's programs in health services psychology and there is currently an APA taskforce on master's level-practice charged with creating a blueprint for accrediting such programs (Worrell et al. 2018). This change would allow health services psychology training programs to fill market demand for master's level practitioners that are currently going to social workers and counselors—professionals from programs that focus on different skill-sets than health services psychology. Existing master's level model licensing language suggests that after a training accreditation systems is established, advocacy for supervised practice with broad scope (i.e., the counseling and clinical

Table 1 Summary of Professional Practice, Training, and Credentialing Standards

Profession	Scope of practice	Academics	Predegree experience	Examinations	Postdegree requirements
Medicine	Broad with a focus on somatic care	2 intensive years of academic training followed by clerkship.	2 years of clerkship involving a combination of seminars and supervised practice while rotating through multiple specialty areas.	USMLE steps 1 & 2 prior to MD;	Supervised practice varies by state.
		Minimal exposure to behavior analysis	4000+ hours	USMLE step 3 post MD and required for provisional license;	3000 to 4000 hours per year is common.
				Specialty exam for post licensure board exam	
Clinical (health services) psychology	Broad with a primary focus on social-behavioral interventions	90+ credit hour doctorate typically completed within 4 to 7 years. Exposure to behavior analysis varies substantially by program.	3000+ hours (2000 at an internship placement)	EPPP exam for most states.	Supervised practice varies by state from 0 to 4000+ hours
				Optional specialty exams for postdoctoral board certification	
Social work	Broad scope of practice related to policies and resources in care systems. Includes provision of social-behavioral interventions	MSW is 30 to 60 credit hours.	900+ hours of supervised field education	ASWB exam for most states	Supervised field work varies by state, but 3000 hours is the typical minimum
		Minimal exposure to behavior analysis			

(continued)

Table 1 (continued)

Profession	Scope of practice	Academics	Predegree experience	Examinations	Postdegree requirements
Counseling	Broad scope of practice focused on understanding normal development. Includes provision of social-behavioral interventions	Master’s is 60+ credit hours.	700+ hours at the master’s level.	Optional CPCE exam pre degree;	3000+ hours of supervised experience
		Doctorate is 90+ credit hours	700+ additional hours at the doctoral level	NCE and NCMHCE exam for licensure	
School psychology	Broad scope of practice within school districts. Includes provision of social-behavioral interventions	Master’s or specialist degrees are 60+ credit hours.	1200 hours for master’s and specialist levels.	School psychology praxis exam	Varies by state at all levels of training
		Doctorate is 90+ credit hours	1500 hours for doctoral level (3000+ hours if also meeting criteria for licensed psychologist)		
Licensed behavior analyst	Relatively narrow scope of practice providing behavioral interventions for intellectual and developmental disability populations	Bachelor’s degree for the BCaBA.	1000 to 1300 hours for bachelor’s level.	BCaBA exam for bachelor’s.	No supervised practice when BCBA is the standard for licensure. Continuing education varies by state.
		Master’s is 30+ credit hours	1500 to 2000 hours for master’s level	BCBA exam for master’s	

psychology “psychological associate” models) is likely to follow (Association of State and Provincial Psychology Boards 2018).

Working documents outlining educational goals and basic training competencies for master’s level health services psychology trainees have been distributed that provide insight regarding the accreditation standards that are likely to develop (American Psychological Association Task Force on Guidelines for Master’s Programs in Psychology 2018; Cooper et al. 2020). It is highly likely that recommendations for accredited health services psychology programs will include 60 credit hours for the degree given that this is the minimum for social work, school psychology, and counseling psychology. There has generally been upward pressure

on the hours of instruction required to meet the competency expectations for greater practice independence. This has implications for training programs that would like to meet training standards for both the BCBA and health services psychology. To accommodate increased health services psychology curricular demands and meet supervised fieldwork experience expectations for the BCBA such combined training programs would likely need to expand their program offerings and increase their time to degree from 15 to 24 months to 32 to 36 months. There is also a strong likelihood that licensing norms for master's level practice will require 2000 or more hours of post degree supervised practice.

Expanded training and supervision would provide more opportunities for master's level behavior analysts to practice in diverse areas beyond developmental and intellectual disabilities. The challenge will be in establishing a supervision framework that would support a more diverse scope of practice. The existing BCBA supervisory workforce is increasingly housed in colleges of education and has focused on early intensive interventions for autism in response to third-party payer regulatory frameworks. While this market area needs to remain strong, an expanding scope of practice consistent with that found in health services psychology will need to be housed in departments of psychology rather than colleges of education. This is where that expanded scope of practice will remain in contact with the basic behavioral research that serves as its foundation and where supervisors with broader scopes of practice will be found.

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Part II
Early Intervention Settings

Early Intervention Services for Children with Autism Spectrum Disorder



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Abstract One of the most widely known applications of behavior analysis is through early intervention services for children with autism spectrum disorder (ASD). In this chapter, we begin with a brief history of early intervention services over the past 30 years and how early behavior analysts changed the trajectory for children with ASD. Following the success of these early and intensive treatments, applied behavior analysis therapy became one of the most well-researched and supported interventions for children with ASD. This chapter provides an overview of the typical process of early intervention service provision from initial referral and intake to transition and termination of services. Differences in teaching methodologies, such as discrete trial training versus natural environment teaching, as well as factors to consider when selecting treatment strategies are also discussed. In addition, this chapter describes the best practices in clinical supervision and training for professionals in the field and alerts the reader to specific ethical codes throughout the chapter referencing the Behavior Analyst Certification Board's *Professional and Ethical Compliance Code*. While early intervention is one of the more established practices in the field of behavior analysis, we still have a lot to learn in order to make our treatments the most meaningful for our clients and society.

This chapter was written by behavior analysts at Western Michigan University's Kalamazoo Autism Center in collaboration with students and faculty from the Department of Psychology.

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Early Intervention Services for Children with Autism

For more than 30 years, the application of behavior analytic technology has shown to be an extremely effective treatment for individuals with developmental disabilities such as autism spectrum disorder (ASD; National Autism Center 2015). In the 1980s, Lovaas was working with children with ASD at a clinic at the University of California, Los Angeles (UCLA). He used applied behavior analysis (ABA), which includes the application of the basic principles of behavior to make meaningful improvements for important behaviors (Cooper et al. 2007). Lovaas obtained powerful results and published a manual-type book to help others in obtaining similar effects (Lovaas 1981). For the first time, a condition that was believed to be unalterable demonstrated reliable improvements. Then, in 1987 he published the first peer-reviewed study using ABA as an intervention for children with ASD. His results showed that children who received intensive (40 h per week) ABA therapy saw significantly greater improvement in socially significant behaviors than those who received only 10 h of ABA therapy. At the same time, other researchers in the United States found similar results (Lovaas 1987). Since then, numerous articles, manuals, books, conferences, evaluation tools, and practice guidelines aimed at providing effective treatment to children with ASD, monitoring the effects of those treatments, have been published. At the time of this writing (2019), government and private entities fund ABA treatment for individuals with ASD (Autism Speaks 2018; Behavior Analyst Certification Board 2014a, 2019b; National Autism Center 2008, 2015). As a result, there has been major growth in this area of behavior analysis.

Effective treatment for autism requires an understanding of the characteristics of autism. As the field of behavior analysis has grown and new treatments have been discovered, the definition of what characterizes ASD has also evolved. Kanner (1943) first described children with autism as lacking the ability to “form affective ... contact” (p. 250). Today, the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders* fifth edition (DSM-5; American Psychiatric Association 2013) defines ASD as a developmental disorder which includes core symptoms in two major categories: “persistent deficits in social communication and social interaction across multiple contexts ... and, restricted, repetitive patterns of behavior, interests, or activities” (DSM-5, Diagnostic Criteria for Autism Spectrum Disorder, 299.00). Because ASD presentations vary among individuals and consist of individually different strengths and deficits, the disorder is considered a “spectrum disorder.” While the definition and diagnostic criteria for autism have evolved over the years, one thing has remained constant: ABA is a highly effective treatment for individuals with ASD, and the sooner treatment is initiated, the better the outcome will be (American Psychiatric Association 2016).

ABA is the only intervention for autism endorsed by the United States Surgeon General (1999). In a recent (2016) press release, the American Psychiatric Association (APA) urged pediatricians to use autism screeners to facilitate early diagnosis of ASD, to facilitate early intervention services, and, in turn, to improve treatment outcomes for individuals with autism.

Building on the rich history and breadth of scientific literature in the field of ABA and ASD, this chapter will describe the process of ABA service provision for early intervention as well as various models of ABA service delivery in early intervention. Early intervention is generally defined as services available to children from birth to 5 years of age who are not meeting developmental milestones or who have developmental disabilities (Centers for Disease Control 2018). While ABA treatments are effective beyond early intervention for children with autism (National Autism Center 2015), this chapter will focus on ABA for early intervention in particular, due to the importance of early intervention and the impact early intervention can have on treatment outcomes. Later chapters will examine ABA technologies in other settings and across the life span of an individual with ASD. Thus, the goals of this chapter are to describe the service provision model of ABA for ASD treatment and to describe where and by whom these services are provided. Our aim is to describe, in part, how research in ABA has been put into practice, both in the types of services provided to children and in systems development to manage service implementation. Both ABA research and its translation into systems of care are crucial for high-quality early behavioral intervention for children with ASD.

Service Provision

Service provision in early intervention can be conceptualized as a six-part process. This process includes (1) referral for services, (2) consent/intake for services, (3) assessment, (4) goal setting, (5) treatment implementation, (6) progress monitoring, and (7) termination of services. Below, we describe methods, tools, and professional roles in each step of the process. Because this chapter focuses on early intervention, we will typically refer to the consumer of our services as “the client” or “the child.” In addition, because our clients are always minors, we will refer to parents, caregivers, and guardians frequently in the chapter but will use the term “parent” or “parents” to mean the legal guardian who is responsible for providing consent for treatment.

Referral

The process of service provision usually begins with a referral for treatment. During the referral process, the agency accepting the referral should gather general information about the child’s needs in order to determine if the agency’s behavior analysts

have the expertise to address the child's needs. This is usually accomplished through an initial conversation between a behavior analyst in a leadership position in the agency, such as a clinical director, and the child or the parent(s). Just as different medical professionals specialize in specific areas, behavior analysts also specialize in various presenting concerns and approaches. For example, some behavior analysts are well versed in addressing significant language delays and communication, while others have extensive experience and training working with delays in social skills or challenging behavior. While the principles of behavior remain the same across these different areas, specific knowledge of how these principles apply to these specialty areas is required for behavior analysts to practice within their boundaries of competence (Code 1.02, Behavior Analyst Certification Board 2014b). Behavior analysts should only accept as clients those individuals whose needed services correspond with the behavior analysts' education, training, and experience. The behavior analyst should consider their available resources and organizational policies as part of whether they can serve an individual (Code 2.01, Behavior Analyst Certification Board 2014b). For this reason, informal preliminary information about the client must be gathered before the consent and intake can occur.

Consent and Intake

Assuming parents wish to continue the process of initiating services with the behavior analyst after a behavior analyst determines it is within their scope of practice to serve the child, the next step is consent and intake. During the initial intake meeting, the behavior analyst should begin by describing the scope of services they will provide through the process of assessment and treatment. The behavior analyst should also provide the family with the parent/client handbook, as well as a service contract. The behavior analyst reviews the service contract with the family, paying special attention to the patient-provider relationship and appointment expectations. This is done to avoid future barriers to service provision. For many reasons, the patient-provider relationship can be confusing for families. For example, due to the nature of behavior analytic services, behavior analysts are often involved in many aspects of the client's life (i.e., daily living skills, healthy eating and sleeping behaviors, developmental milestones like talking and walking, enrollment in school programs). This close involvement with intimate aspects of the client's life can make professional/personal boundaries a bit unclear for parents. Healthy client-provider boundaries need to be established for the behavior analyst to make objective and unbiased decisions about treatment. Also, unlike other medical providers, behavior analysts provide treatment to a child for up to 40 hours per week; thus, behavior analysts have frequent contact with both the child and the family. Adherence to the treatment dosage relies on parents and other caregivers consistently bringing the client in for treatment, when treatment is delivered in a center. When treatment is delivered in the home, behavior analysts rely on parents to be home to allow the behavior analyst into the home. Early intensive behavioral intervention is a unique

treatment that may be unlike any other treatment(s) the family has experienced. As a result, a good deal of time needs to be spent describing the process and ensuring the family understands the services they are agreeing to participate in. After the behavior analyst has reviewed the service contract with the family, the behavior analyst typically allows time for the parents to ask any questions or raise any concerns they may have. When these have been resolved to both parties' satisfaction, both the behavior analyst and the parents sign the service contract (Code 2.12, Behavior Analyst Certification Board 2014b).

Next, the intake process typically begins and involves the behavior analyst gathering standard patient information, including medical history, as well as assisting the family in identifying their main concerns and goals for the child. During the intake, the behavior analyst also gathers information from the parents about the child's general demographics and current perceived level of language, daily living, and social skills. The behavior analyst then uses this information to identify what types of assessments (i.e., skills assessments or functional behavior assessments) need to be conducted to (a) address the family's concerns and (b) thoroughly evaluate the child's skill levels. Often, behavior analysts will include a consent document specific to the planned assessment as part of the initial intake packet. Similar to the service contract, the behavior analyst reviews the proposed assessment procedures with the family, allowing time for questions. If the family agrees to these proposed assessment procedures, the behavior analyst asks the parents to sign the consent document so that written consent to begin the assessment is obtained (Code 3.05, Behavior Analyst Certification Board 2014b).

If a later point in time, the behavior analyst determines additional assessment procedures are needed beyond those that they previously described to the parents, the behavior analyst obtains additional consents to conduct those assessments (Code 3.05, Behavior Analyst Certification Board 2014b). For example, if the initial consent provided permission for the behavior analyst to evaluate pre-academic, communication, and daily living skills (see below for a specific discussion of these assessments), but the behavior analyst observes significant problem behavior during the assessment, the behavior analyst may want to propose an additional assessment to evaluate problem behavior (see below for a specific discussion of this form of assessment). In cases where additional assessments are necessary, the behavior analyst discusses with the family what additional assessments will be conducted, how long the assessments will take, and what will be needed from the family to complete the assessments, checks for understanding, and obtains consent prior to conducting any additional assessments.

Assessment

After consent to assess has been obtained, the behavior analyst conducts comprehensive assessment to determine and formalize the goals of treatment. During this process, the behavior analyst identifies the child's strengths and weaknesses across a

variety of domains using various assessment methods (Code 3.01, Behavior Analyst Certification Board 2014b). Some methods include interviewing parents and reviewing records of the child's previous treatment efforts and assessments from other professionals, when applicable. However, directly observing child behavior and collecting data on those behaviors are the essential characteristics of ABA (Baer et al. 1968). Therefore, direct assessments conducted by the behavior analyst are the primary focus of the assessment process. There are a variety of assessments available to behavior analysts to determine the child's strengths and weaknesses. The assessments conducted may differ depending on the original reason for referral (e.g., skill acquisition, behavior reduction, or both). Broadly speaking, the assessments can be categorized into two classes: skills assessments and functional behavior assessments.

Skills Assessments Skills assessments may consist of daily living skills assessments, language assessments, and social skills assessments. One key deficit of ASD is a difficulty with communication (American Psychiatric Association 2013). Therefore, an important component of the initial assessment is an evaluation of the child's current communication skills. There are many different assessment tools behavior analysts use to evaluate communication skills. One commonly used language assessment in early intervention services is the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP; Sundberg 2008). Other commonly used skills assessments that focus on adaptive and social skills as well as language skills are the Assessment of Basic Language and Learning Skills – Revised (ABLLS-R; Partington 2006), Assessment of Functional Living Skills (AFLS; Partington 2012), and Promoting the Emergence of Advanced Knowledge (PEAK; Dixon 2014). All of these assessments are criterion-referenced assessments that assess basic language and functional skills for an individual. These assessments were developed by behavior analysts and are based on direct observations of child performances. Another commonly used assessment that evaluates adaptive skills is the Vineland Adaptive Behavior Scale (Vineland-3; Sparrow et al. 2016). Unlike the VB-MAPP, PEAK, ABLLS-R, and AFLS assessments, the Vineland is a norm-referenced assessment that is based on parent interviews and provides a measure of the child's personal and social skills in everyday living (Sparrow et al. 2016).

Behavior analysts may use one or more of the above assessment tools, as well as tools they have developed themselves, or even additional published assessment tools during the assessment process. A key component to a well-done assessment is that it must be comprehensive and thorough. For example, the VB-MAPP may provide the behavior analyst with an overview of a child's language skills, but it will not provide information about the child's daily living skills or social skills; additional assessment is needed to evaluate those skills. Multiple modes of assessment are required to obtain a thorough understanding of the child's skills. No one assessment can effectively address all areas of need for a child. A recent study found that the results of the VB-MAPP may not be reliable across behavior analysts (Montallana et al. 2019), perhaps due to the lack of standardized administration. Any assessment provides only a snapshot of the child's performance on the day the assessment is conducted. Assessments based on proxy report, such as the Vineland, may be biased and unreliable. In short, no single assessment, in and of itself, represents a comprehensive

representation of the child's skills. The behavior analyst must conduct multiple assessments and consider all available sources of information about the child, the strengths and limitations of that source of information, and how information obtained from these multiple sources converges to identify the strengths and limitations of the child's repertoires. At the end of the initial assessment process, the behavior analyst should understand not only the child's strengths and weaknesses across several domains, he or she should also understand the parents' concerns and overall goals for treatment.

Functional Behavior Assessment When a child is referred to a behavior analyst for treatment of problem behavior and/or if a child engages in significant problem behavior during the assessment process (or even later, during the treatment process), a functional behavior assessment (FBA) is warranted. An FBA is an information-gathering process for identifying the environmental variables maintaining problem behavior (O'Neill et al. 1997). FBAs typically consist of one or more of the following assessments: informant assessment, direct observation, and functional analysis (O'Neill et al. 1997; Rooker et al. 2015). Often, all three of these assessments occur in a stepwise fashion. Informant methods include gathering information about the problem behaviors through various formats such as interviews, rating forms, and surveys. One interview that is commonly used to gather information is the Functional Assessment Interview (FAI; O'Neill et al. 1997). After summarizing information from an interview or survey, a behavior analyst typically schedules direct observations at times when the problem behavior is likely to occur. During these observations, information is systematically collected on the antecedents (what happens before a behavior) and the consequences (what happens after the behaviors) of the target problem behavior, as well as the target behaviors themselves (O'Neill et al. 1997). After observing the target behaviors in this format, the behavior analyst develops hypotheses regarding what variables are most likely maintaining the behaviors. Finally, the last and most rigorous step in conducting an FBA is to conduct a functional analysis (FA). This involves directly manipulating the variables that are hypothesized to be maintaining the problem behaviors and observing their effects on problem behavior (e.g., Iwata et al. 1982/1994). During an FA, behavior analysts track the occurrence of problem behaviors under a variety of conditions in which specific antecedent and consequence events are manipulated. At the conclusion of an FBA, the behavior analyst usually has a good understanding of the environmental variables related to the child's problem behavior, which will allow the behavior analyst to develop an effective treatment for problem behavior. (For a more thorough and in-depth description of the FBA process, please refer to Peterson and Neef 2019.)

Goal Setting

After the initial skills and/or functional behavior assessments have been conducted, the next step is to identify treatment goals for the child and their parents. Goals should be based on the findings from the initial assessments and should be important—that is, socially significant—to the child and their parents (Baer et al. 1968;

Code 2.09, Behavior Analyst Certification Board 2014b). This means treatment goals should focus on increasing the overall quality of life for the child and his/her family and promoting independence. In other words, the behavior analyst considers both the assessment data collected from the formal assessments and the child's personal goals and values, along with the family's goals and values. Thus, determining goals for treatment is a joint process between the behavior analyst, care providers, and possibly the child. This allows the child and family to have an active role in treatment planning and provision.

When selecting goals for treatment, the behavior analyst should consider the new repertoires that the child needs to learn. The behavior analyst pinpoints the critical skills that need to be taught at the beginning of instruction (Vargas 2009). Goals should not be selected because the skill primarily benefits others (Cooper et al. 2019). Rather, it is important that the skills targeted are important to the child and family. Behavior analysts refer to skills as having "social significance" if they will improve a person's life experience. Because it is often difficult to determine how a particular change in behavior will impact a person's life experience, Cooper et al. (2019) suggest several key questions behavior analysts can ask to determine social significance. For example, the behavior analyst should consider whether the behavior targeted is a necessary prerequisite for another useful skill, whether the behavior targeted for improvement will increase the child's access to other environments where other important skills can be learned, and whether an improvement in the target behavior will enable others in the child's life to behave in a manner that is beneficial to the child.

Often, a child will have several goals. The behavior analyst may need to prioritize with the parents which goals are most important to address first. This is a complex task that involves carefully considering behaviors targeted for improvement. Considerations might include whether (1) the target behavior is dangerous to the child or others, (2) the client will have many opportunities to display the target behavior, (3) the target behavior is a chronic problem or only a recent development, (4) the behavior targeted will produce high rates of reinforcement for the child, (5) the target behavior will enhance future skills development and independent functioning, (6) the target behavior will reduce negative or unwanted attention from others, (7) the target behavior will be reinforcing for significant others, (8) there is likelihood for success in changing the behavior, and (9) the amount of time and effort required to change the behavior (Cooper et al. 2019).

Goals are then written in measurable and observable terms. They should specify the behaviors that are expected of an individual, the contexts under which the behaviors should occur, and the criteria or standards by which one determines when the goal has been met (Sulzer-Azaroff and Mayer 1991). One very effective way to write treatment goals uses the following format: "Given what, who, will do what, how well, how many times, as measured by what" (Lignugaris/Kraft et al. 2001). For example, if after conducting a VB-MAPP, it is determined that the child needs to work on labeling items, the behavior analyst might write the following goal: "Given the presence of an item and the question 'What is it?,' Sarah will correctly state the name of the item in at least 80% of opportunities presented to her, for 5 consecutive days with at least 2 different therapists as measured by percentage of correct opportunities by a therapist."

When considering the criteria for successful completion of a goal, the behavior analyst considers multiple factors. It is important that children learn to perform a skill correctly. For example, if Anthony is learning to brush his teeth, he needs to get his toothbrush (not his brother's), put toothpaste on the bristles (not on the handle), and put the toothbrush in his mouth (not in his pocket). However, it is also important that Anthony perform this skill fluently (i.e., smoothly and effortlessly) and that he generalize the skill across multiple environments (i.e., at home, at his grandparents' house during a sleepover, and in a hotel when the family is traveling, not just at the treatment center, where the skill is, perhaps, being taught). Goal statements should reflect not only building skill accuracy but should also involve teaching for fluency and generalization (Vargas 2009).

After the treatment team (behavior analyst, child, and parent) has selected and prioritized the goals for treatment, the next task of the behavior analyst is to determine the amount of time it will take for the child to obtain the skills targeted in treatment. Unlike many other areas of treatment, therapies based on ABA are typically implemented on a daily basis over a long period of time. This implementation can be done more (many hours a week) or less intensively (a few hours a week). The behavior analyst estimates the dose of treatment (i.e., hours per week) necessary for the child to benefit from the treatment. Since the initial Lovaas (1987) study, most of the research on early intervention for children with autism supports 30 to 40 hours of ABA therapy (Eldevik et al. 2006; Eldevik et al. 2012; Howard et al. 2014; Linstead et al. 2017). However, many factors influence how many hours of service are recommended. First, behavior analysts consider the pattern of skill deficits. For example, if a child has social skill deficits but has scored at or above average for all other domains on initial assessments, intensive treatment may not be appropriate. Instead, the child may benefit from focused treatment to address social skills. Second, family resources and context play a major role in determining intensity as well (Code 2.09, Behavior Analyst Certification Board 2014b). For example, if a family cannot commit to the full recommendation of hours, the behavior analyst must determine if the child can still make meaningful gains and, thus, benefit from the hours of treatment to which the family can commit. If fewer hours are agreed upon, revision of goals and the treatment plan may be necessary. Further, progress monitoring should occur regularly to determine if the lower intensity is resulting in a socially significant change. Thus, when making a recommendation on treatment intensity, the behavior analyst must consider the supporting research literature, the goals of the treatment plan, parent resources, and any current data on the effectiveness of treatment.

Treatment

Consent for Treatment Before beginning treatment, behavior analysts must again obtain consent from the parents of the child (Code 4.02, Behavior Analyst Certification Board 2014b). Not only is consent for treatment required (Codes 4.02 & 4.04, Behavior Analyst Certification Board 2014b), it is the responsibility of the

behavior analyst to clearly explain to care givers the treatment procedures (Code 4.05, Behavior Analyst Certification Board 2014b), the conditions required for success (Code 4.06, Behavior Analyst Certification Board 2014b), and environmental conditions that may interfere with treatment implementation (Code 4.07, Behavior Analyst Certification Board 2014b). Parents of children with ASD play an immensely important role in their child's treatment success, and it is very important that they collaborate in treatment planning. Interventions implemented in clinical settings with children with ASD are only socially valid when the skills taught generalize to other settings (e.g., the home) and to those who interact with the child the most (Van Houten et al. 1988). Collaborating with parents, caregivers, and other stakeholders and involving them in the treatment planning process is often the best way to ensure this success (Slocum et al. 2014).

Approaches to Treatment After a behavior analyst has completed the assessment process, identified treatment goals, and recommended hours based on goals to be taught, the next step is to decide which treatment procedures should be used to teach those goals. There are a variety of evidence-based treatment options available for treating children with ASD. We will describe some of them below. All evidence-based treatments in ABA are based on the principles of behavior and operant conditioning. All treatments described below involve the careful arrangements of three-term contingencies or specific antecedent-behavior-consequence (A-B-C) relations. The careful arrangements of these environmental relations are critical for learning. Treatment selection is tailored to the specific needs and individual characteristics of each child and the settings in which the child lives and learns. We can conceptualize the available treatments as a continuum that ranges from very highly controlled and contrived procedures to relatively uncontrolled and naturalistic procedures. When considering each individual's unique situation, some treatment modalities will be better suited than others to the needs of the child and the overarching context of the setting in which the child operates. None of the strategies we describe are necessarily better than another. Rather, different strategies may be more or less appropriate for different learners in different contexts and at different points in time. It is imperative for the behavior analyst working with families to examine the results from the assessments they have conducted and consider child and parent values and preferences when selecting the appropriate teaching procedures (Code 2.09c, Behavior Analyst Certification Board 2014b). The good news is that behavior analysts have a number of effective treatment options from which to select, including but not limited to discrete trial training, natural environment teaching, incidental teaching, pivotal response training, milieu teaching, reciprocal imitation training, chaining procedures, and explicit instruction (National Autism Center 2008, 2015).

Discrete Trial Training (DTT) Discrete trial training (also called discrete trial teaching) is a highly structured, one-on-one, teaching procedure that focuses on teaching single units of behavior. Initially developed by Lovaas (1981), DTT involves a series of discrete trials, each of which includes five components: (1) the presentation of a cue or discriminative stimulus (S^D) (the antecedent condition), (2)

a response prompt (which demonstrates the correct response) if needed, (3) a target response (the behavior of the child), (4) a reinforcing consequence (contingent on correct responding), and (5) a specific intertrial interval (period of time post consequence before the next discrete trial is implemented) (Smith 2001; Steege et al. 2007). For example, when teaching a child to receptively identify a picture of a dog, first, the S^D is presented by the behavior analyst (e.g., says, “point to the dog”). If the child does not point to the dog, a prompt is added immediately after the S^D (e.g., behavior analyst says, “point to the dog,” while modeling the correct response by pointing to the picture of the dog). When a child makes a correct response (i.e., points to the dog), a reinforcer (e.g., a favorite toy) is delivered, and the intertrial interval (i.e., short break before the next trial) begins. In DTT, teaching sessions are therapist-led, use therapist-chosen teaching materials, apply tightly controlled prompting and reinforcement procedures, and often use contrived reinforcers. DTT is effective for teaching a variety of basic skills, such as attending to the teacher or relevant stimuli in the environment or requesting specific desired items, that are required for more complex learning, such as attending to the teacher or relevant stimuli in the environment or requesting specific desired items. For many children, basic skill acquisition requires extensive repetition across multiple exemplars. DTT is commonly used because it provides multiple opportunities to practice the target skill, includes tightly controlled and consistent teaching procedures, occurs in a distraction-free environment with minimal stimuli, and provides reinforcers immediately following the child’s response so the child gets immediate performance feedback. DTT is ideal for skills that require repetition and do not involve inherently reinforcing consequences (Weiss 2005). In addition to being endorsed as an established evidence-based treatment by the National Standards Report (National Autism Center 2008, 2015), a variety of single-subject studies (see LeBlanc et al. 2014 for a review) and control group comparison outcomes studies (see Lerman et al. 2016 for an overview) demonstrate DTT’s effectiveness.

The evidence supporting DTT highlights its clear utility as an early intervention treatment, and, thus, it is frequently used in autism treatment. In fact, DTT is so commonly used in autism treatment that many people equate ABA with DTT. However, it should be noted that ABA and DTT are *not* synonymous. DTT is only *one* potential component of a comprehensive behavioral curriculum. ABA is a much broader set of principles and technologies for teaching and analyzing behavior. While DTT has been used effectively to teach a variety of discrete skills, it is not well suited to teaching all skills. For example, some skills require multiple steps that naturally occur sequentially (Steege et al. 2007), such as brushing one’s teeth, following a recipe, and taking a shower. These kinds of skills are not necessarily “discrete” and, therefore, do not lend themselves well to DTT. An additional limitation of DTT involves maintaining motivation. Because contrived reinforcers are often utilized and teaching is almost always therapist-led, children may lack motivation to perform the skill being taught, either during treatment sessions or outside of treatment sessions in contexts where the skill is needed. “Contrived reinforcers” refers to reinforcers that are not natural consequences of a given behavior. For example,

the natural consequences for a child making eye contact with a communication partner might be the child seeing the communication partner's facial reactions to what the child is saying or seeing the communication partner look back at the child, indicating they are attending to what the child is saying. For many children with ASD, at least initially, these natural consequences for eye contact may not function as reinforcers (they may actually be punishing). Thus, a contrived reinforcer, such as an edible item or access to a preferred toy, may be provided contingent on eye contact within DTT to motivate the child to engage in the behavior. Recall that DTT involves frequent teaching trials in a short period of time. This may result in the child receiving the reinforcer multiple times and then tiring of the reinforcer. When a child tires of a reinforcer, there is less motivation to engage in the target behavior, and, thus, it may be less likely to occur. Also, given the highly controlled context of DTT, sometimes skills do not generalize to the actual context in which the skill is needed. Another problem with DTT can be the lack of maintenance of the skill in natural settings when the contrived reinforcer is not present. For skills to be maintained and generalized beyond the DTT context, specific generalization programming is often needed (Brunner and Seung 2009; Smith 2001; Sundberg and Partington 1998). Because of these limitations with DTT, many behavior analysts also include more naturalistic teaching processes in autism treatment along with or in lieu of DTT.

Natural Environment Training (NET) NET is a general term for multiple naturalistic treatment approaches that address limitations of DTT while maintaining the fundamental behavior analytic strategies. Generally, NET approaches share the following commonalities: (a) teaching occurs in the natural environment (i.e., the location where the target response is expected to occur), (b) instruction is child-directed and materials used are child-selected, (c) broader rather than discrete skills are targeted, (d) prompting and reinforcement procedures are applied more loosely, and (e) natural reinforcers are used as consequences (Dufek and Schreibman 2014; Pindiprolu 2012; Weiss 2005). For example, let us consider the example of a child learning to expressively identify dogs. When taught in an NET framework, the behavior analyst practices this target skill only when the child shows interest in dogs (e.g., reaching for a dog puzzle, a dog stuffed toy, pointing at an actual dog, etc.). The behavior analyst might arrange the environment ahead of time to contain a variety of preferred dog toys, to create the opportunity for teaching. Teaching is initiated when the child shows interest in these items. For example, the behavior analyst might say, "What's that?" If the child says, "dog," the behavior analyst then gives the child the dog (natural reinforcer) and plays with the toy dog and child. The behavior analyst might also say things like, "Dogs say 'woof woof!'" to loosely prompt additional skills development.

NET has a broad research base supporting its use and has been endorsed as an established evidence-based treatment by the National Standards Report (National Autism Center 2008, 2015; Pindiprolu 2012). A variety of teaching procedures are conceptualized as NET, including incidental teaching (IT; Charlop-Christy and Carpenter 2000; Charlop-Christy 2008; Hart and Risley 1968, 1974, 1980), milieu

teaching (MT; Brunner and Seung 2009; Dufek and Schreibman 2014; Hancock and Kaiser 2002), pivotal response training (PRT; Cadogan and McCrimmon 2015; Koegel and Kern Koegel 2012; Weiss 2005), and reciprocal imitation training (RIT; Dufek and Schreibman 2014; Ingersoll and Schreibman 2006). A variety of these procedures have been modified further to fit specific learning needs, such as modified incidental teaching sessions (MITs; Charlop-Christy and Carpenter 2000), enhanced milieu teaching (EMT; Goldstein 2002; Hancock and Kaiser 2002; Mancil et al. 2009), and prelinguistic milieu teaching (PMT; Franco et al. 2013). While all of these procedures include the base components of NET, they vary in terms of the types of skills they target, the level of structure involved, and the specific procedures utilized.

Research comparing NET and DTT suggests that NET may address many of the limitations of DTT. However, NET is not without limitations. Many NET approaches rely on children having prerequisite skills in their repertoires, such as the ability to initiate communication, scan for items in the environment, attend to stimuli in the environment, and interact with toys in the environment. When children lack these skills, DTT may be necessary to develop them. NET may also take more time to acquire treatment gains compared to DTT, although NET has been found to produce better generalization and maintenance outcomes in the natural environment (Charlop-Christy and Carpenter 2000; Ghezzi 2007; Goldstein 2002; Weiss 2005).

Chaining There are a variety of important and complex daily living skills that are not well suited for either NET or DTT treatment approaches (Steege et al. 2007). Many functional/daily living skills involve two or more responses that occur in a sequence creating a behavior chain and are not easily taught using NET or DTT. For example, personal care, eating, and toileting skills are all skills that consist of a series of discrete responses that must occur sequentially to complete the behavior (Miltenberger 2016; Steege et al. 2007). To teach a behavior chain, a behavior analyst creates a task analysis that breaks complex skill into smaller components. This is often accomplished by watching someone else complete the complex skill. Alternatively, the behavior analyst might complete the skill and make note of the steps taken while doing so. In either case, the behavior analyst records each step as it is executed. For example, if a behavior analyst is going to teach a child to wash their hands, the behavior analyst begins by observing another child wash their hands and recording all of the steps involved. It should be noted that there are some “standardized” task analyses available to behavior analysts for some skills. However, it is important that the behavior analyst write task analyses that match the child’s culture, setting, skills, etc. Thus, behavior analysts are cautious about using “standardized” task analysis and always individualize the task analysis to specifically match the child’s needs.

After the component skills of the complex behavior chain are identified, prompting is used to teach the sequence of behaviors, otherwise known as a behavior chain. The types of prompts used may include verbal, gestural, model, or physical (see Cooper et al. (2007) and Miltenberger (2016) for a description of prompting procedures). Behavior chains can be taught using a forward, backward, or total task

chaining procedure. In forward chaining, the initial response in the sequence is taught first, until it is completed independently. At this point, the second response is taught, and the child must complete both the first and second responses in the chain (Cooper et al. 2007; Miltenberger 2016; Page et al. 1976). Reinforcement is delivered after successive responses are made (i.e., chained schedule of reinforcement), and the first response in the chain is practiced every time.

Backward chaining is conducted in a very similar manner as forward chaining; however, as the name indicates, teaching starts with the last response in the chain, and as responses are mastered, the next to last response is taught, and so on. An advantage of backward chaining is that the reinforcer is always delivered at the end of the chain, and the final response in the chain is practiced during every trial (Cooper et al. 2007; Miltenberger 2016). One benefit of backward chaining is that when chains result in a natural reinforcer (e.g., shoelaces are tied; snack is ready to be eaten), the natural reinforcer can be used in teaching.

A final chaining method, total task presentation, involves teaching the entire chain during each session. The behavior analyst uses prompting, only as necessary, to prompt all responses in the chain. Total task chaining is an effective procedure for relatively simple chains or chains that are partially developed, such as when the child is able to successfully complete some but not all of the steps in the sequence (Miltenberger 2016; Test et al. 1990). Video models (Domire and Wolfe 2014), visual or picture prompts (e.g., Phillips and Vollmer 2012; Wacker et al. 1985), and self-instruction (e.g., Mechling and Gast 1997) teaching procedures have been successfully blended with chaining procedures. Research on task analysis and chaining procedures suggest they are effective in teaching a variety of functional and daily living skills (Edwards et al. 2018; Matson et al. 1990; Matson et al. 2012; Slocum and Tiger 2011; Test et al. 1990).

Direct Instruction (DI) Thus far, we have discussed teaching procedures that are typically used in one-on-one teaching situations. However, some skills are best learned in group instruction. Group instruction requires a different treatment approach than one-on-one therapy. Explicit instruction is an umbrella term that refers to a variety of instruction procedures that are direct, systematic, and effective approaches to teaching (Archer and Hughes 2011). Direct instruction is a specific example of explicit skill instruction. It is explicit in that the behavior analyst clearly tells the children what behavior is expected or demonstrates how to perform the skill. Then, the children engage in the skill with the behavior analyst, and, finally, they are prompted to perform the skill independently. Throughout this teaching sequence, explicit feedback is provided on the correctness of each response. Instruction is fast-paced and provides many opportunities for children to respond. Not only can direct instruction be used to teach academic skills, it also provides an opportunity to teach children how to respond in group contexts, such as school settings. Group instruction also maximizes resources in situations where one-on-one instruction is not possible. Direct instruction has been used effectively to teach children with ASD a variety of skills including oral language skills broadly (Shillingsburg et al. 2015), specific language skills (Ganz and Flores 2009), reading comprehen-

sion (Finnegan and Mazin 2016), and “wh” questions (Cadette et al. 2016), among others.

While the teaching procedures described above do not include all options within the field of ABA, they are some of the most commonly used with children with ASD in early intervention (for a complete list of teaching procedures that meet rigorous research and practice standards for effective interventions, please refer to the National Standards Project 2015). Behavior analysts select the most appropriate procedures and interventions that fit the contextual variables present for each client (Code 4.03, Behavior Analyst Certification Board 2014b).

Progress Monitoring

Irrespective of the treatment implemented for any given individual with autism, the behavior analyst must monitor the effects of treatment. Progress monitoring is a form of continued, ongoing assessment aimed at determining whether the treatment produces desired changes in the targeted behaviors (e.g., reductions in problem behavior, acquisition of specified skills). If the treatment produces improvements in skills and behaviors, progress monitoring will document these improvements and signal the need for additional assessments to determine the next skills to target for treatment. If treatment is not effective, progress monitoring signals that the behavior analyst needs to investigate why the treatment is not working, and changes in the treatment may be warranted. Further, the behavior analyst defines “effective” as changes in the target behavior that are significant enough to make a positive impact on the individual’s quality of life (Baer et al. 1968; Code 2.09 Behavior Analyst Certification Board 2014b).

Monitoring Client Behaviors Progress monitoring consists of operationally defining the behaviors targeted for improvement or reduction; identifying a data collection system that can be used to measure both pretreatment levels of the target behavior and during- and posttreatment levels of target behavior; producing graphs that depict ongoing measures of the targeted behaviors; visually analyzing these graphs; and making data-based decisions regarding the continuation, modification, or discontinuation of treatment strategies (Vargas 2009). Frequent (e.g., daily) measures of all target behaviors are taken, and the behavior analyst maintains close, continual contact with these measures so that treatment decisions can be made in a timely fashion (Mayer et al. 2012; Vargas 2009).

The behavior analyst must be concerned with several aspects of the target behaviors to determine if the intervention has been “effective.” With respect to skills targeted for improvement in the treatment plan, the behavior analyst measures initial acquisition of the skill. Recall when discussing goal selection above that the behavior analyst must consider more than whether the child has shown initial mastery of the skill by completing it accurately. The child must also demonstrate fluency and

generalization of the skill for it to have been mastered. In addition to being performed correctly, the skill must also be performed quickly and smoothly. For example, the behavior analyst might teach Samantha to tie her shoelaces. Samantha may be able to perform all of the steps correctly, but it may take her 5 min to tie one shoelace. After the skill has been acquired, the behavior analyst targets fluency. Samantha might need to build speed so that she ties shoelaces quickly and smoothly. The skill must also occur in a variety of situations and contexts. In other words, the skill must be maintained over time and generalized to multiple environments. For example, if Samantha gets a new pair of shoes (different from the shoelaces she learned to tie) and is able to tie the laces without any further instruction, generalization has occurred. If Samantha can tie her shoelaces at home, at her grandmother's house, and in the shoe store, then generalization has occurred. Only when a skill is performed accurately and fluently and is maintained and generalized can it be considered mastered. Thus, progress monitoring must include measures of skill accuracy, fluency, maintenance, and generalization. If treatment meets benchmarks for all four measures, only then can the behavior analyst say that the treatment was effective (Baer et al. 1968).

When problem behaviors are targeted for reduction, treatment often involves teaching replacement or other adaptive behaviors using some of the strategies described above. Thus, behavior analysts consider acquisition, fluency, maintenance, and generalization of those targeted replacement behaviors, as described above. As replacement behaviors increase, the behavior analyst also monitors whether the behaviors targeted for reduction simultaneously decrease. When decreases are observed, the behavior analyst assesses whether reductions in problem behavior are durable over time and across contexts. Just as initial demonstrations of replacement and adaptive behaviors are not a sufficient measure of skill acquisition, steady and clinically important reductions in problem behavior are not sufficient for determining effectiveness of problem behavior treatment. Reductions in problem behavior must be shown to be durable over time, even in the face of challenges to treatment, if behavior analysts are to consider treatment a success (Wacker et al. 2017). For example, consider a child who punches peers with a closed fist, and the behavior is reliably followed by adult attention. The treatment implemented might consist of teaching the child to request adult attention using a picture exchange communication system. When the child approaches an adult and places an "attention" icon in the adult's hand to request attention, the adult provides enthusiastic attention (i.e., reinforced the attention request). At the same time, when punching occurs, the adult ignores the child for a brief period of time (i.e., places punching on extinction). Let's assume this treatment works as long as the adult provides immediate attention when the child approaches with the picture card. But what if the adult is busy when the child approaches with the card? What if the child must wait 5 or 10 s before attention is delivered? If problem behavior begins to occur in this context (i.e., a challenge to treatment), then treatment cannot yet be considered a success. Data such as these suggest that treatment effects depend on specific conditions in the environment (in this case, immediacy of reinforcement delivery). The treatment cannot be considered complete if the target behavior only occurs under these

specific conditions (Volkert et al. 2009). Treatment that produces initial positive effects should continue until problem behavior does not return when a challenge is introduced. Repeated probes to determine whether challenges to treatment result in maintenance of the newly taught replacement behaviors or reoccurrence of problem behavior can be conducted to evaluate the effectiveness of treatment and when it can be discontinued safely (Wacker et al. 2017).

Monitoring Therapist Behaviors During progress monitoring, it is important to measure not only child behavior but also therapist behavior. In early intervention, the “therapist” is often a trained behavior technician, a school paraprofessional, or even the parent (more information on these roles will be described below in the section on *Models of Service Delivery*). Specifically, it is important to measure the extent to which the therapist implementing treatment is doing so with fidelity (Code 5.03, Behavior Analyst Certification Board 2014b). That is, is the therapist implementing the treatment according to how the treatment was described and intended? Whenever therapists implement procedures, they may make implementation errors (DiGennaro et al. 2005; Noell et al. 2000; Wilder et al. 2006). There may be omission errors (e.g., failing to implement a specific element of a treatment at a given time, such as failing to deliver a reinforcer contingent upon a correct response) or commission errors (e.g., incorrectly implementing an element of the treatment, such as delivering a reinforcer for a behavior when the reinforcer should have been withheld). These commissions and omissions have been shown to decrease treatment efficacy (Pipkin et al. 2010). Errors in treatment fidelity can be viewed as challenges to treatment, as described above. For a variety of reasons, it is important that the behavior analyst measures these kinds of issues during treatment implementation to determine (a) if treatment errors are responsible for treatment failure and thus to determine if staff training is needed to produce positive treatment effects, (b) if treatment is not effective despite flawless implementation and, thus, further assessment and evaluation is warranted, or (c) if treatment must continue for a longer time to produce durable effects (Code 2.09, Behavior Analyst Certification Board 2014b; Moncher and Prinz 1991).

Another therapist behavior that is important to measure during progress monitoring is how accurately the therapist is recording child responses to the treatment. Accuracy in data recording is paramount to making good decisions about the effectiveness of treatment (Code 3.01b, Behavior Analyst Certification Board 2014b). Inaccurate data can lead to poor decisions about whether to continue with, modify, or discontinue treatment (Taber-Doughty and Jasper 2012; Cooper et al. 2007). One of the greatest threats to data accuracy is human error (Johnston and Pennypacker 1993; Cooper et al. 2007). For example, a therapist may not collect data in accordance with the data collection procedures designed by the behavior analyst. To determine whether data are being collected consistent with the data collection procedures prescribed and whether the measures are accurate (i.e., counted correctly in accordance with the operational definition created by the behavior analyst), the behavior analyst collects measures of interobserver agreement. Interobserver agreement is a measure of how well the observations of two independent observers are

consistent with one another (Cooper et al. 2007). Interobserver agreement measures should be taken frequently and intermittently throughout treatment and across all behaviors targeted for intervention (Vollmer et al. 2008). If interobserver agreement scores are high, then the data collected might be considered representative of the client's behavior. If interobserver agreement scores are low, the assessment results are considered invalid, and judgments about treatment effectiveness might not be possible.

Evidence-based practice in ABA means selecting the best available evidence that applies to the child's context and measuring the individual effects of that treatment toward producing meaningful, socially significant changes (Slocum et al. 2014). Progress monitoring allows the behavior analyst to determine whether or not the treatment selected is, indeed, producing meaningful and socially significant change. When treatment has been implemented reliably and consistently enough to produce meaningful and durable improvements in child behavior, the behavior analyst may determine it is time to move on to new goals and objectives. At some point, the time may come when the child has met all appropriate goals and objectives and, thus, is now performing at a level comparable to peers. At this point, the behavior analyst may terminate services and transition the child to the usual, developmentally appropriate services, provided by teachers and daycare staff, for example.

Termination of Services

The goal of any ABA treatment is to meet socially significant goals and fade treatment, thus reaching a point where the client no longer needs services (Codes 2.15d & 4.11, Behavior Analyst Certification Board 2014b). Early intervention treatment goals focus on teaching children socially significant skills that will maintain and generalize across a variety of settings, not the least of which are the child's home and classroom. As a result, parents, who are with the child in the home environment, are key players in the treatment process. Parent training, then, is a key element of behavior analytic services. Parent training gives parents the skills to promote learning, generalization, and maintenance of behavior across environments. Therefore, from the onset of services, behavior analysts plan for discharge and transitioning from treatment.

Transition Plans The termination of early intervention services does not mean the termination of support for clients and their parents (Codes 2.15d & 2.15e, Behavior Analyst Certification Board 2014b). The goal of early intervention services is to reach a point where children can actively participate in and contribute to community settings, such as their typical school setting. As such, planning for the transition from early intervention services to the next environment, whether that is a general or special education classroom, involves outlining the supports the child will need in those environments to be successful (Fox et al. 2002). A transition plan is a written plan the behavior analyst creates for the child, based on the strategies that were

effective during early intervention. This plan should be individualized according to each individual child's needs. Behavior analysts systematically outline the strategies and treatment plans they have identified as successful in helping the child perform learned skills in the new environment. Suggested strategies may include modifying assignments, altering the physical arrangement of the classroom, or modifying the child's schedule (Fox et al. 2002). The behavior analyst might also suggest strategies for presenting new material to the child, reinforcement strategies that have been effective in the past, prompting strategies that have been effective in the past, and the like. One of the seven dimensions of ABA is that it is "technological" (Baer et al. 1968). With respect to transition planning, this means that behavior analysts write transition plans with enough detail that any individual can implement them with consistency (Baer et al. 1968). Therefore, behavior analysts ensure that their transition plans are thorough and detailed enough for the transition team to understand and implement.

Often, as a child transitions to a new environment, there are individuals who will be working with the child for the first time. The child may be relatively unknown to these individuals and vice versa. For example, if the child is transitioning to a kindergarten classroom, there will be a teacher and possibly teaching assistants who will interact with the child. These individuals may not have as much information about and knowledge of the child as the behavior analyst has, because the behavior analyst likely has a longer history of interacting with the child. It is often helpful for the parents to request a meeting between the classroom teacher, teaching assistants, school administration, and the behavior analyst to discuss the transition plan created by the behavior analyst.¹ At this time, the behavior analyst reviews the recommended transition strategies and offers to provide the teacher and teaching assistants with training on strategies found to be helpful for the child. If a child is transitioning to a special education classroom, the child will have an Individualized Education Plan (IEP) provided by the school. Similarly, children receiving special education services simultaneously with early intensive behavioral intervention will have an Individualized Family Service Plan (IFSP) provided by the school system. Both of these plans can also include transition services. Holding a meeting with the parents, school personnel, and the behavior analyst can be an excellent opportunity for the behavior analyst to collaborate with school personnel on a transition plan. Chief among discussion points in such a meeting is a discussion regarding the roles and responsibilities each party may have in ongoing support for the child. The behavior analyst understands the importance of establishing a collaborative relationship with school personnel, as the school is their "turf." As such, the behavior

¹While the behavior analyst could request this meeting, the school may find this intrusive. In our experience, this request is better coming from the parents, as it communicates the parent's expectation that the school will collaborate with the behavior analyst. We have found that some school personnel are less likely to be receptive to the behavior analyst "pushing into" the school, perhaps due to perceived confidentiality issues, than if the parent initiates the meeting request.

analyst must be invited into that environment in order to have a meaningful role in helping the child transition to that environment.

Parent Involvement Raising a child with ASD can be challenging and stressful for parents (Strauss et al. 2012), and termination of early intervention services is a stressful life transition. Empowering parents to support their child's behavioral goals is an important goal of treatment. In addition to writing goals for the child, behavior analysts often write measurable goals for parents (Behavior Analyst Certification Board 2014b). Helping parents feel confident and empowered involves many caregiver skills that require active engagement in treatment sessions (as opposed to simple observation of professionals working with their child). Parent engagement includes parent implementation of the interventions that have shown to be successful during treatment. Behavior analysts then must train parents to implement these interventions with effective and evidence-based training strategies, such as behavioral skills training and coaching (Postorino et al. 2017). Parent implementation ensures that the skills that are mastered in treatment sessions are maintained and generalized to natural settings in the absence of the therapist.

In addition to training parents to implement the interventions carried out during treatment, behavior analysts must also teach parents the basic principles of the science of behavior. Promoting parents' understanding of behavior management facilitates a sense of empowerment and confidence in applying these strategies to any new challenge that will inevitably arise in their child's life after treatment (Dillenburger et al. 2002). During early intervention services, it is not possible to anticipate, program for, and tackle every challenge that will come up in a child's life. Additionally, transitions—such as those from childhood to adolescence—will bring novel challenges. Therefore, parent training should focus on teaching the basic principles of behavior so that parents can analyze any situation and independently identify the supports their child will need and the strategies they could use to help their child overcome that challenge. Further, by teaching parents how to identify behaviors for change, strategies for changing those behaviors, and ways to measure the effects of those strategies, behavior analysts are empowering parents to be the best advocates for their child across all settings. Ultimately, teaching parents these skills will equip them with the tools to help their child succeed in life (Dillenburger et al. 2002).

Thus far, we have described what ASD treatment looks like, from intake to termination of services. As described, this is a complex process that involves many hours of service delivery. Next, we will discuss the variety of places where intervention can be implemented and the roles of those who implement services. These are important components of the ASD treatment service delivery model. Again, because of the intensity of treatment, the location of service delivery and the number and type of service providers differ from other healthcare domains.

Clinical Roles and Location of Service Delivery

Clinical Roles in Early Intervention

Most agencies that provide ABA services incorporate some form of a tiered service delivery model. This model often includes a Board Certified Behavior Analyst – Doctoral™ (BCBA-D™), a Board Certified Behavior Analyst® (BCBA®), sometimes a Board Certified Assistant Behavior Analyst® (BCaBA®), and very often a number of Registered Behavior Technicians® (RBT™). For more information on these credentials, please refer to the Behavior Analyst Certification Board’s website at www.bacb.com.

BCBA/BCBA-D BCBA and BCBA-Ds are responsible for all aspects of clinical decision-making for a child. This includes being deeply familiar with child’s needs, being fluent in implementing treatment plans and teaching others to implement them, monitoring treatment effectiveness, monitoring treatment integrity, providing parent training, and supervising RBTs in implementing treatment plans (Behavior Analyst Certification Board 2014a, c, 2019b). The primary difference between BCBA and BCBA-Ds is that BCBA-Ds have acquired doctoral training in behavior analysis. BCBA-Ds often have deeper and more specialized training than BCBA and, thus, may be able to provide consultation on more challenging cases. BCBA-Ds often serve in leadership roles in ABA agencies, whereas BCBA are more directly involved in ongoing treatment planning and decision-making for clients served by the agency.

BCaBA The primary role for a BCaBA is to assist BCBA in case management duties, including measuring treatment fidelity, updating graphs and treatment reports, and providing training for RBTs. Depending on the setting, a BCaBA can be a resource that allows a BCBA to carry a higher case load.

RBT The primary role of an RBT is to directly implement skill acquisition or behavior reduction procedures. In other words, the RBT is often the front-line staff implementing the treatment plan that the BCBA has written. RBTs also collect data, graph progress, and maintain organization of the client’s file per the supervising BCBA’s instructions.

Supervision This tiered model of service delivery requires that some members of the treatment team supervise other members of the treatment team. BCBA-Ds often supervise the BCBA informally, while BCBA supervise the RBTs in a highly formalized manner. BCaBA may also supervise RBTs in their work. BCaBA also receive supervision from BCBA. Critchfield (2015) indicated that a successful practitioner is identified by the success of their clients. In the realm of supervision, behavior analysts can conceptualize themselves as having two clients: the child requiring services and their supervisees. A behavior analyst’s success as a supervi-

sor is measured by the success of their supervisee(s), which in turn is measured by the child's success progress toward goals.

The Behavior Analyst Certification Board has identified ethical obligations for supervisors and outlined supervision guidelines (Behavior Analyst Certification Board 2012, 2014a, c, 2019b). Additionally, several researchers have identified the specific components of ethical-effective supervision (Brodhead and Higbee 2012; Sellers et al. 2016). Still others have developed supervision models and tools for practitioners (Hartley et al. 2016; Turner et al. 2016; Garza et al. 2018). Supervision research has provided the field with substantial knowledge on recommended supervision practices. Just like treatment varies individually for a child, interactions within the supervision context vary depending on the specific needs of the supervisee. Thus, it is critical that behavior analysts functioning as supervisors be fluent in effective supervision practices and remain transparent throughout the entire supervision process, following the same guidelines for consent, assessment, and treatment that they follow for their early intervention clients (Codes 5.01–5.07, Behavior Analyst Certification Board 2014b). This means behavior analysts assess, either in a contrived or naturalistic manner, their supervisee's current skill level to determine where to actually begin the supervision process. When initial skills are mastered and the supervisee demonstrates fluency, it is then the supervisor's job to prepare their supervisee for the real-life scenarios that might arise and teach generalization and maintenance of skills, given the location of service delivery presents various advantages and challenges. Thus, ongoing supervision is a necessary requirement of ABA services.

Licensure and Insurance Legislation Many states within the United States now have legislation that requires both Medicaid and private insurance companies to fund ABA services for children diagnosed with ASD. A good source for obtaining the most current information on insurance legislation in any given state is Autism Speaks' Health Insurance Information webpage (<https://www.autismspeaks.org/health-insurance-coverage-autism>). This website is frequently updated to be current with legislation related to autism treatment. Many states also have licensure laws that regulate the title and practice of ABA in that respective state. Licensure boards are formed in states that license behavior analysts, and the role of these boards is to protect the consumer from fraudulent or harmful behavior on the part of professionals. If a licensed behavior analyst engages in unethical, harmful, or fraudulent practices, the state can revoke that individual's license to practice in that state, even if the behavior analyst maintains his or her certificate from the BACB. Requirements to become licensed as a behavior analyst vary from state to state. Behavior analysts are responsible to be aware of, know, and understand the licensure laws in any and all states in which they practice. Due to the great variability in both insurance coverage and licensure laws across states, a detailed discussion of these topics is beyond the scope of this chapter. However, behavior analysts working in early intervention settings should be aware of local licensure and insurance laws and are encouraged to seek further professional development on these issues.

Location of Service Delivery

The delivery of behavior analytic services occurs in many types of settings, including clinics, homes, and school districts, to name a few.

Clinic-Based Services In clinical settings, each child and his/her RBT typically work in a treatment room dedicated to that child, often separated from other children by a partition or wall. Within this space, there are usually desks/tables, chairs, the child's preferred items, and treatment materials. Treatment is delivered in this space by an RBT, typically. However, elsewhere in the clinic, a supervisor (either a BCBA-D, a BCBA, or a BCaBA) is present, ready to help the behavior technician with troubleshooting, supervision, or problem solving. One of the greatest advantages of service delivery in clinic-based service is the immediate access to a supervisor. A clinic-based model provides supervisors continual opportunities to train and supervise staff, which can help to increase treatment fidelity (Leaf et al. 2018). In addition to immediate supervisor support, service agencies have a great amount of control over the environment. Controlling the environment can be as simple as decreasing or increasing the visual stimuli in treatment rooms or as complex as implementing behavioral reduction procedures for severe problem behavior in a safe and controlled area (e.g., a room with padding and two-way mirrors). More control over the environment can lead to fewer interruptions and an increased number of learning trials, which can produce large treatment effects, the third advantage of clinic-based service delivery. Due to the limited distractions and supervisor access, the RBTs can contrive multiple learning opportunities throughout a treatment session, and if a target or program is mastered within the session, the RBTs can either immediately move on to teaching the next skill or contact the supervisor to receive immediate training on the next treatment program. On the other hand, if an RBT is experiencing difficulties with a specific program, he or she can immediately contact the superior to receive in vivo training or support. Thus, there is limited amount of treatment delay and relatively high treatment fidelity.

Although there are many advantages to delivering behavior analytic services in a clinic setting, there are some challenges as well. The primary challenge is the lack of natural opportunities for skill generalization. Skills developed within clinic-based setting may not generalize to other environments, such as the child's home (Leaf et al. 2018). The constraints of the clinic may require that some skills be taught out of the context of the natural environment in which those skills ultimately should be demonstrated (Leaf et al. 2018). Thus, the behavior analyst may need to invest more time programming for maintenance and generalization of skills than if the skills had been taught in the natural context to begin with. This highlights the need to discuss parent training and monitoring at the onset of treatment, which leads us to the next barrier for clinic-based services. Parent involvement can be difficult, given that many parents may choose clinic-based services because such services fit into the context of their family better than home-based services. Further, clinic-based services typically occur during the standard workweek (e.g., Monday through

Friday, from 9 a.m. to 5 p.m.) which is when many parents and caregivers are at work. Thus, increasing parent involvement may be more effortful for the parents, because they have to leave work, drive to a clinic, and receive training and then they, too, have to generalize the skills they learned in the clinic to their home environment. To alleviate the added strain on scheduling, some agencies offer parent training on nights and weekends in the child's home, where natural generalization opportunities are present.

Home-Based Services Some ABA providers offer home-based services. In home-based services, typically an RBT goes to the child's home and implements the treatment in that setting from the start. The BCBA or the BCaBA occasionally accompanies the RBT to the home to provide supervision and case management. One prominent advantage of home-based service delivery is the level of family involvement. Given that most home-based ABA programs have strict policies on parents or caregivers being home during therapy (for liability reasons), treatment occurs while parents are present. Thus, parents are privy to the daily learning and skill acquisition for their child. Providing intervention in the home may promote generalization because the RBT teaches the skill in the environment where the child spends most of his/her time. Thus, many of the natural cues for the behavior are already present, as are the natural reinforcers for the target behaviors (Stokes and Baer 1977). For example, if the child has a goal to increase daily living skills, such as brushing teeth, this skill can be taught in the child's own bathroom, during a time when they would naturally brush their teeth, and the parent can be right there to learn the teaching strategy on the spot. Less instructional time might need to be spent on generalization and maintenance because the instruction occurs in the natural environment to begin with.

There are challenges for home-based therapy, however. One challenge is navigating family dynamics. Some families may not prefer home-based services because they may feel a loss of privacy, given that the RBT could be in the home for up to 40 h a week. A very large challenge with home-based services is the lack of continuous contact between the supervisor and the RBT. As RBTs are required to travel to their clients' homes and do not have a base unit (i.e., a clinic or office setting), this can decrease work morale, decrease training opportunities, and present many challenges for maintaining adequate amounts of supervision (Leaf et al. 2018). Because supervisors are not immediately present to observe RBTs as often as they are in a clinic setting and because supervisors are not present to help troubleshoot, treatment integrity may suffer. All of this can impact the treatment effects or impede rapid skill acquisition. Finally, because RBTs are in the family home for many hours a week, there is increased risk of blurring the lines between personal and professional relationships for the parents and the RBT.

School-Based Behavior analytic services can be provided in school settings if schools allow for it. For example, behavior analysts can provide classroom management coaching, conduct functional behavior assessments for specific students, implement school-wide programs, or provide one-on-one early intervention ser-

vices. School-based services add a substantial value because skills are being taught in the context of their educational setting and the interventions are typically implemented by a principal, teacher, or paraprofessional. In addition, schools can provide the unique balance between the less-controlled home setting and the more contrived clinic setting.

Conclusion

ABA therapy is the most researched and effective treatment for children with ASD (National Autism Center 2008, 2015). Several large studies have shown that early intensive ABA programs can have dramatic positive effects on cognitive functioning, social functioning, and adaptive functioning (Howard et al. 2014; Howard et al. 2005; Kovshoff et al. 2011). The increase in prevalence of ASD over the past several years (1 in 150 in the year 2000 to 1 in 59 in 2014; Baio et al. 2018) and the availability of effective treatment has produced a surge in the field of ABA, as measured by the rapidly growing number of practicing BCBAs (Behavior Analyst Certification Board, Association of Professional Behavior Analysts 2019a; Deochand and Fuqua 2016).

In this chapter, we provided an overview of benchmarks for quality service provision in ASD. Services begin at intake, where BCBAs describe their service, learn about parent goals for their child, and obtain consent for assessment. BCBAs then conduct assessments, using a multimodal approach to identify the child's strengths and skill weaknesses so that therapy goals and objectives can be formulated. Based on the number of goals and objectives, as well as the pace at which a child acquires skills, the number of hours of therapy to be provided is determined. Research evidence suggests that 30–40 h of treatment per week produces the most promising outcomes. After goals and objectives are formulated, the BCBA designs the specific treatment strategy to be used. Often, this is a combination of DTT, NET, and direct instruction, depending on the skill to be taught and needs of the child. The BCBA then trains an RBT to implement the treatment and provides ongoing supervision to ensure the treatment is implemented with fidelity and that adequate treatment gains are made. When the child is functioning at a level that treatment is no longer indicated, services are terminated. However, services are not abruptly terminated. Instead, transition planning takes place to fade services and to ensure that the child is functioning well in the next environment. Parent and other caregiver trainings are important components of continuity and successful transitioning. Thus, the BCBA engages the parents and other caregivers in training throughout the process.

An intensive service delivery system, such as that described above, requires multiple tiers of service providers. This delivery system can be implemented in a variety of settings, including clinics, the child's home, or at the child's school. Each setting likely has its own advantages and disadvantages. Ideally, services are provided across settings, to achieve the advantages of each setting and to ameliorate the disadvantages of each setting to the maximum extent possible. No matter the setting,

RBTs are often the ones providing the direct service to the child, supervised by either a BCBA or a BCBA and a BCaBA working together. Many times, a BCBA-D is in a leadership role, providing support, consultation, and overall agency management for the team. Essentially, the BCBA (and BCBA-D) has two sets of clients—children and supervisees. It is imperative that the BCBA adopt a behavior analytic model for not only child services but also supervision practices for maximum effectiveness (Behavior Analyst Certification Board 2012). Evidence-based practice of early, intensive ABA can be understood as a professional decision-making framework that draws on the best available evidence, child-family values and context, and clinical expertise (Slocum et al. 2014). As service providers, behavior analysts are obligated to provide their clients with the most effective treatment procedures that have empirically demonstrated both long-term and short-term effects to the child and society (Behavior Analyst Certification Board 2014b).

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Early Interventions for Infants at Risk of Autism Spectrum Disorder



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Abstract A plethora of research in early evidence-based behavior-analytic interventions consistently yield promising outcomes for teaching young children diagnosed with autism spectrum disorder (ASD) a variety of social, adaptive, behavioral, and functional skills. Given the promising results of previous basic experimental research with infants, we examine here the application of behavior-analytic interventions specifically designed for infants at risk of ASD. The present chapter first provides an overview of the various early markers, indicators, and behavioral characteristics reliably observed in infants, which are later associated with a diagnosis of ASD in early childhood. We review relevant content areas in the realm of infant social behavioral development from a behavior-analytic perspective, including the development of attachment, fears, precursors to language and social communication, like eye contact, vocalizations, joint attention, and social referencing. In this process, we also emphasize the unique role of the infant's environment as a dynamic variable influencing the development of these various skills and provide general behavioral strategies derived from evidence-based behavior-analytic interventions with typically developing infants. Other nonbehavioral mainstream, eclectic, and emerging evidence-based approaches are offered as well. Lastly, we delineate guidelines and recommend ethical considerations when developing behavioral interventions for infants at risk, while outlining specific codes in the Professional and Ethical Compliance Code for Behavior Analysts. These recommendations include the responsibilities and competency of the practitioner, appropriate assessment procedures, identifying and defining goals, arranging the environment, designing methodology, and developing intervention and treatment specifics. Overall, our chapter illustrates how early behavior-analytic interventions can effectively establish pivotal social behavioral phenomena among infants at risk of ASD within their natural environment.

Keywords infants · at risk · autism spectrum disorder · applied behavior analysis · early intervention

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The extensive body of research accrued in the last 30 years in early behavior interventions is evidence of the great advancement and efficacy of behavior-analytic principles to treat young children diagnosed with autism spectrum disorder (ASD) and other developmental disorders (e.g., Eldevik et al. 2009; Eldevik et al. 2012; Howard et al. 2005, 2014; Lovaas 1987; MacDonald et al. 2014; Virués-Ortega 2010). Early behavioral interventions have been very useful in treating a wide array of issues observed among infants at risk of developmental problems. The targeted problems have included the reduction of behavioral excesses, the treatment of behavioral deficits, and the teaching of core foundational cusps and other pivotal social and communication skills, like eye contact, vocalizations, joint attention, tacting, naming, social referencing, and perspective taking. It is well documented that, the earlier a child receives early intensive behavior interventions, the greater the gains made (Howard et al. 2014; MacDonald et al. 2014). For those children who receive services at an earlier age, as compared to older children, these behavioral gains are not only significant, but they also maintain and generalize for longer periods (MacDonald et al. 2014).

One inconsistency in the literature, however, is the definition of *early*. How early should one intervene? Generally speaking, early intervention services are typically provided following a formal ASD diagnosis, and as such, services often become diagnosis contingent (i.e., between 2-5 years of age). In general, the age for intervention varies and depends on when the earliest markers of ASD are identifiable. The appearance of these markers often results in referral to pediatricians and clinical psychologists for a formal diagnosis, which typically includes the administration of the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord et al. 2012). The formal diagnosis helps the parents secure reimbursement for intervention services. On average, children receive formal ASD diagnoses at approximately 5 years of age (Baird et al. 2003) although in many circumstances, observable deficits, behavioral markers, and characteristics associated with a later onset diagnosis of ASD are observed months and even years prior to the diagnosis.

Presently, assessment and diagnostic procedures are sensitive enough to detect and diagnose ASD as early as 18 months of age (Baird et al. 2003; Ozonoff et al. 2010; Rogers and Pennington, 1991; Zwaigenbaum et al. 2005, 2015), and some behavioral markers of ASD are noticeable as early as 6 to 12 months of age (Landa and Garrett-Mayer, 2006; Ozonoff et al. 2014). These early indicators and pre-ASD characteristics, among other parental, genetic, and environmental factors, place an infant “at risk” of ASD and/or other developmental (e.g., Tourette’s syndrome), behavioral (e.g., attention-deficit and hyperactivity), social (e.g., selective mutism), emotional (e.g., attachment problems), and intellectual disorders (e.g., global learning and language delays). Considering the existing evidence with children already diagnosed with ASD and other developmental disorders, the delivery of early interventions based on the application of behavior-analytic principles to infants at risk, seems both appropriate and necessary, in particular, as a form of preventive intervention. In fact, research results by Bradshaw et al. (2015) encourage the suitability of evidence-based behavioral interventions with children younger than 24 months of age. Today, we know that treatments based on behavior-analytic

procedures and techniques are applicable to prevention prior to an ASD diagnosis (Bradshaw et al. 2015; Zwaigenbaum et al. 2005, 2015).

The objectives of the present chapter are to: (a) provide an overview of the *markers, indicators, and/or behavioral characteristics* of infants who are considered “at risk” of ASD and other behavioral and social issues; (b) outline specific *content areas* of infant social behavioral milestones and development from a behavior-analytic perspective (i.e., attachment, fears, and social communication) while reviewing the research on interventions and *applications of behavior analysis* to typically and atypically developing infants; (c) discuss both *behavior-analytic and mainstream interventions* for promoting infant social behavioral health; and (d) offer *best practice guidelines*, including specific environmental arrangements and ethical considerations when developing behavior-analytic interventions for at risk infants.

Behavioral Characteristics and Markers of Infants at Risk

The definition of *at risk* varies across disciplines, professions, and geographical states, which affects the implementation of specific regulations (e.g., IDEA). A wide range of factors place a child at risk of ASD. These factors reported in the literature include a child’s neurodevelopment, genetic disorders, environmental contexts, and the presence of specific problematic behavior or the absence of specific social skills. Often, an infant considered at risk is one who begins to show developmental delays as a result of various medical or physiological issues at birth (e.g., low birth weight, low APGAR scores, prematurity, respiratory distress, infection, brain hemorrhage, lack of oxygen, or other physical trauma at birth – see Fig. 1).

Fig. 1 An example of a premature, 32-week gestational age, neonate with low birth weight (3 pounds 4 oz.)



An infant may also be considered at risk if he/she has had a history of genetic disabilities or abnormalities (e.g., developmental disabilities, genetic disorders); in-utero exposure to specific environmental factors (e.g., maternal disease or viruses, poor nutrition, alcohol, tobacco and narcotic use, and exposure to other toxic chemicals); and/or has a history of specific parental behavioral interactions (e.g., parental neglectfulness, physical or verbal abuse, maternal depression, parental stress, emotional inexpressiveness, noncontingent responding, unresponsiveness, apathy, and authoritarian parenting styles) (Boutress and Chassin 2015; Hart et al. 1998; Neimy et al. 2017; Novak and Pelaez 2004; Pelaez et al., in review).

When an infant has a specific genetic, physical, and/or medical condition, that child is also considered at risk, irrespective of having a more formal diagnosis (e.g., cerebral palsy, blindness, and/or visual impairment, Down's syndrome, and Fragile X syndrome). As such, many of these infants receive targeted early intervention services provided by specialists who primarily intervene focusing on ameliorating those medical or diagnostic-specific symptoms.

Infants at risk may not meet any of the above criteria, yet, they may be experiencing an at-risk environment (e.g., siblings of a child with ASD) (Neimy et al. 2020). Given that ASD is phenomenological in nature, and research is still being conducted to determine the specific influence of a single or many genetic or chromosomal features, the environment that an infant develops within seems to play a significant role in the expression and manifestation of the various characteristics of the disorder itself (Drash and Tudor 2004). For example, misplaced, intrusive, and/or inappropriate reinforcement contingencies for various social and communicative infant behaviors provided by parents and/or caregivers may inadvertently reinforce maladaptive patterns of responding that can be symptomatic of ASD (Neimy et al. 2017). As such, several observable responses of an infant may be indicative that they are at risk of later developing social, behavioral, or language problems (Osterling and Dawson 1994).

Harris (2003) and Harris and Glasberg (2003) offer guides for parents on the topic of siblings of children with ASD and delineate practical and age-appropriate steps for how parents should prepare lessons for teaching their children about ASD. It is important for parents to learn how to help their young children form a relationship with their sibling with ASD. For example, when the typical infant wants to play with her sibling with ASD and smiles, she often can end up being ignored, given that her sibling may lack the necessary play and social skills to reciprocate. At other times, a sibling with ASD might display tantrums, cry, or become aggressive with the typical young child – all relatively aversive contexts – and the social attempts of the young sibling may undergo punishment or extinction. In situations like this, without an early intervention and monitoring program in place, it can be difficult for the neurotypical child to develop a healthy, constructive, and positive relationship with the sibling with ASD. Also, there is the potential for the subsequent generalization of these skill deficits to other relationships (e.g., peers) and other environments (e.g., school).

Within the first year of life, many of the observable *markers* of an “at risk infant” most commonly include: (a) infrequent initiated and sustained eye contact; (b)

limited visual eye tracking, pointing, and joint attention; (c) lack of responsiveness and orienting to name; (d) limited smiling; (e) over-reactivity and fussiness; (f) minimal vocal behavior; (g) difficulty in referencing social cues; (h) lack of imitative skills; and (i) limited interest or motivation to engage socially and play with others (Baird et al. 2003; Neimy et al. 2017; Ozonoff et al. 2010; Pelaez et al. 2013; Zwaigenbaum et al. 2005, 2015). These social behavioral deficits could then impede the future development of other important social repertoires, like those behavioral skills that are essential for children’s communication and social interaction (e.g., perspective taking and empathy). For example, some behavioral cusps can involve those social behaviors that provide the learner with extensive opportunities to contact novel reinforcers, environments, and contingencies, and subsequently generalize across new or related behaviors. Interventions that focus on helping infants establish these behavioral cusps, as early as possible, are of utmost priority. In many cases, these infants at risk would be eligible to receive early behavior intervention services.

Many of today’s treatment services stem from a wide array of disciplines and professional fields, and thus yield significant variability in the quality and type of applied therapeutic services delivered (i.e., occupational therapy, speech and language therapy, cognitive behavioral therapy, and acceptance and commitment (ACT) therapy). With this in mind, behavior analysts should stay focused on employing behavior–analytic principles within the context of early infant individualized interventions, prioritizing the acquisition of social behavioral cusps that the infant at risk is lacking.

Early Milestones of Social Behavior in Infants

The nature and quality of interactions between infants and parents, and how these interactions influence various aspects of child development, have long been a source of interest and research across related, but conceptually differing fields (e.g., Ainsworth 1979; Gewirtz and Pelaez-Nogueras 1996; Schlinger Jr 1995). This interest has resulted in different forms and approaches to infant intervention. Traditionally, the learning of infant social and communicative behaviors has been understood through the lens of developmental psychology (e.g., Shaffer and Kipp 2012), where historically, developmental psychologists have been considered the experts in the realm of social, emotional, and cognitive development of infants and young children. However, when we analyze the theories formulated by developmental psychologists, often there is a lack of consistency and uniformity. Developmental psychologists tend to operate under the pretense of hypothetico-deductive constructs that commonly are proposed as the cause of various social, emotional, cognitive, and communicative deficits as a function of “stages of development” – this notion of stages as a causal variable of the child’s skills has been rejected by behavior analysts (e.g., Pelaez et al. 2008a, b; Pelaez and Monlux 2020;

Schlinger Jr 1995). A stage is considered only as a distant variable that organizes behavior, but a stage is not causal for the development of any behaviors discussed below.

Another concern with mainstream developmental psychologists' approach is that they frequently explain the expression of infant observable milestones and behaviors as a function of their chronological *age* (Baer 1970). Many developmental researchers have used age as an independent variable or as a grouping variable. In this way, age has served as the foundation for the "stage-like" manner within which behavior and language is thought to unfold. But for behavior analysts, infant development should deemphasize the ontogenic and idiosyncratic influences of genetics, and focus mainly on the specific behavior-response relations and on describing, predicting, and understanding infant behavior as a result of individualized environmental contingencies (Gewirtz and Pelaez-Nogueras 1992; Pelaez, 2002). Parsimoniously, the infant's age may more appropriately speak to the collective number of 3 and 4-term contingencies, on a macro level, that the infant has directly experienced for each unique social behavior. Also, from the behavioral approach, the critical phenomena under study should include the origins, early acquisition, and progression of complex social behaviors, like those denoting attachment and separation anxiety, acquisition of fears, and sibling jealousy (Gewirtz and Pelaez-Nogueras 1990, 1991, 1993). In the following section, we discuss these social phenomena in relation to development with both typically and atypically developing infants.

Specifically, in the next section, we elaborate on the social behavioral milestones that are of extreme importance for healthy early infant development: *attachment*, *fears*, *early language skills* (e.g., mands, vocalizations, and echoics), *eye contact*, *joint attention*, and *social referencing*. Our emphasis is that these social, communicative, and behavioral cusps are integral for the subsequent development of more complex behaviors later during childhood and adolescence (Novak and Pelaez 2004).

Attachment Patterns

Theories of attachment have included developmental, ethological, and clinical perspectives (Ainsworth 1979; Bowlby 1969; Gewirtz and Pelaez-Nogueras 1990) and have suggested that a biological propensity of attachment to a parent figure develops early. Ultimately, an attachment pattern evolves as a function of that figure removing or reducing the likelihood of threatening consequences. Mother-infant interactions are largely reciprocal, but attachment bonds are thought to be established based on the infant's innate "need" for safety, security, and protection. The dynamic interplay between infant and parent results in an overarching "system" of attachment. This attachment system is said to influence the development and acquisition of other behaviors due to the specific *style* of that attachment. The behaviors denoting a mother-child attachment style include: (a) signaling and approaching parents (b)

infant crying, (c) smiling, (d) babbling, and (e) clinging (after the ensuing separation). Through a closer analysis of the etiology of these behaviors, we see that attachment theorists have associated these various behaviors largely as a function of innate, internal processes that unfold due to the infant's development and unique temperament, in conjunction with the style of interaction with their parent (i.e., mother). These researchers have suggested that the quality of attachment is often a function of the separation protests resulting from parent provided contingencies during the departures and/or separations from the infant (Gewirtz and Pelaez-Nogueras 1991; Schaffer and Emerson 1964). The behavior patterns that denote an attachment style have been analyzed using operant conditioning principles (Gewirtz and Pelaez-Nogueras 1991). These patterns of child and mother interactions correspond with overarching styles of attachment that are defined by Ainsworth and colleagues using four different categories: (a) *secure attachment*, (b) *avoidant attachment*, (c) *anxious attachment*, and (d) *disorganized attachment* – the latter three categories collectively represent aspects of what has been named by Ainsworth and followers as an *insecure* attachment style.

The science of behavior analysis has continued studying dyadic parent-child behavior interactions and redefining patterns as those previously characterized as attachment (Patterson and Gullion 1971; Rutter et al. 2009). In general, attachment styles are typically considered stably aligned with one's social environment, yet still changeable. Attachment interaction styles may alter as a function of specific environmental contexts (e.g., poverty, early adverse childhood experiences, parental withdrawal, and other global life stressors). While previously conceived as an internal construct, the behavioral-attachment or behavioral systems perspective, illustrates dynamic changes by person-environmental interactions and transactions (Novak and Pelaez 2004; Rutter et al. 2009). Infant behaviors associated with specific types of attachment, such as separation protests denoting *insecure* attachment, are considered to be a function of the loss of a potent reinforcer (i.e., absence of parents and parental extinction), and as such, attachment is not a "thing" an infant possesses, but a behavioral style that develops as a function of a specific history of reinforcement contingencies (Gewirtz and Pelaez-Nogueras 1991).

Gewirtz and Pelaez-Nogueras (1990, 1991, 2000) demonstrated experimentally that infant separation protests can be problematic and are established and maintained like any other operant behavior. When parental attention is provided contingent on the infant separation protests, these separation responses increase and are shown probabilistically depending on the parent providing reinforcement (e.g., the mother's contingent attention and warm hugs upon reunion with her infant increases the probability of the next separation protests).

Some developmental research has noted that young children with ASD and their parents are at a heightened risk for developing an insecure attachment style, which may lend itself to infants at risk of ASD. However, these data are still relatively inconclusive and variable (Hattigan et al. 2011; McKenzie and Dallos 2017). From a behavioral perspective, an insecure attachment style may also result from inconsistent or misplaced parental contingencies during other important interactions, like feeding opportunities (e.g., breast and bottle feeding), that interfere with the

operant/respondent conditioning processes. It is these dynamic pairing processes that may help establish the parent (or any immediate caregiver) as a potent social reinforcer (Gewirtz and Pelaez 1992). For example, when a parent/caregiver is feeding their infant, the parent/caregiver's voice, physical appearance, smell, and touch (hypothesized neutral stimuli) are all being simultaneously paired with the delivery of milk (unconditioned reinforcer), and as such, may become part of a collective conditioned reinforcement system.

Given that children already diagnosed with ASD are often less responsive to, and motivated by, social contingencies, it is likely that not only are parents potentially less inclined to respond to the subtle communicative cues of the infant at risk of ASD, but that, in turn, their infant does not initiate and/or reciprocate interactions in ways that the parents/caregivers may expect (Van IJzendoorn et al. 2007). As such, parents/caregivers may inadvertently, unknowingly, and/or incorrectly reinforce crying and other undesirable behaviors (i.e., infant's behavior being maintained on an intermittent schedule of reinforcement). From this view, early behavioral interventions focus on establishing early interactions that promote replacement behaviors and a secure "attachment" between the infant and the parent/caregiver. Parents and all relevant caregivers should be taught to differentially respond to both the emerging pro-social behaviors or "engagement cues" (e.g., eye contact, vocalizations, and reaching responses) of their infants on a consistent reinforcement schedule.

Fear Development

Historically, classic experiments within behavioral psychology have illustrated the operant nature of the development of fearful behavior (Watson and Rayner 1920), suggesting that fear responses are conditioned and learned as a result of specific histories of conditioning. "Stranger anxiety" has been viewed as a developmental milestone in the literature, emerging around approximately 6 to 7 months of age. Reliably, behavioral studies have demonstrated that fear responses are similar to those responses that are emitted during "stranger anxiety" episodes (e.g., infant crying, gazing away, and clinging to parent) and that these behaviors result as a function of the reinforcers being delivered by parents for that class of functionally equivalent responses (Gewirtz and Pelaez-Nogueras 2000).

Researchers have evaluated phenomena like infant fear of the dark and fear of strangers. From their studies it has become increasingly clear that infant differences in how these "anxieties" and fears are established are largely a result of how those infant responses are shaped by their parents/caregivers. Parsimonious explanations and systematic analyses of the acquisition of fear of strangers and the conditioning of infant fear of the dark have been provided by behavior analysts using prompting and shaping procedures (Gewirtz and Pelaez-Nogueras 1992, 2000; Novak and Pelaez 2004). For example, in one experiment, Gewirtz, Pelaez and collaborators (Lum Lock et al. 1999) compared and examined how 9-month-old infants learned

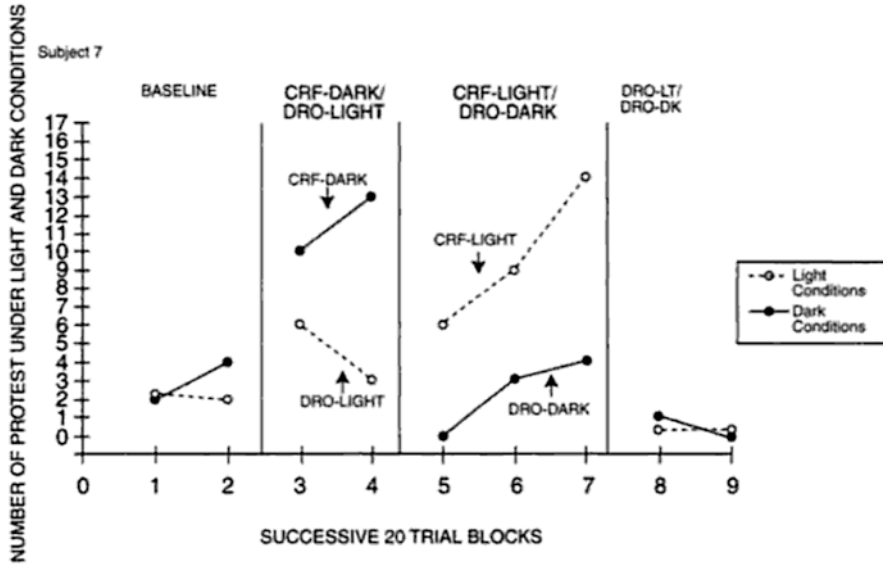


Fig. 2 Illustrates maternal responding to infant protests during two different treatment conditions (CRF vs. DRO) (Gewirtz and Pelaez-Nogueras 2000)

to approach or avoid a confederate female stranger depending on the unique discriminative and reinforcing stimuli provided by the mother. Their results, similar to studies on fear of the dark, suggest that behaviors denoting fear of strangers in real-life settings is significantly influenced and related to operant conditioning processes where reinforcement contingencies are intentionally or unintentionally provided by the primary parent (i.e., mother hugging and consoling) (see Fig. 2).

Given that fear is a learned operant response, one could ask, how do these fears develop and how do they manifest among infants at risk, and can they be evaluated systematically in relation to the environment (i.e., contingency analysis, parametric analysis, and observations)? With toddlers and very young children, a parent’s own anxious and fearful behaviors are often the target of intervention, ensuring that their behaviors do not inadvertently reinforce fearful responses of their children through negative reinforcement contingencies (e.g., Aktar et al. 2014). Additionally, other research has demonstrated that both fears and phobias are often more prevalent among children with ASD, and may be more unusual, atypical, or uncommon than those fears displayed by neurotypically developing children (e.g., noises, specific environments, shadows, features of stimuli, and mechanical objects) (Lyndon et al. 2015). Similar to the research discussed above with neurotypically developing infants, and to the studies that treat fears among children diagnosed with ASD, we believe behavior-analytic interventions can be effective.

Behavior analysts can reduce fear responses of infants at risk using behavior-analytic principles and operant conditioning procedures (e.g., shaping, differential reinforcement, systematic desensitization, habituation, and gradual extinction),

while ensuring that parents/caregivers are trained to respond differentially to the infant's behavior (e.g., differential reinforcement of other behaviors (DRO), differential reinforcement of alternative behaviors (DRA), and differential reinforcement of low rates of behaviors (DRL)).

Language and Communication

The emergence and etiology of language is among the most controversial topics in the understanding of human behavior (Chomsky 1965; Skinner 1957). Generally speaking, we can distinguish between a *topographical/structural* approach and a *functional* approach to the development of language. According to developmental linguists, the topographical development of language historically unfolds relative to age sequences, beginning with early cooing around 3–6 weeks of age, babbling, echolalic babbling, and complex vocables emerging between 3 and 12 months of age, and first words typically emerging around 12–15 months old (Oller et al. 1999). However, these developmental norms do not account for the specific role of the environment and its potential influence in shaping the emergence of these early approximations to language. More recently, developmental theorists have promoted a social interactional view of language, which is now more widely accepted (e.g., Golinkoff et al. 2015; Vihman 2017) and discards the conception of an internal developmental system in the absence of behavior-environment interactions (Gottlieb 1991; Lerner 1991). Behavior analysts were among the frontrunners in this more modern approach to the conceptualization of language “development” (Novak and Pelaez 2004; Pelaez et al., in review). Further, the functional approach to language asserts that early vocalizations are shaped into native-language sounds and words through a combination of both automatic and social reinforcement. Vocalizations are verbal behavior, which like any other learned operant behavior is acquired as a function of the differential reinforcement provided by the environment (Esch et al. 2009; Novak and Pelaez 2004; Schlinger Jr, 1995; Shillingsburg et al. 2015; Sundberg et al. 1996).

Moerk's (1986) analysis suggested that there is ample evidence that the environment, mediated in particular by the parent, shapes the child's language. The high intensity of repetitions of words, modeling, and the frequent feedback provided by parents (e.g., reinforcement) shape their child's vocal responses. Critically important data were provided by Hart and Risley (1995) showing that young children have an enormous amount (i.e., millions of repetitions and words) of language spoken to them at home. But those children who were exposed to language on a more consistent basis and heard more repetitions from their parents (i.e., millions vs. thousands of repetitions of words and sentences), showed a larger vocabulary in later in childhood than those children with less exposure (Hart and Risley 1995).

Mands Among the earliest forms of communication is crying. An infant cry can be conceptualized from the functional approach as a verbal operant, or more specifically,

Fig. 3 Infant crying likely serves as a mand; a request for the parent/caregiver to meet the infant's needs (feeding, changing, attention, and sleep)



as a *mand*. The infant's mand is controlled by some relative state of deprivation (i.e., establishing or abolishing operations), and may serve as a request for the parent/caregiver's attention to meet the infant's needs (e.g., hunger). The parent/caregiver then subsequently reinforces the infant's mand by providing specific reinforcement in return (e.g., feeding, changing, physical touch, and sleep) (Pelaez-Nogueras and Gewirtz 1997) (see Fig. 3).

As the infant continues to contact reinforcement for engaging in vocal and other verbal behavior (i.e., symbolic gestures) as they develop, topographies of communication become more refined and begin to approximate more complex verbal responses (i.e., babbling and first words). Thus, as previously noted, the early development of language is likely only related to time and chronology in that it may speak to average histories of reinforcement (i.e., cumulative reinforcement contingencies contacted), and the individual behaviors observed across infants suggests idiosyncrasies in these specific environmental interactions.

Vocalizations A behavioral approach to verbal behavior accounts more for the role of automatic and social reinforcement in how and when infant vocalizations are expressed within their developmental trajectory. Specifically, infant vocalizations occur in part because they are contacting internal automatic reinforcement contingencies (e.g., proprioceptive sensations on the infant's vocal cords and mouth, and the audible sound produced by vocalizing). In other words, the vocalizations emitted by the infant "feel good" and as such, the infant continues to produce similar sounds in the future. At some point in the infant's learning history, those earliest vocalizations initially maintained by automatic contingencies, contact social reinforcement contingencies provided by the parents/caregivers (e.g., smiles, vocal attention, and physical touch) and as such, become dually maintained by forms of both automatic and social reinforcement (Baer and Deguchi 1985; Schlinger Jr 1992, 1995; Sundberg et al. 1996).

Motherese Speech and Vocal Imitation The parent’s vocal behavior, through pairing with other primary reinforcers, has been shown to be an incredibly effective reinforcer for promoting typically developing infant’s vocalizations, but only when delivered in the appropriate temporal sequence. Specifically, researchers have investigated and compared parent’s *motherese speech* in relation to parent’s *vocal imitation*, in both contingent and noncontingent paradigms (Neimy et al. 2017, 2020; Pelaez et al. 2011a, b). Results consistently demonstrated that infants prefer contingent social reinforcement, with idiosyncratic differences in preference for both motherese speech and vocal imitation (see Figs. 4 and 5) (Bendixen and Pelaez 2010; Neimy et al. 2017, 2020; Pelaez et al. 2011a, b, 2018).

Other researchers have similarly demonstrated that operant procedures can be effectively applied to promote the emergence and increased frequency of vocalizations in children diagnosed with ASD (Esch et al. 2009; Shillingsburg et al. 2015), however often additional reinforcement systems (i.e., edibles and tangibles) and/or procedures (i.e., stimulus-stimulus pairing) are necessary (Miguel et al. 2002; Shillingsburg et al. 2015).

Further, recent research has also demonstrated that parental vocal imitation, when used as a reinforcer for infant vocalizations, not only promotes increased rates of vocalizations, but establishes the emergence of early echoic repertoires. Specifically, the vocal imitation provided by the parent for the infant’s vocalizations serves as both a reinforcer and a discriminative stimulus (SD) for the infant to continue vocalizing/echoing, and illustrates among the first vocal “conversations” or

Fig. 4 Parent’s vocalizations in the form of vocal imitation and motherese speech function as conditioned reinforcers early in the development of infant vocal responses



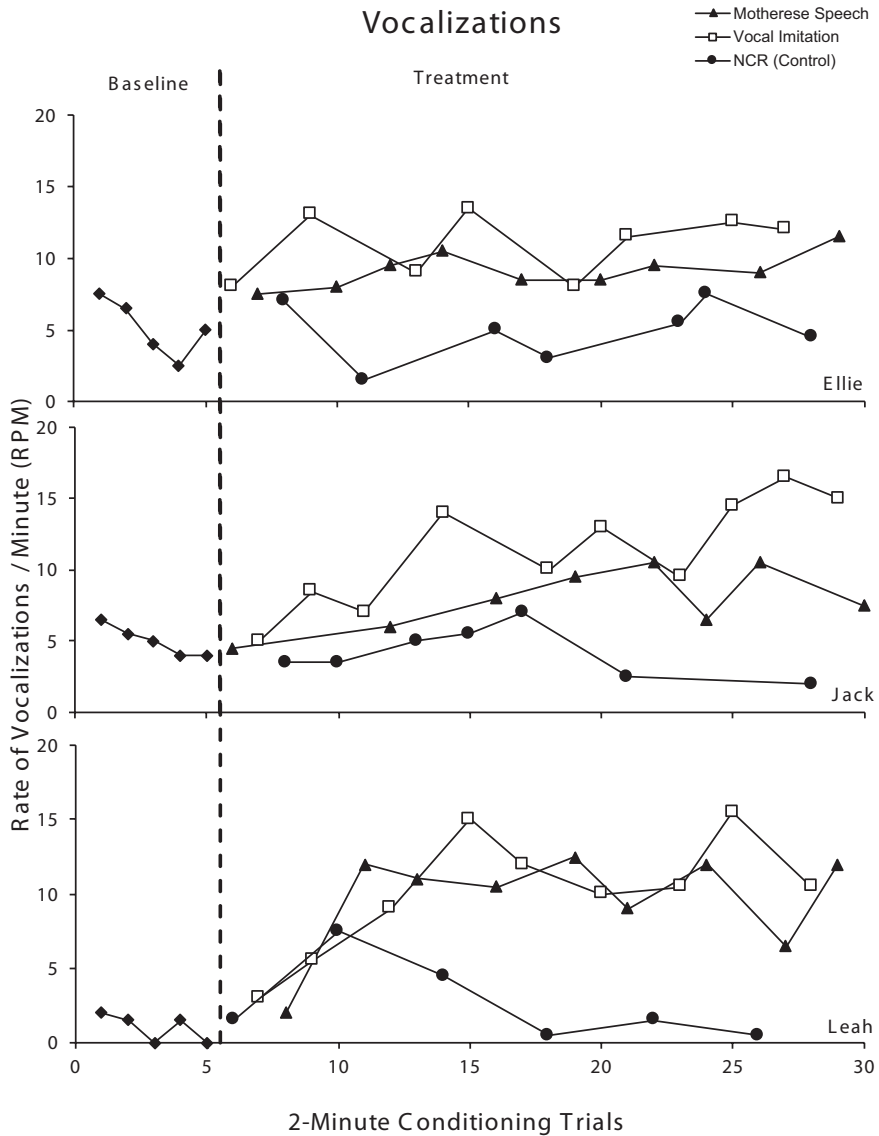


Fig. 5 Graph illustrating the rate of vocalizations emitted during behavior-analytic parent-led interventions with three infants at risk of ASD (Neimy et al. 2020)

“back-and-forth” interactions observed among infants and their parents. This has now been investigated and demonstrated in both typically and atypically developing infants (Neimy et al. 2020; Pelaez et al. 2018).

Eye Contact

A variety of integral operant responses emerge during early infancy, including: head turning, “rooting,” high-amplitude sucking, visual and auditory tracking, orienting, gazing away, kicking, crawling, smiling, laughing, grasping, touching, reaching for an object, moving away, vocalizing, grimacing, protesting, tacting, naming, crying, referencing, and imitating (Gewirtz and Pelaez-Nogueras 1990, 1991, 1992; Hulsebus 1973; Novak and Pelaez 2004; Ohr and Fagen 1994; Pelaez et al. in review; Pelaez et al. 2011b; Pelaez-Nogueras and Gewirtz 1997; Poulson and Nunes 1988). Among the most critical and integral skills that an infant acquires right after birth is eye contact with others (see Figs. 6 and 7).

Eye contact is crucial for the development of more complex social skills later in infancy, like joint attention and social referencing. Infants will often display reliable eye contact and can begin discriminating facial features within the first few weeks of life. However, infants at risk have been found to orient and more frequently allocate their eye gaze to nonsocial stimuli (e.g., toys, objects, and textures) or inaccurate social stimuli (e.g., parent’s/caregiver’s mouth movements) vs critical social stimuli (i.e., parent’s/caregiver’s eyes and facial expressions) (Jones and Klin 2013; Klin, Shultz, & Jones, 2015).

In the past 50 years, a breadth of literature has demonstrated the efficacy of early behavior-analytic interventions that teach eye contact in children diagnosed with ASD and other disabilities. These behavioral interventions vary from client to client, but typically include the delivery of some kind of identified conditioned or unconditioned reinforcer contingent on specified eye contact response criteria (i.e.,



Figs. 6 and 7 Parents/caregivers establishing eye-contact during face-to-face interactions. Around 2–3 months, infants begin scanning faces; they become fixated on the parent’s/caregiver’s eyes, where they can then receive important social information. Infants later diagnosed with ASD exhibited decline in eye fixation from 2–6 months of age (Jones and Klin 2013)

initiated instances of eye contact, total duration of eye contact, fluency with responding, orienting to name, and controlled gaze shifting). Some studies have investigated the acquisition of eye contact among young infants (Pelaez-Nogueras et al. 1996a). Researchers have found that with typically developing infants, contingent positive reinforcement consisting of combined forms of physical touch, positive facial affect (e.g., smiling), and infant-directed speech (i.e., motherese speech) can be used to promote increased infant initiated instances and duration of eye contact with their parent/caregiver (Pelaez-Nogueras et al. 1996a; Pelaez-Nogueras et al. 1997). These developmental behavior analysts have coined this combined reinforcement package *synchronized reinforcement*, which has been successfully used to promote eye contact with infants of mothers who both were, and were not, diagnosed with depression (see Fig. 8) (Pelaez-Nogueras et al. 1996a, b).

We should note that infants at risk of ASD who display lower levels of eye contact and a higher frequency of gazing away may similarly benefit from interventions within the natural environment delivered by parents/caregivers that reinforce appropriate and increased eye contact (Neimy et al. 2017; Pelaez and Monlux 2018).

Fig. 8 Synchronized reinforcement, which includes physical touch, provided by the parent/caregiver can serve as a powerful reinforcer for infants and improve infant's social development. Research has showed that the duration and initiations of infant eye contact increases when parents/caregivers provide physical touch contingent on their infant's eye contact



Joint Attention

We have defined joint attending operationally, given that differing disciplines have conceptualized *joint attention* inconsistently (i.e., some as an innate phenomenon) (Mundy et al. 2007). From a behavior-analytic approach, joint attention consists of a discrete chain of individual behaviors, specifically when an infant: (a) shifts their eye gaze to/between objects to (b) their parent/caregiver, as an initiation or a response, in order to (c) obtain social reinforcement and develop stimulus-stimulus relations about their world around them (see Fig. 9) (Dube et al. 2004; Monlux et al. 2019; Pelaez and Monlux 2018). Infants initiate and/or respond to joint attention instances by looking at, pointing at, showing, sharing, or engaging with objects, then shift their eye gaze to their parent/caregiver, who may often provide forms of generalized conditioned reinforcement (e.g., social praise, nodding, and smiling) as part of a shared social experience. During these shared experiences, the infant joint attention response contacts both unconditioned (i.e., parent’s/caregiver’s face) and conditioned (e.g., parent’s/caregiver’s facial expressions) social reinforcers, and as such, these repertoires are strengthened in the future (Pelaez and Monlux 2018, 2020).

Considering the social nature of the exchange, joint attention has been examined extensively among ASD populations and is a hallmark deficit observed in those children. Diagnosed with ASD (DeQuinzio et al. 2016; Isaksen and Holth 2009; Taylor and Hoch 2008). These exchanges are typically maintained by the social interaction that follows, and could be considered a form of mand for attention to “share an experience” with their parent/caregiver. Given the limited potency of

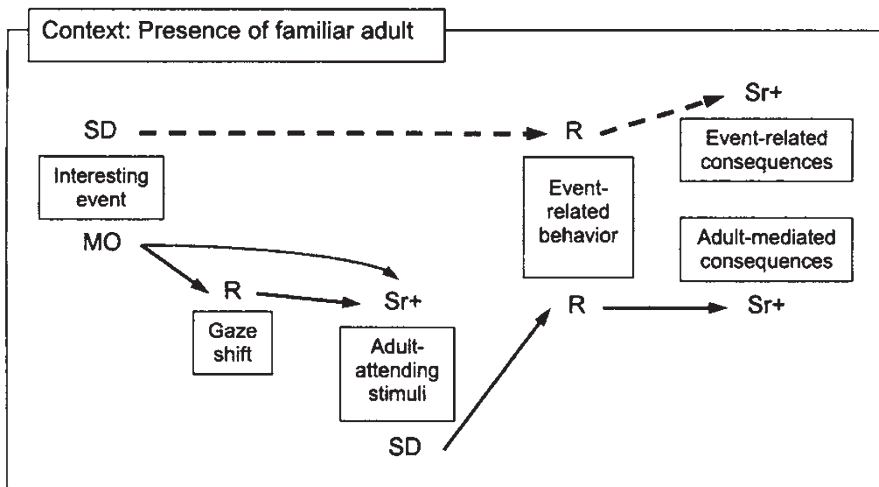


Fig. 9 Contingency diagram of the behavioral components of the joint attention sequence (Dube et al. 2004)

social reinforcers for individuals with ASD, it is not surprising that these repertoires are often lacking.

A breadth of studies over the past two decades have consistently demonstrated that joint attention skills can be taught using systematic combinations of shaping, prompting, and differential reinforcement (Holth, 2005; Isaksen and Holth 2009; Monlux et al. 2019b; Taylor and Hoch 2008). Interventions with infants at risk of ASD and other disabilities attempt to facilitate the emergence of joint attention to mitigate the likelihood of future deficits (e.g., over-selectivity and/or discrimination issues resulting in failure to acquire social referencing) and strengthen pivotal foundational repertoires or cusps (Pelaez and Monlux 2020; Pelaez and Novak 2013).

Social Referencing

A critical skill that may mediate the development of many prosocial and/or maladaptive behaviors is the infant's ability to read the social cues and facial expressions of parents/caregivers when presented with novel, unfamiliar, or vague stimuli. *Social referencing* has been similarly discussed by developmental psychologists as a conceptual skill that is "prewired," and emerges within the chronology of development, however developmental behaviorists have also demonstrated that similar to attachment and fear, social referencing is acquired like any other learned operant (Gewirtz and Pelaez-Nogueras 1991; Pelaez et al. 2012). Specifically, Pelaez and collaborators have shown that social referencing is a complex behavior chain made up of joint attention skills, where infants orient and shift their eye gaze to specific social stimuli (e.g., parent's/caregiver's facial expressions) following the presentation of novel stimuli, in an attempt to understand how to respond (i.e., approach following positive signaling, or avoid following negative signaling) (Pelaez et al. 2012) (see Fig. 10).

Behavior analysts have studied social referencing in both typically developing infants and infants at risk of ASD and developmental delays. Researchers have conditioned novel stimulus cues (e.g., parents/caregivers emitting specific gestures/hand signals) in the presence of ambiguous stimuli. In the presence of these cues, they taught infants to discriminate whether to approach or avoid the ambiguous stimulus based on the presentation of the parent's/caregiver's cues (i.e., SDs). This was done in a direct response to developmental psychologists conventionalizing social referencing as an innate ability that unfolds developmentally. The infants reliably acquired the skill using combinations of prompting, shaping, and reinforcement procedures, which demonstrated that parent's/caregiver's facial expression can become conditioned SDs (cues) that either signal reinforcement or an aversive consequence for engaging in approaching responses (Pelaez et al. 2012, 2013). This was the first concrete evidence for the learning theory of social referencing, illustrating that this behavioral skill sequence was something that could successfully be taught.

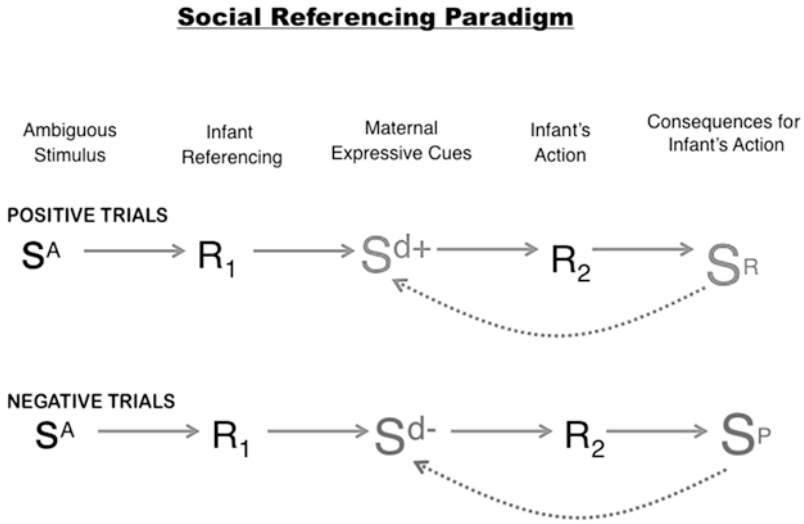


Fig. 10 Illustration of the different behavioral components of the operant-learning social referencing paradigm (Pelaez 2009)

For children with ASD, social referencing has been effectively taught using the principles of behavior analysis as part of early behavior intervention programs (Brim et al. 2009; DeQuinzio et al. 2016). As such, early behavior intervention research on social referencing with infants at risk of ASD and other developmental disabilities has yielded some initial promising results. Social referencing needs to be prioritized and systematically programmed for those infants at risk who lack these social repertoires. Targeting this complex social behavior chain as part of an early intervention program will establish the infant’s referencing repertoires and fluency in effectively responding to the nonvocal verbal behavior and emotions exhibited by others. In other words, the learning of joint attending and social referencing skills are essential for infant’s understanding and interpreting the emotions of others, and ultimately may play a role in more complex social skills, like perspective taking (Monlux et al. 2019b; Pelaez and Monlux 2018, 2020).

Behavior-Analytic and Mainstream Interventions for Infants at Risk

The behavioral and mainstream interventions discussed in this chapter follow the application of early behavioral principles through behavioral skills training (BST) (Parsons et al. 2012). We focus primarily on the parent and/or any immediate caregivers as the agent of change, and use evidence-based treatment approaches to address various skill and behavioral deficits during infancy (Patterson and Gullion

1971). Depending on the concerns faced, one can choose from a wide array of interventions available to a broad scope of multidisciplinary practitioners. In general, the majority of early intervention services for infants are administered by nurses, speech language pathologists, occupational therapists, physical therapists, psychologists, and their respective interns/assistants. However, focus should continue to become more centered on the training of the infant's parents/caregivers, either directly in vivo, and/or using telehealth or remote models, given their relative success with other populations (Monlux et al. 2019a; Tsami et al. 2019; Wacker et al. 2013). These services are most commonly provided for infants who have preexisting diagnoses (e.g., Down's syndrome and cerebral palsy) or specific medical fragilities (e.g., low birth weight, prematurity, and feeding issues). For infants at risk of ASD and some other genetic disorders (e.g., Fragile X), however, infant development services may be granted to qualifying families depending on their specific state-wide or federal regulations and/or medical insurance benefits, but these services may or may not include behavior analysts. The lack of involvement of behavior analysts, at least in the United States, may be largely a function of funding sources and limitations of the Board Certified Behavior Analyst (BCBA) credential. Given that the majority of services for applied behavior-analytic therapy are funded either via the state (e.g., regional centers) or through state-specific insurance mandates (e.g., government and private health insurance), behavior analysts have been limited in the populations they can feasibly serve.

Our professional governing body, the Behavior Analyst Certification Board (BACB 2014) does not provide licensure, only a certification – a limitation that may hinder involvement of behavior analysts across settings and populations outside of ASD in general. Conversely, there are several states that do have regulating licensing boards for behavior analysts, and as such, the intervention services afforded to both infants at risk of ASD and other developmental disorders by behavioral providers vary significantly (“Licensure and Regulation of Behavior Analysts” n.d.).

These focused support early interventions for infants are often conceptually different than our early behavioral interventions models. As we have seen, behavior-analytic researchers have investigated many of the behavioral phenomena lacking in infants at risk of ASD and other disabilities. Specifically, as previously mentioned, interventions delivered by specialists and parents/caregivers that focus on establishing social behavioral cusps, like eye contact and gaze shifting, vocalizations, joint attention, and social reinforcement, are paramount as the foundation for the development of more complex social and language skills in later childhood (Neimy et al. 2017; Novak and Pelaez 2004; Pelaez and Monlux 2019, 2020).

Extensive literature reviews suggest that best practices for interventions for children under the age of 2 years old who are at risk for ASD and other developmental disabilities, should be based on the principles of behavior analysis (Zwaigenbaum et al. 2015). In general, early intervention models that use specific principles of behavior analysis can be applied to not only treat the core deficits of ASD and developmental disabilities, but a myriad of other social, emotional, and behavior deficits and/or excesses observed in infants. In addition to the early intensive behavior interventions (EIBI) curricula, early infant interventions may be based on

applied behavior analysis (ABA), but at a reduced dosage, duration, and/or intensity. We can target a variety of specific social (e.g., joint attention, social referencing, and eye contact), behavioral (e.g., separation protests, noncompliance, and latching), and language skills (e.g., vocalizations, echoics, mands, and tacts) with a moderate rate of intervention. Often, moderate ABA interventions are parent-/caregiver-directed or include extensive parental/caregiver involvement in both brief and extended treatment models.

In general, an early behavioral intervention that focuses on dyadic parent–child interactions is crucial to establishing generative repertoires during early infancy and childhood. Similar naturalistic behavior-analytic interventions that have been successful in treating those specific characteristics of ASD may be similarly applied and adapted to infants at risk of ASD (LeBlanc et al. 2006). Specifically, interventions typically conducted within the natural home environment of the infant could incorporate *Incidental Teaching* (Charlop-Christy and Carpenter 2000; Hart and Risley 1968; McGee et al. 1999), *Naturalistic Environment Teaching (NET)* (Sundberg and Partington 1998), *Applied Verbal Behavior (AVB)* (Sundberg and Michael 2001) and other ABA-based *Naturalistic Teaching Strategies (NATS)* (Charlop-Christy et al. 1999) to teach skills and promote generalization. Further, these type of interventions can include more standard parent/caregiver management training (Parsons et al. 2012; Patterson and Gullion 1971) or modifying the environmental context and setting in a more structured format (Kohlhoff and Morgan 2014).

Specific components or aspects of behavior-analytic treatment are often incorporated into mainstream interventions, in conjunction with other procedures grounded in cognitive, clinical, and/or developmental psychology. Further, the vernacular and description of treatment that is utilized may be adjusted to more appropriately match the consumers (i.e., minimizing behavior-analytic terms and jargon). Collectively, these *eclectic* approaches and procedures may demonstrate overall efficacy as a package when evaluated, yet the underlying function or specific catalyst of change is partially unknown due to the use of correlational statistical inference instead of isolating treatment variables and demonstrating functional relationships, experimental control, and strong internal validity (i.e., component analysis may be necessary to identify the “active” ingredient of the treatment package). However, there are ongoing discussions and updates within the scientific community about how the term “evidence” may best be characterized and defined in efforts to best publicize those treatments that are in fact effective and have a significant impact overall (Kazdin 2015; Tolin et al. 2015).

Many of the emerging evidence-based eclectic procedures may in fact be effective due to the behavior-analytic principles included in treatment (i.e., contingent reinforcement, extinction, and shaping) (Howard et al. 2004; Schlinger Jr 1992, 1995). We should note that some of these approaches, like *Pivotal Response Training (PRT)* and *Parent Child Interaction Therapy (PCIT)* have strong behavior-analytic roots and incorporate significantly more aspects of applied behavior analysis within the context of their intervention approaches. As a result, these mainstream eclectic

interventions are difficult to tease apart and formally define as either meeting or not-meeting a pure behavior-analytic criterion for treatment.

Early Start Denver Model (ESDM) (Rogers and Dawson 2010; Rogers, Dawson, & Vismaea 2012) is another well-known emerging evidence-based eclectic intervention for young toddlers between the ages of 12–48 months old diagnosed with and/or at risk for ASD, based on the principles of developmental psychology and applied behavior analysis. The intervention is focused on addressing key domains of development, including imitation, communication, social, cognitive, motor, adaptive behavior, and play, all delivered by parents and therapists in a positive play-based and relationship-focused format. ESDM focuses on building a positive relationship, contrives teaching opportunities within natural play and normalized routine activities, and utilizes play to promote social interactions and communication skills. ESDM therapy is often delivered across home, clinic, and school settings, in either one-to-one and/or group settings. A critical component of ESDM is parental involvement; therapists will recruit participation of parents during sessions to ensure strategies and treatment approaches are adopted outside of direct sessions.

Parent–Child Interaction (PCI) Feeding and Teaching Scales (Kelly et al. 2003; Oxford et al. 2016). The PCI scales (formerly NCAST Feeding and Teaching Scales) are both a valid and reliable assessment and intervention guide for measuring specific observable parent–child interaction behaviors in the context of feeding and/or teaching situations. The PCI scales are among the most frequently used tools for identifying early patterns of social dysfunction and/or maladaptive interactions between infant and parent behaviors, and subsequently establish treatment programs targeting deficits observed during the scales. Using a blend of both cognitive and developmental approaches, there are also specific behavioral components that are targeted within the context of the PCI Feeding Scales that emphasize important aspects of infant–parent social interaction that occurs during breastfeeding, nursing, and feeding.

The components of an early behavior-analytic PCI intervention include: (a) contingent vocal responding; (b) contingent social reinforcement; (c) noncontingent attention; (d) differential reinforcement of other and alternative behaviors (DRO and DRA schedules); and (e) response redirection. During feeding opportunities, parents are encouraged to maintain an “en-face” position (i.e., face-to-face with direct aligned eye contact with the infant), respond to their infants when they make eye contact or vocalizations, talk to their infants both contingently and noncontingently, vary their tone and prosody of speech, provide positive and conversational statements to their infant, allow their infant to touch and explore the source of food (e.g., breast or bottle), immediately respond to and help redirect the infant’s distress responses and disengagement cues (i.e., lateral gaze aversion, swiping, pushing away, and crying), and provide touch and vary the motion given to their infant during the interaction (i.e., stroking, massaging, swaying, and bouncing).

From a behavior-analytic perspective, these various contingent responses of the parent during the delivery of such a potent primary reinforcer (i.e., food) may

establish the parent's social behaviors as a source of reinforcement and stimulus control. That is, the parent's various social behaviors become a conditioned reinforcer for the infant's behaviors, while promoting the learning of the earliest social skills of the infant (e.g., eye contact, gaze shifting, social referencing, vocalizations, and appropriately terminating feeding) (Pelaez-Nogueras and Gewirtz 1997).

Parent Child Interaction Therapy (PCIT) (Kohlhoff and Morgan 2014; Lieneman et al. 2017; McNeil and Hembree-Kigin, 2010) is an evidence-based treatment for young toddlers to establish positive social-emotional relationships between parent-child dyads. PCIT is based on the developmental theory of parenting, attachment theory, social learning, and uses specific behavioral techniques (i.e., DRO, DRA, and contingent social reinforcement) to promote "secure attachment" through authoritative parenting style. This includes teaching parents to focus on boundary setting and healthy levels of follow through and consistency in responding to their toddlers. In general, PCIT is delivered via parents, and "coached" by a therapist using a "bug-in-the-ear" device within a clinic setting, allowing the therapist to provide moment-to-moment feedback and guidance on how to manage the child's behavior. PCIT is generally conducted across two treatment phases, in anywhere from 12–20 sessions, depending on the unique dyad. Phase one focuses on establishing warm positive relations between parents and their children, prioritizing the reduction of tantrums, hyperactivity, negative attention-seeking behavior, and parental frustration/over-reactivity, and increase secure attachment styles, attention span, self-esteem, and pro-social interactions and communication behaviors. Phase two of treatment focuses on managing and decreasing more challenging behaviors like aggression, destruction, and defiance, increasing compliance with functional, household, and academic requests, promoting positive behavior around others in public, and establishing strategies for parents/caregivers to remain calm and confident while managing these behaviors consistently and effectively.

Pivotal Response Treatment (PRT) (Koegel and Koegel 2006). PRT is similar in essence to Incidental Teaching, however its curricula as a package is still an emerging evidence-based treatment for children with ASD. PRT focuses on increasing a child's motivation to learn, self-monitoring of behaviors, and initiating social interaction and communication with others. The *pivotal skills* serve as a foundational behavioral cusp, that allow the child to learn a wide array of skills by contacting naturally occurring reinforcers. PRT targets specific pivotal areas including motivation, responding to multiple different cues, self-management of disruptive and self-stimulatory behaviors, and increased social, communication, and academic skills through natural reinforcement contingencies within the child's natural environment. Treatment can include an average of 25 hours per week, and is delivered by an interventionist in a play-based format, with learning opportunities and trials generally initiated by the child. The treatment goals are individualized and tailored to meet the unique goals and needs of the child within their natural environment, and focuses on six segments across language, play, and social skills during both unstructured and structured interactions.

Guidelines for Developing Behavior-Analytic Interventions for Infants at Risk

Any behavior-analytic intervention for infants at risk needs to be aligned with the *dimensions of applied behavior analysis* delineated by Baer et al. (1968). Specifically, infant behaviors selected for intervention need to be observable and measurable (*behavioral*), the goals and behaviors identified are socially significant in that they warrant intervention (*applied*), the treatment procedures are formalized into step-by-step protocols (*technological*), the interventions are grounded in behavior-analytic research and are evidence-based in nature (*conceptually systematic*), the experimental methods utilized demonstrate functional relations between selected independent and dependent variables (*analytic*), the intervention systematically programs for generalization across behaviors, individuals (i.e., parents and any/all immediate caregivers), and settings (*generality*), and the results of the interventions demonstrate overall efficacy and positive outcomes (*effective*).

Additionally, for behavior analysts specifically, working with at risk infants and their families presents several considerations to ensure procedures are being reliably upheld ethically; these are vulnerable populations that require extra care, sensitivities, and protections, and as such, careful attention to specific assessment methods, environmental arrangements, use of specific intervention methods, and experimental design considerations, in relation to specific BACB *Professional and Ethical Compliance Code for Behavior Analysts* (BACB, 2014) topics, warrants further discussion (Diekama 2009).

I. Practitioner's Competency and Responsibilities (*BACB Professional & Ethical Compliance Codes 1.02, 1.03, 2.01 & 2.02*).

Behavior analysts have not been consistently trained to work with infants in applied or clinical settings, or work amongst the common disciplinary team affiliated with infant intervention services. Practicing behavior analysts are most commonly working with young children, adolescents, and adults with ASD and other developmental and intellectual disabilities. In general, nurses, doctors, early childhood educators, psychologists, speech language pathologies, occupational therapists, and physical therapists frequently interact with infants. As such, before beginning assessments or interventions with infants at risk, behavior analysts will need to ensure they receive supervision, mentorship, and hands-on training from individuals who work with these infant populations prior to providing any form of services accordingly. Further, behavior analysts will likely need to complete additional course work in the areas of child development, early education, and developmental psychology.

A good behavior analyst should be fluent in child development and the typical developmental phenomena and research that have been discussed here (e.g., attachment, fear acquisition). Also, a behavior analyst interested in child development should know about how different theoretical perspectives have informed us on child development (e.g., Novak and Pelaez (2004; Schlinger Jr 1992, 1995). Behavior

analysts need to familiarize themselves with the research literature on infant behavior and development. These studies discussed here have been published mainly in developmental journals and have served as a historical basis for how behavior-analytic procedures have evolved (e.g., *Infancy*, *Child Development*, *Journal of Child Psychology & Psychiatry*). More importantly, behavior analysts must familiarize themselves with the research literature on early interventions with children with ASD and the results of the meta-analysis conducted (Virués-Ortega 2010). It is important for emerging behavior analysts to shadow and be supervised by practitioners who work directly with infant at risk populations, such that they have direct hands-on experience on assessment and treatment as part of their supervised experience hours necessary for pursuing or maintaining certification.

When testing and conducting interventions with infant populations, particularly those at risk, it is important to consider the vulnerability of the home environment across all the indirect consumers one interacts with. The parents/caregivers are likely under significant amounts of stress, may be battling with mental health issues, and may need additional support and consultation to better manage the behavioral contingencies of their infant. A focus on integrating appropriate “*bedside manner*” and various “*soft-skills*” (e.g., empathic listening, validation, flexibility, patience, and open-mindedness) is an essential component of *building rapport* with indirect consumers during the initial stages of developing the intervention (Taylor et al. 2018). The BCBA is responsible to all parties affected by the services provided, and as such, these early interventions with infants need to be sensitive to all parties involved.

When considering the fragile and vulnerable nature of infants born with a developmental problem, particularly those at risk because of medical complications and/or physiological and biological concerns, it may be necessary to *maintain ongoing collaboration* and/or *consistent consultation* with medical professionals (e.g., pediatrician, nurse physician, and medical specialists) to rule out any and all possible medical or physiological issues that may be emerging as behavioral symptoms. Furthermore, outside collaboration with medical professionals, can help us ensure that the vulnerable infant is also receiving coordinated specialized services from other providers (i.e., speech pathology, occupational therapy, and physical therapy). With this in mind, behavior analysts continue to act and serve the infant as part of a multidisciplinary team and will benefit from collaborative partnerships that include working closely with practitioners who have experience working with neonates and infants with developmental problems (e.g., NICU specialized pediatricians, nurses, lactation consultants, midwives, child clinical psychologists, developmental psychologists, physical therapists, occupational therapists, and speech and language pathologists).

II. Assessment Procedures (*BACB Professional & Ethical Compliance Codes 3.01-3.04*).

Following obtaining all necessary consent, when working with infants at risk of ASD, developmental disabilities, or other social-behavioral disorders, behavior-analytic assessment procedures need to be adapted to address the given concerns

presented by the vulnerable at risk infant. These assessments would not include any kind of formal diagnostics, but would include components of a *functional behavior assessment (FBA)* including, *indirect assessments/interviews* with all relevant immediate stakeholders, *descriptive assessments* and direct observations of the infant's behavior and interactions within the natural environment (e.g., duration of eye contact during interactions with parent/caregiver, frequency of vocalizations during play, and latency to fussiness during "tummy time"), gathering *baseline data* on specific skill and/or behavior deficits (e.g., vocalizations, gaze shifting, eye contact, joint attention, and social referencing) and excesses (e.g., crying, separation protests, avoidance and disengagement cues, and fear responses), and conducting *contingency or experimental functional analyses* to identify the putative maintaining variables for those specific behavioral excesses.

The use of standardized normative assessments may also be used as part of the indirect and descriptive assessments to corroborate anecdotal information provided by parents/caregivers, and help guide the development of skill-based goals. Specifically, these assessments may include: (a) *Adaptive Behavior Assessment System, Third Edition (ABAS-3; Harrison and Oakland 2015)*; (b) *Assessment of Basic Language and Learning Skills – Revised (ABLLS-R; Partington 2006)*; (c) *Developmental Profile, Third Edition (DP-3; Alpern et al. 2007)*; (d) *Early Social Communication Scales (ESCS; Mundy et al. 2003)*; (e) *Modified Checklist for Autism in Toddlers Revised with Follow-Up (M-CHAT-R/F; Robins et al. 2014)*; (f) *Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP; Sundberg 2008)*; and (g) *Vineland, Third Edition (Vineland-3; Sparrow et al. 2017)*. Each of these aforementioned assessments can be conducted by behavior analysts or trained school psychologists with infants from birth onwards. Normative developmental assessments can provide an additional information and help us measure progress throughout the course of treatment. BCBAs may need to seek additional training and mentorship from practitioners and specialized psychologists who are fluent on these assessments in order to successfully interpret and integrate the results into ongoing assessment reports, which serve as a basis for decision-making throughout the course of treatment. The obtained assessment results should be formally prepared (i.e., assessment report) and reviewed with parents/caregivers and all other immediate indirect consumers, using language and visual displays of data like graphs that effectively and easily helps us evaluate and explain findings (with minimal behavior-analytic jargon).

Additionally, indirect and direct *preference assessments* may also need to be incorporated into these early interventions to identify the infant's preferred stimuli and potential reinforcers to incorporate during treatment. This may involve interviews with parents/caregivers and/or directly observing the infant interacting with different tangibles (e.g., rattles, high contrast stimuli, cause-and-effect toys, and mobiles), activities (e.g., "tummy time", rocking/swaying, listening to songs, music, or books delivered by the parent/caregiver) and/or forms of social interaction (e.g., peek-a-boo, tickles, massage, hugs, and kisses).

III. Identifying and Defining Goals (*BACB Professional & Ethical Compliance Codes 4.03 & 4.05*).

The selection of goals needs to be tempered, balanced, prioritized, and weighed in relation to the goals of the family and other relevant stakeholders, considering their unique and diverse sociocultural beliefs, economic supports, and the overall acceptability of procedures and goals (i.e., *social validity*). Collaboration is critical to ensure parental participation, satisfaction, and ongoing treatment involvement (Zwaigenbaum 2015). Specifically, behavior analysts may use informal open-ended interviews in conjunction with the results of more standardized assessments to identify socially significant and relevant behavioral goals to address within the context of the intervention. These goals may include increasing infant social behaviors like eye contact, smiles, vocalizations, gaze shifting, oral motor, fine, and gross motor imitation, and promoting “tummy time” and the development of motor movements. They also may include parent-specific goals, like shaping infant self-feeding behavior, guidance with breast/bottle feeding, establishment of safe sleep environments and sleeping routines, identifying and responding to infant cues (i.e., hunger, engagement, and disengagement), and assistance with other adaptive daily living routines (e.g., bathing) (Figs. 11 and 12).

Similar to any other behavioral intervention plan with older children, infant behavior goals should be objectively delineated and defined such that ongoing data collection and visual inspection and analysis of graphs allows for data-based decisions as a function of client progress. The intervention established for the infant needs to focus on addressing *observable and measurable gains* in specific skill deficits and/or excesses related to their identified developmental issues. The intervention needs to focus on addressing the core social and behavioral deficits (i.e., the lack of developmental cusps) and on attempting to mitigate the gap in



Figs. 11 and 12 Interventions to teach an infant self-feeding responses and infant–parent engagement during sustained “tummy time” practice

functioning across domains (e.g., social, emotional, communication, adaptive, leisure, and cognitive skills) as quickly as possible.

IV. **Arranging the Environment** (*BACB Professional & Ethical Compliance Code 4.06 & 4.07*).

Working with infants at risk can present many challenges that can make delivery of early behavioral interventions services quite difficult. Specifically, considerations like the *time and duration of sessions*, *environmental distractions*, and providing *sufficient breaks* may be necessary. Specifically, infants often have varied sleeping and feeding schedules, and as such, sessions should be scheduled when the infant is well-rested and fed to prevent any potential problematic behavior that may interfere with or confound the progress made within treatment. Further, it is important to consider the overall duration of sessions, and to keep the teaching trials brief (i.e., 1–5 min maximum) and/or embedding teaching opportunities into naturally occurring contexts within the infant’s natural environment. The behavior analyst must ensure, before every intervention, that the environment is set up for the infant’s learning and success. For example, the use of appropriate seating arrangements (i.e., high-chair) that limit any potential distractions during treatment is necessary. The interventionist should allow the infant to have access to highly preferred items or edibles, ensure that no dangerous or unsafe items are within proximity, and that the infant has opportunities to take breaks frequently (i.e., playing and having snacks).

V. **Single-Subject Experimental Designs Considerations** (*BACB Professional and Ethical Compliance Code 4.09*).

Aside from general logistics of a treatment session, other specific design decisions need to be considered. Single-subject experimental designs have long been the preferred methodology of behavior analysts because they allow for the identification of functional relations between the dependent and independent variables at the individual level, where the subject serves as his/her own control (Kazdin 2011). In applied (nonexperimental) interventions, we recommend minimizing the use of reversal/withdrawal designs (ABAB) to reduce some of the potential negative side effects of removing treatment for too long (i.e., extinction effects) and to avoid the absence of effective treatment in place. The practitioner should opt for the use of *multiple-baseline designs*, *alternating designs*, and *changing-criterion designs* whenever possible, all of which still allow for replication and verification effects.

Always keep in mind that behavioral interventions require that we obtain parental consent for participation and also institutional review board (IRB) permission, including a training certification for the interventionist. The practitioner should protect the rights, welfare, and well-being of infant participants and follow the highest ethical standards for conducting human research. In particular, when conducting interventions with infants at risk, the behavior analyst must adhere to the ethical principles outlined by federal and state funding agencies. These ethical guidelines include *protecting humans from any possible harm* and also by making efforts to *secure their well-being* and *confidentiality of results*. Also, the practitioner should ensure they are employing a *sound research design, maintaining scientific*

integrity, and determining the *practical implications* of the work. One must ensure that the research and/or intervention in place contribute to generalizable knowledge and is worth conducting for the social significance of the potential outcomes.

VI. **Intervention/Treatment Specifications** (*BACB Professional & Ethical Compliance Code 4.01 & 4.08*).

With respect to the actual implementation of the intervention, we must keep in mind that infants are incredibly delicate beings, and require special protections and safety measures to ensure procedures are being conducted in the most ethical manner possible. One must always use the *least restrictive procedures* and means to produce meaningful behavioral change. Behavior analysts can establish observable and measurable criteria together with the parent/caregiver. Based on preliminary assessments of the infant's and parent's/caregiver's behavioral interactions and the surrounding environment, we can design our intervention and establish the criteria for when to initiate and terminate procedures. We must ensure that the infant is content during treatment sessions and have clear criteria for the termination of any procedures (e.g., consistent infant crying or protesting for longer than 30–45 seconds or based on parental level of comfort).

Further, we recommend that behavior intervention procedures be carried out by the parent/caregiver directly, and that interventions be primarily conducted in a parent-training format. Given that infants will spend the majority of their time interacting with their parents and other immediate caregivers, teaching these indirect consumers to implement the various treatment procedures may help ensure generality and maintenance of procedures outside of therapy sessions. As briefly mentioned previously, the use of in vivo BST has been demonstrated to be an effective method for training parents/caregivers to implement behavior-analytic procedures with their infants (Neimy et al. 2017, 2020). The use of telehealth and remote training sessions may also be warranted and applicable when providing services to families in remote locations, to minimize reactivity or any unwanted effects of the therapist's presence, and for the potential conveniences associated with avoiding scheduling conflicts, transportation issues, presence of health-concerns (e.g., illness), and reducing the costs and effort associated with participation (Tsami et al. 2019).

As such, the behavior-analytic interventions selected should primarily focus on the use of reinforcement contingencies provided by the parent/caregiver during social interaction, like the use of *modeling*, *prompting*, *shaping* via *DRA* and/or *DRO*. *Least-to-most* or *most-to-least* methods of prompting are often individualized based on the unique needs of each infant. The use of parent/caregiver modelling is integral for facilitating the acquisition of a myriad of pivotal social skills that are prerequisites for more complex social development (e.g., eye contact, vocalizations, joint attention, naming, manding, social referencing, imitation, play behaviors, and pointing/gesturing – see Fig. 13).

Also, we recommend focusing on the *reduction of problematic behavior* (e.g., excessive crying, avoidant social behaviors, and stereotypic behaviors). Extensive baselines and any periods of prolonged extinction should be avoided and replaced with more naturalistic interactions with parents/caregivers using *DRA* and *DRO*

Fig. 13 The outcome of early behavioral interventions is healthy infant social behavior (e.g., eye contact, smiling, vocalizing, pointing, referencing, and playing)



procedures (i.e., reinforcement for replacement and other behaviors) whenever possible. Targeting replacement behaviors is preferable as shown in some of the studies reported earlier in this chapter, where DRO and DRA are typically used instead of extinction. Keep in mind that extinction, time out, and other negative punishment procedures often produce other concomitant undesirable infant behaviors (e.g., anger, frustration, and emotional distress) (Gewirtz and Pelaez-Nogueras 1992).

Taken collectively, the principles of ABA have been effectively used to establish pivotal skills among infants at risk of ASD, developmental disabilities, and other social, emotional, and cognitive behavioral disorders, across a variety of different intervention procedures. While historically mainstream developmental and cognitive psychologists have dominated the literature on interventions, the research by behavior analysts illustrated in this chapter offers a direct application of behavior-analytic principles and intervention methodologies to conceptualize important infant phenomena, like attachment, fear acquisition, language development, joint attention, and social referencing. In this chapter, we have emphasized the importance of early behavioral interventions and evidence-based treatments in addressing critical early social-learning phenomena. We illustrated applications of ABA principles and techniques to establish social skills that are critical precursors and cusps for healthy development, in particular for infants at risk of ASD. The early interventions for infants at risk of ASD we discussed here focus both on the prevention and mitigation of behavioral and social skills deficits in later childhood.

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School Psychology



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Abstract This chapter describes the field of school psychology for behavior analysts who may want to explore training and credentialing as a school psychologist. The discussion of workforce development and job opportunities reveals that job opportunities are plentiful and that demands for school psychologists with behavior-analytic training are increasing. Best practices in the field of school psychology are described according to the competencies established by the National Association of School Psychologists and the American Psychological Association, the two professional associations that govern training and credentialing. These competencies are compared and contrasted with the competencies specified in the BCBA 5th Edition Task List. Readers will discover a number of areas of overlap with their current or desired competencies and several competency areas that fall outside of behavior-analytic training. The chapter describes ethics, regulatory and licensing frameworks for school psychology, and best practices in supervision. Here too, readers will find both overlap and differences between behavior-analytic training and preparation as a school psychologist to work in the schools or in other areas (e.g., private practice as a licensed psychologist). Behavior analysts have great potential for impacting the field of school psychology and schools as credentialed school psychologists. They will need to be discerning, however, about which training program best meets their career goals. Thus, the chapter ends with a discussion of questions behavior analysts should investigate as they pursue future training and practice in the field of school psychology.

Keywords School psychology · Behavior analysis · Training · Education

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Overview of the Field

The National Association of School Psychologists' (NASP 2010a) Model for Comprehensive and Integrated School Psychological Services describes school psychology practice in this way:

School psychologists provide direct educational and mental health services for children and youth, as well as work with parents, educators, and other professionals to create supportive learning and social environments for all children. School psychologists apply their knowledge of both psychology and education during consultation and collaboration with others. They conduct effective decision making using a foundation of assessment and data collection. School psychologists engage in specific services for students, such as direct and indirect interventions that focus on academic skills, learning, socialization, and mental health. School psychologists provide services to schools and families that enhance the competence and well-being of children, including promotion of effective and safe learning environments, prevention of academic and behavior problems, response to crises, and improvement of family–school collaboration. (p. 1)

As an applied psychology discipline like clinical and counseling psychology, school psychology resembles these other disciplines in many of its professional practices. But NASP's description of the field also reflects a couple of distinct features that sets it apart. First, the primary context of school psychology practice—schools—has shaped the population school psychologists serve (students). Second, the nature and types of services that school psychologists deliver involve working primarily *with* other parties (people responsible for the students' welfare—parents, educators, and other professionals) through consultation to improve the learning environment for students. Although school psychologists may provide direct intervention in some cases, their role is largely an indirect one in which they work with these third parties to address “the learning and mental health of all children and youth” in the context of schools (National Association of School Psychologists 2010a, p. 1), drawing on training in both education and psychology.

The field has published six editions of a *Best Practices* book series (Harrison and Thomas 2014), covering all of the various areas of professional practice school psychologists engage in. A perusal of the content of these tomes also illustrates both the breadth of student growth and development problems school psychologists seek to address (i.e., “academic skills, learning, socialization, and mental health,” in the words of the NASP Model) and the often unique assessment, intervention, and consultation frameworks they use to serve students, families, school personnel, and other constituents. Like their colleagues in other applied psychology disciplines, the field of school psychology seeks to adhere to a standard of science-based practice (Armistead and Smallwood 2014; Kratochwill and Stoiber 2002). However, to deal with the unique kinds of research school psychologists draw from, the field has even developed its own “procedural and coding manual” to help practitioners and researchers uphold scientific standards for practice (Kratochwill and Stoiber 2002), again testifying to the distinctive identity of the field.

Specialist-level training (a minimum of 60 graduate semester hours or the equivalent plus a minimum of 1200 clock hours of a specialist-level internship [600 of

which must be completed in a school setting])—almost the double of a master’s degree—is the minimal standard for entry into the field (the details of credentialing and licensing are discussed below). However, school psychologists are trained at both the specialist level (education specialist degree, the EdS) and the doctoral (PhD) level. Many school psychology programs offer training at both levels, with both EdS and PhD students being trained together in common coursework and practica. The chief differences between the two training levels are largely in the depth of training and the range of professional settings in which students are prepared to work once they are credentialed. Whereas EdS-level school psychologists work primarily in public and private schools following credentialing, PhD-level school psychologists tend to work in a broader range of settings, including hospitals, private practice, mental health clinics, and universities as trainers, researchers, or mental health clinicians (National Association of School Psychologists 2010b). Therefore, although school psychology training uniquely prepares students for practice in educational settings, these competencies are very useful in a variety of other settings, and doctoral-level school psychologists have sufficient breadth and depth of training to be competitive job applicants in a wide variety of settings.¹

The field regulates itself internally through two professional associations—NASP (<http://www.nasponline.org/>) and the American Psychological Association (APA, <https://www.apa.org/index>)—that accredit training programs, define professional competencies, advance model certification and licensing laws, and establish and enforce ethical principles. NASP is concerned with both EdS-level and PhD-level training and practice, whereas APA is concerned only with PhD-level training and practice. In an effort to establish a set of national principles for training, credentialing, practice, and ethics, NASP has created a number of documents that address each of these areas individually (Armistead and Smallwood 2014), including the *NASP Model for Comprehensive and Integrated School Psychological Services* (NASP 2010a), *Standards for the Credentialing of School Psychologists* (NASP 2010b), *Standards for Graduate Preparation of School Psychologists* (NASP, 2010c), and *Principles for Professional Ethics* (NASP, 2010d), all of which are on the NASP website (<https://www.nasponline.org/standards-and-certification>). APA is made up of 54 divisions of psychology (<https://www.apa.org/about/division/index>), which are described by its website as “interest groups.” School psychology is Division 16, which defines itself (according to its bylaws, <https://apadivision16.org/wp-content/uploads/2016/11/Division-16-Current-Bylaws.pdf>) as “responsible for the application of sound psychological principles to schooling and education in the broadest sense” (p. 1). It has its own journal and publications, as well as a student affiliate organization.

Although applied behavior analysis’ historical roots reach back in time to the middle of the twentieth century (at least in terms of applications to humans), it is

¹ Some EdS-level school psychologists are also able to work in settings other than schools, but they generally do this under an alternative state credential. For example, the state of Nebraska has the Licensed Mental Health Practitioner credential, which allows license holders to practice on a limited basis outside of the schools.

much younger than school psychology as a distinct applied professional discipline with competency standards developed and maintained by its professional association, ethics codes for practice, and regulatory and licensing frameworks defining the scope of practice. School psychology as an applied discipline grew immensely when the Education for All Handicapped Children Act of 1975 (Public Law 94–142) became federal law. All of a sudden, schools needed trained professionals to conduct assessments for special education verification, and school psychologists responded to the call. State certification and licensure standards eventually ensued as NASP and APA created and advocated strongly for model legislation. Yet, school psychology services expanded beyond psychoeducational assessment to include behavioral assessment, intervention design, and consultation, as our brief introduction demonstrates. Although school psychology programs must train students in all these areas, each program places more or less emphasis on different areas according to faculty interests and areas of expertise.

We assume that you are reading this chapter because you are interested in both ABA and school psychology. We expect that some of our readers are at the beginning of their training and wish to combine school psychology and ABA, whereas others of our readers may already have the BCBA credential and are looking for school psychology training to expand their professional opportunities. Accordingly, we describe the job opportunities in the field of school psychology along with training and credentialing requirements so that you will know what to look for and expect in school psychology programs. We trust that you will see that there are considerable opportunities for BCBAs who are credentialed school psychologists, as well as overlap between the fields. For example, the competencies of BCBAs detailed and outlined in the BACB Task List overlap with the competencies that school psychologists should possess according to the field's standards (as defined by NASP and APA), as you will see later in the chapter. Schools desperately need well-trained professionals who are competent in the areas defined by the BACB Task List. Behavior analysts who enter the field of school psychology will be well prepared in vital forms of service delivery with a strong specialization in ABA. School psychology certification and licensure can expand your job opportunities as well as your scope of practice. Finally, we will give you questions to guide your investigation of possible school psychology training programs to help you determine whether they are a good fit for your professional interests.

Workforce Development and Job Opportunities

In 2019, the US News and World Report ranked school psychology as #2 in their rankings of social service jobs based on job availability, satisfaction, and salary, among other things (<http://money.usnews.com/careers/best-jobs/rankings/best-social-services-jobs>). The report indicated that the field should expect to see approximately 14.3% growth in jobs between 2016 and 2026, according to the Bureau of Labor and Statistics. The median salary of school psychologists was

\$75,090 in 2017, according to the report. The US News and World Report also evaluated job satisfaction among school psychologists in terms of upward mobility (reported as “average”), stress level (reported as “above average”), and flexibility (reported as “average”).

Currently, the field cannot train school psychologists fast enough to meet the needs of schools. School psychology shortages are evident at the national and regional levels and have been for quite a while. National surveys routinely find shortages of school psychologists, which has been described as “severe” (Curtis et al. 2004). More recently, Castillo et al. (2014) conducted a follow-up study on the school-psychology-shortage crisis and found that shortages are expected to continue through 2025. In a NASP Research Report published in June of 2018, Walcott et al. (2018) described the field’s workforce shortage problem as existing since the field’s early origins and likely to continue “for the foreseeable future” (p. 1). A 2006 report from the Center on Personnel Studies in Special Education (Canter 2006) concluded that due to concerns with supply and demand, “the school psychology profession will face significant challenges in achieving its goals for comprehensive, culturally competent service delivery” (Canter 2006, p. 29). We are witnessing the fulfillment of that prediction today.

While the workforce shortage may seem like a positive prospect for current school psychology trainees in terms of job availability, severe national and regional shortages are likely to restrict the scope of services that school psychologists can offer (Walcott et al. 2018). The NASP Practice Model (2010a) recommends a ratio of 1000 students to 1 school psychologist and even smaller (i.e., 500–700 students for each school psychologist) if school psychologists are to provide broad and comprehensive services that include things like consultation, crisis intervention, and behavioral interventions. Walcott et al. (2018) found a current overall average ratio of 1381 students for every school psychologist in their recent survey and that only 37.2% of respondents worked in school districts that met the NASP-recommended ratio of 1000 to 1. The problem may be compounded by a significant shortage of school psychology trainers that has also existed for a long time and continues to be an ongoing problem in the field (Clopton and Haselhuhn 2009). Walcott et al. (2018) point out that ongoing trainer shortages and increasing retirements in the field will probably only further exacerbate the workforce shortage. There is thus a desperate need for more school psychologists and more school psychology trainers, and there are some data that suggest that behavior analysts are in an excellent position to help fill that need.

The Behavior Analyst Certification Board hired Burning Glass Technologies to do an analysis of the demand in the United States for credentialed behavior analysts (Burning Glass Technologies, 2015). The report indicates that there was almost a threefold increase in job postings for clinical, counseling, and school psychologists demanding behavior analyst skills between 2012 and 2014 (with job postings increasing from 146 to 425 during that span). The title of “school psychologist” is third in the list of jobs requiring behavior analyst credentials from 2012 to 2014, following “behavior/behavior analyst” (#1) and “board-certified behavior analyst” (#2). These results suggest that schools are explicitly seeking school psychologists

with behavior-analytic training. This rapid increase in demand for school psychologists with behavior analyst credentials is not surprising in light of the competencies that behavior analysts bring to the role of the school psychologist, an issue discussed in more detail below.

On a more anecdotal level, Ed Daly (the first author) has taken to routinely asking behavior analysts who attend his workshops on school-based consultation how they began working in the schools. It is striking how often schools are hiring BCBAs when schools are not actually required to hire behavior analysts. Schools *are* required to hire state-certified school psychologists, guidance counselors, nurses, social workers, etc., but *not* BCBAs. Yet, schools are increasingly offering BCBAs contracts and full-time paid positions. The sample is obviously limited and the investigation lacks all the rigor we as behavior analysts are accustomed to look for. But the field is in transition as it grows. These testimonials at this early period are rather revealing. Without exception, every one of the BCBAs I spoke with told a similar story. They were working privately with a family who then had them work with the school to help expand their child's programming to the school. When the school personnel saw what the BCBAs were able to do with the child, the school hired them to work with other children. In many cases, the school then expanded their role to include developing training and implementation programs when they saw the results they were able to achieve.

We recognize that we cannot put a percentage on the number of behavior analysts working in the schools who came by their jobs in this way. Behavior analysts have worked in the schools for years. However, the BCBA credential is rather new, and schools have no obligation to hire BCBAs; yet, we are witnessing an increase of BCBAs being hired not necessarily as teachers or school psychologists but as BCBAs in their own right. The reason for this seems to be that BCBAs' competencies are highly desirable to the schools. As we explore the standards and professional competencies of school psychologists below, you will see that trained BCBAs are already prepared in some of these areas (e.g., data-based decision-making, intervention design). We suspect that BCBAs with school psychology training will become increasingly coveted by schools all over the country, especially as schools continue to expand service delivery models like multitiered systems of support (e.g., response-to-intervention, positive behavior intervention support) that require professionals competent at providing consultation, behavioral assessment, and intervention support for academic and behavior problems.

Best Practices

NASP and APA have both defined the professional competencies for school psychologists, each at different levels (NASP primarily for entry level as a state-certified school psychologist and APA for entry-level, license-eligible psychologists). These competencies overlap with the competencies specified in the BCBA Task List, but there are some differences which are discussed at the end of this section.

NASP’s Competencies NASP’s competencies are outlined in the NASP Practice Model (2010). However, a visionary document called “School psychology: A blueprint for training and practice III” (Ysseldyke et al. 2006), also published by NASP, has a helpful figure that shows the relationship of school psychology competencies specified in the NASP Practice Model to the delivery systems within which school psychologists operate and the kinds of outcomes they work to generate. The Blueprint III predates the practice model and played a major role in shaping it. A reproduction of the figure appears in Fig. 1. The domains of competence (described below) are to the left. These professional competencies can be viewed as the inputs school psychologists provide into schools (the delivery system) for meeting the needs of *all* students. We will discuss these after looking at the delivery systems in which school psychologists work and the outcomes they strive to achieve.

Although school psychologists have traditionally been more aligned with special education services to address the needs of students at risk for or experiencing school failure through diagnostic classification practices, a nationwide shift to multitiered intervention delivery systems has expanded the field’s conceptualization of the populations it serves as well as the practices that it engages in. School psychologists now see themselves as working to address the needs of *all* students, not just those at risk or eligible for special education services, which is why the NASP (2010a)

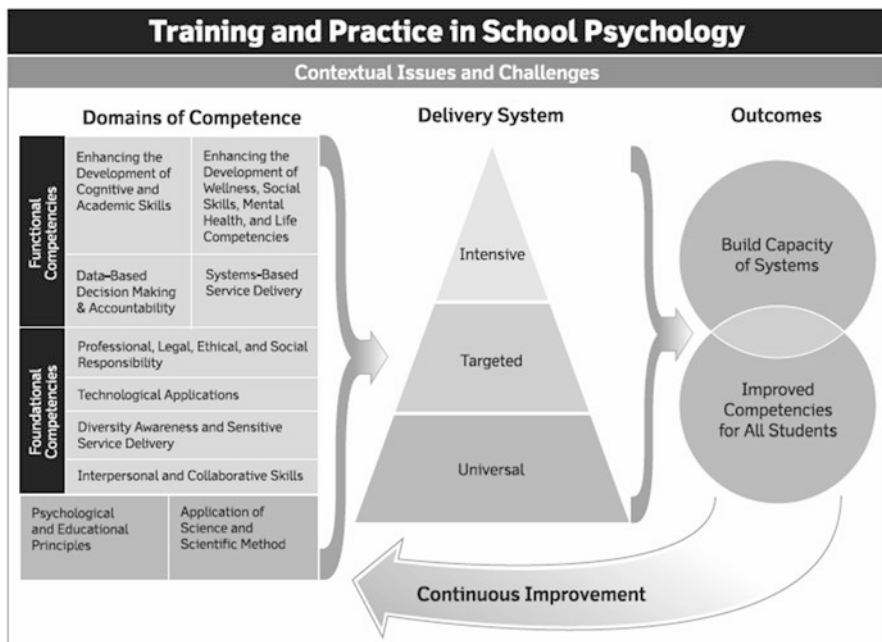


Fig. 1 The Blueprint III (Ysseldyke et al. 2006) model for training and practice in school psychology. Copyright (2006) by the National Association of School Psychologists, Bethesda, MD. Reprinted by permission of the publisher. www.nasponline.org

Model for Comprehensive and Integrated School Psychological Services quoted at the beginning of the chapter speaks of students in general and not specific subpopulations of students in schools. The three-tier triangle under “delivery system” in Fig. 1 reflects the types of multitiered intervention delivery systems (middle of the figure) that have become increasingly prevalent in the schools. Multitiered systems of support (MTSS, originally called response-to-intervention) grew out of the prevention literature, which defines different levels of support available to all members of a population and a continuum of intensity of services for at-risk students and students with disabilities in need of the most intense intervention (Erchul and Martens 2010). MTSS involves universal screening to identify needed level of support for all students and increasingly intense, structured accommodations and remedial instruction for students who are not succeeding at the universal level of support, which would be the regular curriculum in schools. These students are moved to “targeted” or “intensive” levels of intervention based on regular progress-monitoring and supplemental interventions. The desired outcomes of the field of school psychology are to help “build capacity of systems” and collaterally improve “competencies for all students” through a continuous improvement process (Fig. 1).

Therefore, within this type of delivery system and with these desired outcomes in mind, school psychologists must master and apply both functional competencies and foundational competencies. Foundational competencies that should permeate everything the school psychologist does include highly developed interpersonal and collaborative skills, diversity awareness and sensitive service delivery, use of technology, and exhibiting the highest level of professional, legal, ethical, and social responsibility. Functional competencies also permeate everything school psychologists do to some degree, but they are more technical competencies in nature. Functional competencies include data-based decision-making and accountability, systems-based service delivery, and two areas related to intervention design: enhancing the development of cognitive and academic skills (academic intervention) and enhancing the development of wellness, social skills, mental health, and life competencies (behavioral intervention). These competencies drive (a) NASP’s standards for graduate training (discussed below) and (b) its promises to society about what entry-level practitioners are prepared to do for their students. The Blueprint III also specifies a core foundation of psychological and educational principles and scientific-based practice in which school psychologists should receive training. These foundational areas include things like measurement, human development, and research methodology, which school psychology graduate students can expect to have to study in their training programs.

APA’s Competencies APA has established the Competency Benchmarks in Professional Psychology (available at <https://www.apa.org/ed/graduate/competency>) as an organizational framework for a set of core competencies for individuals practicing within professional psychology. The purpose of the benchmarks is not to outline a set of requirements but to be a resource to guide the curriculum standards for professional psychology education and training programs given that there is a wide variety of training settings and unique competency emphases across the field.

APA is vague in the details of how each competency should be operationalized at the individual level (probably by necessity), presumably expecting that training programs will interpret and modify components of the benchmark-based approach for their program.

Within this competency benchmark framework, there are six competency clusters, including professionalism, relationships, application, science, education, and systems. Within these competency clusters, 16 core competencies are outlined with corresponding essential “components” (APA’s term). The APA competency clusters and corresponding essential components appear in Table 1. Each essential component has developmental descriptors and behavioral anchors delineated for each of the three states of the education and training sequence (i.e., readiness for practicum, readiness for internship, and readiness for entry to practice).

Comparing Competency Areas There is a considerable amount of overlap between the BCBA Task List (5th ed.) and NASP and APA in terms of broad areas of professional competency (see Fig. 2). All three include ethical and professional responsibilities, a topic which is discussed in the next section. All three emphasize competencies in scientific knowledge and research methods. All three also include foundational knowledge related to basic concepts and principles. NASP calls it “psychological and educational principles.” It is not as evident in APA’s competency domains, but it is covered through the foundational areas of coursework required of APA-accredited training programs. The BCBA Task List deals exclusively with basic principles of behavior, whereas APA and NASP are more eclectic in nature and do not have this degree of specificity, let alone items even related to basic principles of behavior. The three areas cover similar competencies in the Task List’s domain of “measurement, data display, and interpretation.” NASP calls it “data-based decision-making,” and APA calls it “evaluation.” Here too, the BCBA Task List competencies are more specific than those described by NASP and APA. The

Table 1 APA competency clusters and essential components

I. Professionalism	1. Professional values and attitudes 2. Individual and cultural diversity 3. Ethical legal standards and policy 4. Reflective practice/self-assessment/self-care
II. Relational	5. Relationships
III. Science	6. Scientific knowledge and methods 7. Research/evaluation
IV. Application	8. Evidence-based practice 9. Assessment 10. Intervention 11. Consultation
V. Teaching	12. Teaching 13. Supervision
VI. Systems	14. Interdisciplinary systems 15. Management-administration 16. Advocacy

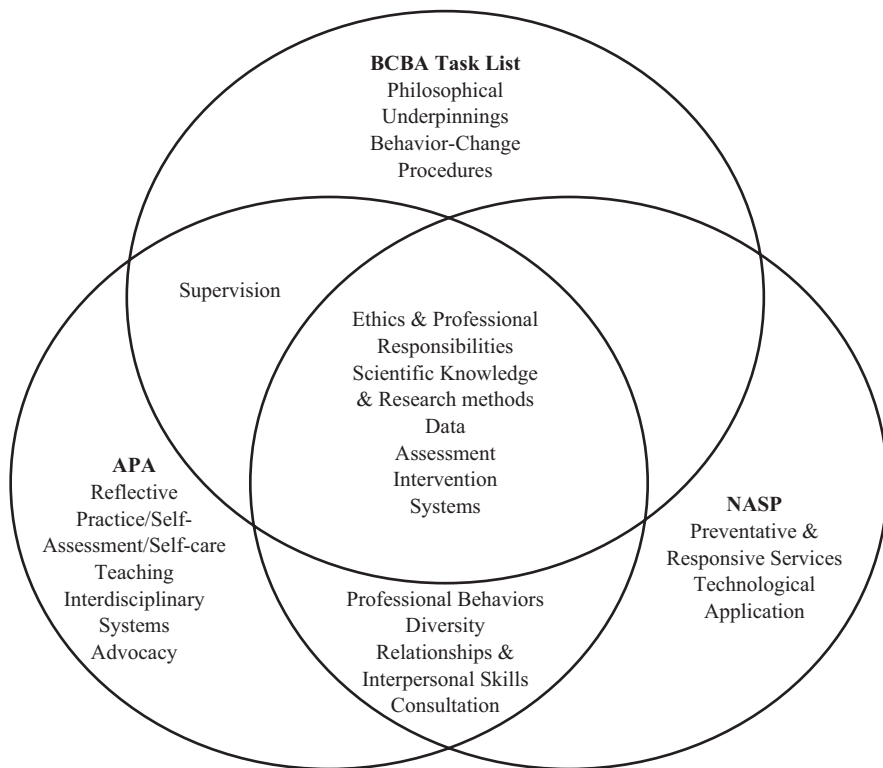


Fig. 2 Venn diagram representing the competencies specified by NASP, APA, and the BACB

BCBA Task List and APA both include supervision competencies. Assessment and intervention (academic and/or behavioral) and the idea of evidence-based practice are also included in all three fields, albeit with somewhat different names. In this area also, the BCBA Task List will have a more narrow set of competencies than NASP and APA, which are more wide-ranging. The BCBA competencies related to “personnel supervision and management” overlap somewhat with NASP’s domain of “systems-based service delivery” and APA’s domain of “management-administration.” But NASP and APA address a broader scope of practice (in terms of services provided and populations served), and the areas are not entirely overlapping between the fields. APA and NASP are more explicit in their stated competency areas in terms of professional behaviors and awareness of issues of individual and cultural diversity, as well as relationships and interpersonal communication skills. The field of ABA has covered these competencies as ethical expectations as described in the BCBA Ethics Code. APA has an explicit competency related to “reflective practice/self-assessment/self-care” which the BCBA Task List does not address. NASP has competencies related to “technological applications” which the BCBA Task List does not address.

The Ethics of School Psychology Practice

School psychologists should be knowledgeable in and practicing in accordance with NASP's (2010d) Principles for Professional Ethics. Because NASP is an organization by, for, and of school psychologists, the content of the "Principles for Professional Ethics" is specific to school psychologists. NASP's Principles for Professional Ethics focuses on the provision of services in a school-based practice and is organized into four broad themes: Respecting the Dignity and Rights of All Persons, Professional Competence and Responsibility, Honesty and Integrity in Professional Relationships, and Responsibility to Schools, Families, Communities, the Profession and Society. These themes are further broken down into principles and specific standards. The NASP ethics code can be found at <https://www.nasponline.org/standards-and-certification/professional-ethics>.

Within the domain of Respecting the Dignity and Rights of All Persons, NASP addresses ethical principles and standards for consent and assent, privacy and confidentiality, and fairness and justice. Within Principle I.3 Fairness and Justice, school psychologists are called to "cultivate school climates that are safe and welcoming to all persons, regardless of actual or perceived characteristics including race, ethnicity, color, religion, ancestry, national origin, immigration status, socioeconomic status, primary language, gender, sexual orientation, gender identity, gender expression, disability or any other distinguishing characteristics" (NASP 2010a, b). NASP calls upon school psychologists to be proactive in addressing and eliminating instances of bias in their own practice, the schools they serve, and in their communities.

The theme of Professional Competence and Responsibility outlines school psychologists' responsibilities to act with beneficence (i.e., for the good and well-being of others), practice within the bounds of their competency, use scientifically informed assessment and intervention practices, and appropriately maintain and safeguard records. Within the theme of Honesty and Integrity in Professional Relationships, school psychologists must accurately represent their professional qualifications, adequately explain their services, cooperate with other professionals, and avoid multiple relationships and conflicts of interest that may adversely impact their effectiveness. Under the theme of Responsibility to Schools, Families, Communities, the Profession and Society, school psychologists should promote safe and healthy school, family, and community environments. School psychologists should also engage in self- and peer-monitoring of conduct for adherence to ethical standards. In addition to monitoring, school psychologists should contribute to the field by mentoring, teaching, and supervising less experienced graduate students and professionals. NASP's Principles for Professional Ethics acknowledges the systems-based influence psychologists can have both in the field- and school-based settings.

Psychologists at the doctoral level (school psychologists or otherwise) must also be knowledgeable in and adhere to APA's *Ethical Principles of Psychologists and Code of Conduct* (2010) as well, which contains general principles that are

aspirational and represent the “highest ethical ideals of the profession” as well as specific, obligatory ethical standards (APA 2010). Principle A: Beneficence and Non-maleficence obligates psychologists to strive to benefit clients and “take care to do no harm.” Principle B: Fidelity and Responsibility requires psychologists to conduct themselves professionally as they serve the individuals they work with, their communities, and the scientific community and cooperate with other professionals. Principle C: Integrity compels psychologists to be accurate and honest in their domains of practice including provision of services, teaching, and scientific contributions. Principle D: Justice requires psychologists to ensure fairness and justice to all in the processes, procedures, and services of psychological work. Unlike NASP, APA places its diversity protections under Principle E: Respect for People’s Rights and Dignity instead of under Principle D: Justice. Within Principle E, APA calls upon psychologists to “eliminate the effect” of biases on their work.

Psychologists are obligated to abide by APA’s ethical standards. Standard 1 (Resolving Ethical Issues) outlines the procedures for resolving ethical issues. Standard 2 (Competence) directs psychologists to “provide services, teach, and conduct research” within the bounds of their competence as informed by their education, training, experiences, consultation, research, and supervision. Standard 3 (Human Relations) calls on psychologists to refrain from engaging in discrimination, harassment, exploitative relationships, and multiple relationships. Psychologists must also take care to avoid or minimize harm. Standard 4 (Privacy and Confidentiality) establishes best practices for informing clients of the limits of confidentiality. Standard 5 (Advertising and Public Statements) provides guidelines for appropriate professional statements disseminated as advertisement; representations of professional training, education, or credentials; and contributions to the media. Standard 6 (Record Keeping and Fees) outlines the appropriate procedures for maintenance, distribution, and disposal of records for both professional and research work (APA 2010). Standard 7 (Education and Training) outlines the requirements for psychologists educating and training students. Specifically, they are obligated to provide appropriate descriptions of programs, develop course syllabi, and assess student and supervisee performance. Standard 8 (Research and Publication) directs psychologists to obtain informed consent from participants when appropriate, accurately report research results, refrain from plagiarizing, and recognize individuals with research credit appropriate for their contributions. The bases, selection, use, development, security, reporting, and explanation of assessment are covered in Standard 9 (Assessment). Standard 10 (Therapy) describes procedures for obtaining consent, providing referrals for interruption of therapy, and terminating therapy (APA 2010).

Behavior analysts are bound by the Behavior Analyst Certification Board’s (BACB) *Professional and Ethical Compliance Code for Behavior Analysts* (https://www.bacb.com/wp-content/uploads/BACB-Compliance-Code-english_190318.pdf). Overall, there is considerable overlap in professional and ethical compliance codes for the BACB, APA, and NASP, including practicing within the boundaries of one’s competence; avoiding relationships with clients, constituents, and other professionals; respecting for the dignity and rights as well as the individual

characteristics of clients; displaying honesty and integrity; and benefiting rather than harming clients. Because professional service to private clients is a prominent characteristic of both ABA and licensed doctoral-level psychologists, the BACB and APA each address private practice issues. NASP's focus on schools adds a slightly different but not incompatible dimension to school-based practice. School psychologists will be actively recruiting and promoting parent involvement in schools to improve students' educational opportunities. Therefore, the dynamics of consent and respect for privacy and confidentiality are similar but are operationalized somewhat differently in schools than in private practice.

Perhaps the greatest area of importance has to do with legal obligations to uphold and maintain state and federal education laws. We do not see any areas of conflict here for behavior analysts, but behavior analysts will need to be knowledgeable about these laws and how school professionals are obligated to fulfill them. One area that will be different for behavior analysts will have to do with ABA's commitment to basic principles of behavior over and above other conceptual paradigms (e.g., cognitive approaches). BCBA's are ethically obligated to implement interventions based on principles of behavior and thus be conceptually consistent with the field's basic theoretical and empirical orientation. NASP and APA are not committed to ABA's conceptual paradigm. This does not create a conflict for behavior-analytic school psychologists per se. There are plenty of school psychologists who function as behavior analysts. However, because NASP and APA embrace broader and more diverse conceptual paradigms, what is justified as science-based practice in the eyes of these broader fields can look different from what behavior analysts expect and are used to. Thus, those with a behavior-analytic orientation looking to be trained or retrained as school psychologists will certainly encounter practices that their trainers and colleagues will describe as scientifically supported but which will not fall as neatly under the coherent conceptual system of principles of behavior that drive behavior-analytic practice. BCBA's are ethically required to use the least restrictive procedure to intervene, which turns out to be a legal mandate in schools as a part of federal special education law. Functionally, the outcome is the same: both school psychologists and BCBA's should be implementing the least restrictive procedure. However, dealing with failure in this point will be handled differently in the schools than behavior analysts might be used to in other settings.

Regulatory and Licensing Frameworks for School Psychology

As previously noted, school psychologists' unique roles and responsibilities require specialized training and credentialing. The types of credentials school psychologists can pursue are dependent on (a) their graduate training program's accreditation status, (b) the degree they receive (EdS or PhD), (c) the credential(s) for which they are eligible (state certification as a school psychologist and/or licensure as a psychologist), and (d) post-training requirements for certification or licensure. EdS

and PhD students are potentially eligible for state certification as a school psychologist and certification as a Nationally Certified School Psychologist through NASP. PhD students are also potentially eligible for licensure as psychologists under a state licensing board.

Graduate Training and NASP Program Approval As the two major associations representing the field of school psychology, NASP and APA play a key role in setting standards for and approving/accrediting school psychology training programs and internships. NASP approves training programs at both the specialist and doctoral levels in school psychology. The NASP (2010c) *Standards for Graduate Preparation of School Psychologists* delineate graduate education experiences and competencies required by school psychology candidates at both the specialist and doctoral levels. Graduate education in school psychology must generally include substantial, specific course work and supervised field experiences in order to prepare for school psychology practice. School psychology programs at both the specialist and doctoral levels should explicitly identify as a school psychology program in their institutions, reflect the 10 comprehensive and integrated domains of school psychology, provide specific course sequences, and have highly qualified faculty members who primarily identify as school psychologists (NASP 2010c). Additionally, students in NASP-approved programs are required to complete practica and internships in order to attain and demonstrate application of knowledge and skills within relevant settings and receive appropriate supervision (NASP 2010c).

Specialist-Level Training The specialist degree is the minimum standard of training required to become a school psychologist. Within a specialist-degree program, NASP requires 2 years of academic study and practice, as well as a full-time academic-year internship for at least 1200 clock hours (NASP 2010c). In total, a specialist program typically requires a minimum of 60 total academic credit hours over a 3-year period (Merrell et al. 2012).

Doctoral-Level Training At the doctoral level, candidates obtain more in-depth training over a minimum of 4 years of full-time study and 90 total credit hours (NASP 2012c). NASP requires doctoral candidates to have a 1-year supervised predoctoral internship for at least 1500 clock hours. According to NASP training standards, at least 600 hours should be in a school setting if an individual wants to practice in schools (Merrell et al. 2012). NASP, however, allows doctoral training programs to substitute a 600-hour school-based practicum experience prior to the internship as fulfilling this requirement, as a large percentage of doctoral-level trainees do their internships in nonschool settings.

Retraining Programs Alternatively, professionals who hold a graduate degree in related fields (e.g., counseling psychology, clinical psychology, ABA) can seek graduate training and prepare for credentialing as a school psychologist through respecialization or retraining via programs that meet requirements consistent with NASP graduate preparation standards (NASP 2010c). A statement on NASP's website says, "Many certified teachers, school counselors, school administrators, social workers, mental health counselors, clinical psychologists, and other psychology and

education-based professionals have foundational knowledge in one or more of the **NASP Domains of Practice**” (<https://www.nasponline.org/resources-and-publications/resources-and-podcasts/school-psychology/shortages-in-school-psychology-resource-guide/recruitment/recruiting-practitioners/respecialization>). Although their statement does not specify behavior analysts, many of the competencies that behavior analysts possess (behavioral assessment, functional assessment, intervention design, data-based decision-making) will probably make BCBAs attractive to school psychology programs that have a behavioral orientation. Ultimately, the BCBA seeking retraining as a school psychologist would have to negotiate which prior courses would meet program requirements. NASP (2010b) states, “The program would apply systematic evaluation procedures and criteria to grant recognition of candidates’ prior courses/field experiences and to identify additional graduate courses and experiences necessary for candidates to meet school psychology program requirements” (p. 4).

The Intersection of NASP Training Standards and Behavior-Analytic Practice According to NASP standards, school psychologists should receive training and be competent in the areas of behavioral assessment and interventions, including collecting and interpreting behavioral data, developing and monitoring individual student behavior intervention plans, and implementing behavior therapy (<https://www.nasponline.org/about-school-psychology/who-are-school-psychologists>; <https://www.nasponline.org/x32089.xml>). Behavior-analytic interventions for behavior and academic interventions are at the fore of best practice in schools, with many behavior-analytic researchers publishing frequently on these topics in school psychology journals. Therefore, these skills are highly valued in the field. However, NASP does not explicitly list ABA as a required area of training, although we are aware that NASP accepts coursework on ABA as meeting its standards for behavioral and academic interventions. The amount of training in applied behavior analysis appears to vary between graduate programs. We hope that as federal and state laws and school districts move from “traditional” psychoeducational testing and classification practices and toward more multitiered systems of support, school psychologists will be able to shed the “gatekeeping” role of testing students for special education eligibility and engage in more functional behavioral assessment and intervention design within a consultative model.

Graduate Training and APA Program Accreditation While APA and NASP overlap in many of their training and professional standards, the largest difference is that APA is primarily concerned with and responsible for accrediting doctoral-level school psychology programs. Many doctoral-level training programs pursue and maintain APA accreditation so that their students can obtain APA-accredited internships, which is a prerequisite to licensure as a psychologist. APA requires that doctoral candidates complete at least 2000 clock hours during their internship. In addition, most doctoral-level school psychologists complete a 1-year supervised postdoctoral residency in order to accrue enough supervised hours (3000 between internship and postdoctoral residency) to become an independent, licensed psychologist (see licensure section). However, the total number of required hours of

supervised practice varies by state, and an increasing number of states are no longer requiring a postdoctoral year. APA's guidelines and principles for accreditation of both doctoral graduate programs and internships in professional psychology can be found at <https://www.apa.org/about/policy/accreditation-archived.pdf>.

Another important organization for doctoral-level school psychology trainees to be aware of is the Association of Psychology Postdoctoral and Internship Centers (APPIC). While separate from APA, APPIC facilitates the National Match Program that assigns all doctoral-level psychology students to internships (including APA-accredited programs). It also supports postdoctoral training placements. More information about APPIC's membership criteria for internship programs can be found at <https://www.appic.org/Internships/Internship-Membership-Criteria> and for postdoctoral ("postdocs") can be found at <https://www.appic.org/About-APPIC/APPIC-Policies/Postdoc>.

Credentialing Individual states and provinces govern and authorize professional credentials for practice, as there is no national-level licensing body that provides credentials to work in the field (Merrell et al. 2012). Although NASP and APA do not actually credential school psychologists, NASP-approved and APA-accredited training and professional requirements are almost always sufficient for credentialing in any state or province. The following section will provide more information on the three primary credentialing processes school psychologists may undergo during their career: state department of education certification, the National Certification of School Psychology Credential (NCSP) from NASP, and licensing from state psychological licensing boards for independent practice as a psychologist (Merrell et al. 2012).

State Department of Education Certification for School Psychologists School psychologists at the specialist level must receive credentials from the educational licensing agency of their particular state or provincial department of education. The state-level credential allows practitioners to work under the title "school psychologist" but does not authorize their use of the title "psychologist" outside of school settings. The NASP *Standards for the Credentialing of School Psychologists* (NASP 2010b) provides a model to state education agencies and other state/local entities, as well as criteria for initial credentialing and credential renewals in school psychology. However, standards for entry into the field will vary by state, and those interested in school psychology should review requirements from their own state or province. More information about each state's individual credentialing requirements can be found at <https://www.nasponline.org/standards-and-certification/state-school-psychology-credentialing-requirements>.

National Certification of School Psychology Credential (NCSP) School psychologists may also seek a NCSP credential in addition to the one provided by the state in which they work. The NCSP credential provides practitioners with recognition that they meet national standards for graduate training, knowledge, and skills as a school psychologist. The NCSP credential can also offer increased job flexibility, mobility, and employment benefits to practitioners. The NASP *Standards for the*

Credentialing of School Psychologists (NASP 2010b) define the requirements for the Nationally Certified School Psychologist (NCSP) credential. Additional information about the NCSP, including eligibility, renewal, and continuing professional development, can be found at <https://www.nasponline.org/standards-and-certification/national-certification>. At the time of this writing, 33 states accept the NCSP as meeting or partially meeting state credentialing requirements. Additionally, eight states allow practitioners to use their NCSP credential status to fulfill renewal requirements for state credentialing. Those interested in seeking the NCSP credential can check whether their state recognizes the credential at <https://www.nasponline.org/standards-and-certification/national-certification/why-become-an-ncsp>. Students who graduate from a NASP-approved program will have met all of the NCSP requirements except for the professional exam—the Praxis School Psychologist test (#5402). The Praxis serves as a measure of acceptable entry-level knowledge competency for school psychologists. The Praxis is also required by many state education agencies for state certification. Students who graduate from a NASP-approved program must apply for the NCSP credential within 10 years of graduating in order to receive NCSP. More information on and resources for the Praxis can be found at <http://www.ets.org/praxis/prepare/materials/5402>.

State Board of Examiners in Psychology License for Psychology Doctoral-level school psychologists may seek licensure through their state board of examiners in psychology.

A license in psychology provides certification for independent practice as a “psychologist” (versus “school psychologist”) and allows practitioners to provide services across settings without the supervision of another mental health professional (Merrell et al. 2012). The same credentialing policies and standards are required for school psychologists as those for other specialties in professional psychology (e.g., clinical, counseling). In-depth information on state licensure can be found through the Association of State and Provincial Psychology Boards (ASPPB; www.asppb.net). In addition to graduate training, individuals must obtain passing scores on the Examination for Professional Practice in Psychology (EPPP), state or local jurisprudence exams (laws and ethics), and sometimes an oral exam or case presentation. Each state or province has its own criteria for a “passing score” on these examinations (Merrell et al. 2012). ASPPB provides a helpful guidance document on the “Path to Licensure” (https://cdn.ymaws.com/www.asppb.net/resource/resmgr/Mobility_Path_to_Licensure_December_2.pdf), as well as the “ASPPB PSY Book,” an online reporting tool for licensure requirements (<http://psybook.asppb.org/>). Those interested in licensure should also contact their local state, provincial, and territorial licensing board (<https://www.asppb.net/page/BdContactNewPG>), as these boards govern each state’s licensure laws. Individuals who foresee professional mobility across states may seek several resources (e.g., Certificate of Qualification in Professional Psychology; CPQ) through ASPPB’s Mobility Program (<https://www.asppb.net/page/Moboverview>).

Best Practices in Supervision

As in the other areas, both NASP and APA maintain standards for supervision of trainees, which is vital to the ongoing maintenance and growth of the field. NASP's Principle IV.4 outlines standards for mentoring, teaching, and supervision. NASP's position statement on Supervision in School Psychology can be found at <https://www.nasponline.org/x26834.xml>. With respect to APA's Ethical Principles of Psychologists and Code of Conduct, standards for supervision can be found in Standard 7, available at <https://www.apa.org/ethics/code>. APA Guidelines for Clinical Supervision in Health Service Psychology can be found at <https://www.apa.org/about/policy/guidelines-supervision.pdf>. Supervision of psychological services for less experienced clinicians involves monitoring and supervising service delivery in the areas of assessment, intervention, and consultation. Supervision of graduate students and interns is vital to helping trainees develop appropriate levels of competence with actual field-based experiences before becoming credentialed. Supervisors should provide supervisees with support, appropriate autonomy, and encouragement (Falender and Shafranske 2007). For instance, supervisors should model case conceptualization and therapeutic relationships with clients for supervisees (Falender and Shafranske 2007). They should also assign supervisees tasks with which they are reasonably competent and can be expected to be complete successfully with appropriate support.

In addition, supervisees are entitled to timely and effective feedback (Goodyear and Rodolfa 2012). Supervisors must provide both formative and summative evaluation (Falender and Shafranske 2007). The supervisor also has a responsibility to report progress of the supervisee to relevant parties including, if relevant, the supervisee's training institution, the site's training director, and potentially prospective employers. Supervisees should have opportunities to remediate performance deficits consistent with the supervisory contract and program goals. Finally, supervisors must be able to develop and maintain a strong supervisory alliance with the supervisee by identifying and addressing ruptures within the supervisory relationship (Falender and Shafranske 2007). Due to the evaluative nature of the relationship, a supervisee confidentiality differs substantially from that of client confidentiality and confidentiality in that it is much more limited; however, many of the same ethical considerations apply. Best practices include giving supervisees an opportunity to provide informed consent at the beginning of the relationship (Goodyear & Rodolfa, 2012).

The field of psychology is increasingly moving toward a competency-based framework for supervision of less experienced psychologists. A workgroup dealing with students with competence problems was developed by the Council of Chairs of Training Councils and became affiliated with the Education Directorate of the American Psychological Association (Kaslow et al. 2007). This group proposed a framework for beginning to implement a competency-based system of supervision for the training of future psychologists and the monitoring of practicing psychologists. The proposed framework was not intended to be a set of rules or standards but rather

to start a dialogue in the profession about what competence means and what behaviors constitute competent provision of services (Kaslow et al. 2007). Some qualities that make competent clinicians are so foundational they must be selected rather than trained in candidates. For example, there are judgment and reasoning skills and social relationship competencies that are beyond the capacity of training programs to teach. Training programs have to select candidates possessing these foundational skills to build upon. Falender and Shafranske (2007) suggest using components of the application process (e.g., letters of recommendation, personal statements) to assess a client's personal attributes such as communication skills, empathy, and warmth, which is what school psychology training programs generally do. Competence-based supervision should include opportunities for remediation. Failing to become competent in a certain area should not lead to immediate termination from a program or referral to a licensure board but instead lead to opportunities for the trainee to receive additional training, experience, and supervision in areas of professional need (Kaslow et al. 2007). When students fail to live up to professional expectations, supervisors and trainers are obligated to work with them to develop a remedial plan that (a) specifies the areas of needed growth; (b) establishes objective criteria for achieving them, monitoring the trainee's progress in these areas, and providing formative feedback; and, if necessary, (c) establishes grounds for termination should the trainee fail to live up to professional expectations.

Training opportunities and supervision must be provided in all of the competency areas specified by APA and NASP to assure minimal competency levels for entering the field. Opportunities and supervision will be influenced, however, to some degree by the emphases of the training program. Some training programs embrace more of a behavioral and ecological approach that emphasizes consultation, intervention design (both behavioral and academic), and multitiered systems of support like response-to-intervention and positive behavior intervention support, whereas other programs emphasize more of a psychometric approach that emphasizes the use of norm-referenced tests and psychodiagnostic practices. Training and supervision experiences will be shaped by the program's orientation, with greater concentration of experience and supervision in some practices than in others. For behavior analysts aspiring to receive training as school psychologists, it will be important to gauge the philosophy and emphasis in training experiences of the programs and how well they fit with their interests. Even though school psychology curricula are often aligned with multiple accreditors (e.g., APA, NASP, BACB, ABAI Accreditation Board) and state departments of education, school psychology programs have a lot of latitude in how they shape their students' training experiences. Thanks largely to NASP's domains of professional practice (data-based decision-making and accountability, consultation and collaboration, etc.), behavior analysts pursuing school psychology training can be reasonably sure that they will receive practice opportunities and supervision in areas like behavioral assessment, evidence-based academic and behavioral interventions, multitiered systems of support, and consultation that should appeal greatly to them.

Conclusion

Behavior analysts—especially those already working in the schools—will see many similarities between their field and that of school psychology. We hope that the differences our readers see intrigue them enough to seriously consider school psychology training. We have seen that school psychologists who possess BCBA competencies are being sought after by schools. It seems that this is due to the functional assessment and intervention design skills they bring to the schools. The critical issue is finding a school psychology program that values BCBA competencies, trains them, and teaches its students to integrate those competencies in the multifaceted role of a school psychologist. Unfortunately, the number of school psychology programs, different degree options (EdS-only, PhD-only, EdS, and PhD programs), and the fact that the BACB Verified Course Sequence is not attached to programs per se make it difficult to know just how many school psychology programs train students for behavior-analytic practice and credentialing. Besides, this number will be changing over time. On the one hand, ABA is growing in popularity, which may bring more school psychology programs to include behavior-analytic training. On the other hand, as the BACB and ABAI increase training standards (requiring more in-depth training), some programs are going to struggle to adapt, especially under the weight of other accreditation demands (e.g., NASP, APA) which may take precedence over BCBA training.

The implication of these considerations is that behavior-analytically minded practitioners who want to pursue school psychology training need to be very discerning and ask the right questions when applying to school psychology programs. We assume that if you have read this far into the chapter, you are probably considering pursuing training in both ABA and school psychology. We recommend that you ask the following questions of the program. First and foremost, is the program approved by NASP, and, if it's a PhD program, does it have APA accreditation? These accreditations usually indicate that the program is of higher quality. They can also significantly affect credentialing and licensure. Determine whether the program has a Verified Course Sequence or is accredited by ABAI. We recommend that you also look at the research being done by the faculty to determine whether it is behavioral in nature. Faculty research will tell you a lot about the orientation of the program. School psychology programs can be very diverse, with some programs emphasizing psychoeducational testing and others taking more of a behavioral approach to training and practice. Look carefully at the program's handbook for their philosophy of training and description of the roles for which they are preparing their candidates. You should also talk directly with faculty members to ask them how important functional assessment and behavioral intervention are in their training program. Be sure to ask about typical practicum and internship experiences. What are the roles and expectations for trainees, and do these roles and expectations match the kinds of professional competencies you are seeking? In your investigation, you should ask if there are other students interested in ABA in the program and whether you can contact them to talk about the program. If there are

such students and you are able to contact them, you should ask them how much support they are getting to learn BCBA competencies through coursework, practica, and internship and whether the students are confident they will be able to be credentialed as a BCBA.

Graduate training requires a lot of time, money, and effort. Make sure that you do your homework and find a program with faculty and students who are eager to answer your questions. This will be an important sign for how genuinely invested they will be in helping you realize your professional goals. You are in control of the decision you make. Make the wisest one possible by actively seeking the information you need to determine how well the training program suits your professional interests and competencies. Fortunately, as the data indicate, the future is very bright for behavior analysts looking to enter the field of school psychology.

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Behavioral Parent Training



Michael I. Axelrod and Michael L. Santagata

Abstract Behavioral parent training (BPT) has developed into one of the most successful interventions for the prevention and treatment of child and adolescent behavior problems. BPT emphasizes teaching parents more effective behavior management approaches to prevent inappropriate behavior, promote prosocial behavior, and support a healthy parent-child relationship. BPT relies primarily on principles derived from applied behavior analysis (ABA) including differential reinforcement, extinction and punishment, and stimulus control. Clinicians teach parents effective behavior management procedures using behavioral skills training, an evidence-based practice rooted in ABA. Given BPT's conceptual framework, those with strong backgrounds in ABA are ideal professionals to offer BPT to families. This chapter presents an overview of BPT including its conceptual foundation and underlying scientific principles, specific treatment components common to evidence-based programs, and the skills and competencies unique to this treatment approach. The chapter also describes ethical considerations related to BPT, regulatory and licensing frameworks, and supervisor competencies. Behavior analysts can work collaboratively with parents to effectively solve their children's behavior problems by addressing referral concerns using a BPT model.

Keywords Parent training · Evidence-based practice · Disruptive behavior · Children and adolescents · Parenting · Discipline · Timeout · Professional issues

Behavioral parent training (BPT) has become one of the most successful interventions for the prevention and treatment of child and adolescent behavior problems (Garland 2018; McCart and Sheidow 2016). Often targeting oppositional behavior and more significant conduct problems (e.g., frequent and intense temper tantrums, aggression, stealing, delinquency), BPT emphasizes teaching parents more effective

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135

behavior management approaches to prevent misbehavior, promote prosocial behavior, and support the parent-child relationship. Conceptually, this paradigm rests on the research demonstrating that parents play a large role in the development of prosocial and antisocial behavior, and changing parenting practices and enhancing parenting skills can have a profound and lasting effect on child and adolescent behavior.

BPT relies mostly on principles derived from research in applied behavior analysis (ABA), prominently featuring differential reinforcement, extinction and punishment, and stimulus control. BPT utilizes behavioral skills training to teach parents effective behavior management procedures. Behavioral skills training is a four-step process involving (1) instruction, (2) modeling, (3) practice, and (4) feedback (Axelrod 2017). Consistent with the conceptual foundation of BPT, behavioral skills training has its roots in ABA, and there is considerable research supporting its application to teach skills across domains (e.g., academic, safety, social skills; see Hanley and Tiger 2011).

BPT is often described as an indirect service delivery approach, as clinicians work primarily with parents to address presenting problems (Shriver and Allen 2008). While BPT is most often implemented in clinical settings (e.g., outpatient behavioral health clinics) by licensed clinical psychologists and other mental health clinicians, other child-focused professionals (e.g., school psychologists, nurses) may implement the treatment with appropriate training and experience. Given its conceptual and scientific foundation, those with strong backgrounds in ABA are ideal professionals to offer BPT to families. Professionals using BPT with families must be fluent in ABA if they are to implement BPT with fidelity. Behavior analysts providing intensive behavioral supports to families of children with autism and other developmental disabilities often include elements of BPT in treatment (see Bearss et al. 2015). Moving beyond working exclusively with this population and reaching a more diverse clinical population have been an aspiration of ABA (see Bruni and Lancaster 2019; Friman and Piazza 2011). In addition, there is an unmet need for mental health professionals especially in rural and low-income regions of the United States (Ricketts 2005). Historically, primary care health providers are typically the first stop for parents concerned about their children's behavior (Friman and Piazza 2011). However, as Boat et al. (2016) noted, "filling immediate needs for behavioral expertise appears to fall largely on the shoulders of nonphysician behaviorally trained health professionals" (p. 4). Taken altogether, BPT is a ripe clinical field for behavior analysts interested in collaborating with families to solve children's behavior problems.

This chapter offers an overview of BPT including its conceptual foundation and underlying scientific principles, specific treatment procedures common to evidence-based programs, and the skills and competencies unique to this treatment approach. The chapter also describes ethical considerations related to BPT, regulatory and licensing frameworks, and supervisor competencies.

Conceptual Foundation and Scientific Framework of BPT

BPT's conceptual foundation is supported by the research demonstrating that parenting influences child development. While genetics and broad environmental variables (e.g., socioeconomic status, family structure, culture) are important to child development, parenting factors are known to have a profound impact on many developmental outcomes (Shriver and Allen 2008). Research over many decades has found that certain parenting practices contribute to child behavior problems. Almost a century ago, Healy and Bronner (1926) reviewed thousands of cases and concluded that parenting practices were an important predictor of child and adolescent delinquency. More recently, rigorous empirical research has found that certain parenting behaviors are strongly correlated with child behavior and development. For example, parents of aggressive children are more negative, inconsistent, and overreactive in their responses to aggression than parents of nonaggressive children (see Neuhaus and Beauchaine 2017). Moreover, nonresponsive parenting, ineffective and unclear instructions, poor monitoring and supervision, and lack of a positive parent-child relationship are associated with specific child behavior problems including aggression and noncompliance (Lochman et al. 2011). Contextual factors related to parenting strongly influence children's behavioral, social, and emotional development.

Researchers have also examined how parenting behaviors can directly influence child behavior. Principles of behavior such as contingencies of reinforcement have been used to understand the causal, bidirectional relationship within parent-child interactions. Patterson (1982, 2016) demonstrated how patterns of behavior within a family produce child behavior problems and loss of parental control. According to Patterson's model, defiant and disruptive behaviors (e.g., temper tantrums) may result in avoidance or escape from parental requests or demands. As the child's behavior disrupts the social fabric (e.g., is generally difficult to tolerate, embarrasses the parent in public), the parent terminates the requests or demands, and the child's disruptive behavior is negatively reinforced. This process escalates when parents do not immediately terminate their requests or demands but continue to force rule-following by intensifying their behavior (e.g., becoming louder, resorting to physical force). Under these conditions, the child may occasionally acquiesce to the parents' demands, thus positively reinforcing the parents' coercive behavior. Consequently, the behaviors of both the parent and the child enter a dynamic cycle of positive reinforcement (acquiescence following parental coercion) and negative reinforcement (escape from task following disruptive behavior). Patterson found that over time, coercive patterns inadvertently result in more frequent and intense child disruptive behavior and cruel or disproportionately harsh parenting practices. The process occurs unintentionally, without the parents' or the child's awareness.

As noted above, evidence-based BPT programs target parent-child interactions by teaching parents to more effectively manage inappropriate behavior and promote prosocial behavior. Principles derived from ABA serve as the common scientific framework among these evidence-based programs. For example, several programs

with long-standing empirical support, *Living with Children* (Patterson 1976), *Incredible Years* (Webster-Stratton 1992), *Helping the Noncompliant Child* (McMahon and Forehand 2003), *Parent–Child Interaction Therapy* (Hembree-Kigin and McNeil 1995), *Power of Positive Parenting* (Sanders and Mazzucchelli 2017), and *Parent Management Training* (Kazdin 2005), employ strategies that rely on differential reinforcement, extinction and punishment, and stimulus control. Parents are taught to employ procedures developed from these principles including strategically arranging consequences, establishing effective responses to disruptive or inappropriate behaviors, and using antecedents effectively (e.g., delivering effective requests; Kazdin 2005; Shriver and Allen 2008). The next section describes these procedures in more detail and discusses the application and implementation of BPT.

BPT Practices

Strategically Arranging Consequences

Decades of research have shown that behavior is shaped by its probabilistic relationships with antecedents and consequences. Techniques derived from differential reinforcement (i.e., reinforcing one set of behavior and extinguishing another) can therefore be powerful tools when targeting child behavior problems. Parents are introduced to procedures that involve arranging consequences that positively reinforce appropriate behavior, teach functionally equivalent replacement behavior, and ignore (extinguish) inappropriate behavior.

Emphasis on Positive Reinforcement All evidence-based BPT programs feature use of positive reinforcement as a consequence for children's appropriate behavior (see Garland 2018; Shriver and Allen 2008). By definition, positive reinforcement increases the behavior it follows, and here it is applied to appropriate and prosocial behavior. Parents are instructed to be more attentive to appropriate behavior and deliver positive reinforcement depending on child preferences (e.g., specific praise and acknowledgment, physical touch, treats, small toys, free time) and contingently on occurrence of that appropriate behavior. Parents may learn to use a token reward system (e.g., reward charts) through which the child earns immediate backup reinforcers (e.g., tokens, points, stickers) for positive behavior that can be exchanged later for access to meaningful activities (e.g., screen time, special meals, toys; see Kazdin 2005). Token reward systems are individualized to the child and the child's specific behavior problems. Collaboratively, the parent and clinician identify highly preferred reinforcers for the child and specific prosocial behaviors that warrant improvement (e.g., following parental instructions, including accepting restrictions or limited access).

By repeatedly delivering positive reinforcement to children, parents become discriminative stimuli for the availability of positive reinforcement. Parents must reliably deliver positive reinforcement to remain a discriminative stimulus, thus setting the occasion for behaviors that have been previously positively reinforced by parents. According to Shriver and Allen (2008), this is one reason why evidence-based BPT programs highlight using positive reinforcement over punishment. While reinforcement and punishment both change behavior, teaching parents to more strategically deliver reinforcement (e.g., parental attention) results in both the child's behavior being reinforced and the parent continuing to be a discriminative stimulus for the availability of positive reinforcement. This results in the child wanting to be around the parent more often, leading to increased opportunities for the parent to teach, influence, and shape the child's behavior while also establishing a positive relationship with the child.

Also, BPT typically includes variations of time-in or periods of positive parental engagement, fun, and/or affection. Time-in capitalizes on favored experiences (e.g., play, physical affection) and is frequently employed either during neutral times or as a consequence for appropriate behavior. Conceptually, time-in helps establish a reinforcing environment that contrasts with what the child experiences when engaging in inappropriate behavior (e.g., timeout). More specifically, timeout involves a relationship between what precedes and follows the misbehavior, and its influence on behavior should be a function of both the preceding and consequent conditions (Solnick et al. 1977). While time-in maximizes the availability of reinforcement and increases the abundance of pleasant events, timeout minimizes reinforcement and pleasant events resulting in an unpleasant change for the child (Friman et al. 2010). Parents are encouraged to increase their use of time-in through child-friendly activities, engagement, physical affection, and touch. For example, the *Helping the Noncompliant Child* program (McMahon and Forehand 2003) applies a procedure called the Child's Game, a free-play activity directed by the child, to teach parents to become a continual source of positive attention. Parents provide a running commentary of their child's play, removing commands and questions, by describing and praising appropriate play behavior.

Problematic Positive Reinforcement Parental attention can be highly reinforcing to children, even when that attention is criticizing or disapproving. In such situations, positive reinforcement can functionally maintain children's inappropriate behavior. A pattern can emerge when children engaging in certain misbehavior (e.g., arguing, whining) attract their parents' attention. Parents unintentionally reinforce this behavior by continuing to interact with the child. Even when parents express anger or are upset about a behavior, the behavior now has recruited parents' attention. BPT addresses this pattern by teaching parents to withdraw their attention when their child exhibits inappropriate behavior, thus extinguishing the inappropriate behavior over time (Shriver and Allen 2008). Specifically, parents are taught to ignore misbehavior whenever possible or, at a minimum, limit the amount of verbal or physical attention given to the child when responding to misbehavior. The combination of increasing acknowledgment of appropriate behavior and ignoring

inappropriate behavior serves to redeploy parental attention. Although ignoring often results in a reduction or elimination of certain misbehaviors over the long term, more immediate escalations are expected as the child seeks to obtain the parents' usual response (Lochman et al. 2011). Parents are taught to expect this increase in related inappropriate behavior and encouraged to select behaviors to ignore that can be tolerated when escalations occur.

Extinction Several factors influence the effectiveness of extinction. First and foremost, the parents' use of positive attention should be experienced as a reliable source of reinforcement for the child. Assisting parents to increase their use of time-in and acknowledgement of appropriate behavior aids in increasing the reinforcing value and predictability of positive parental attention. Second, parents must ensure their attention is no longer provided when the misbehavior occurs. Intermittently reinforced behavior is virtually impossible to extinguish. Finally, certain inappropriate behaviors can be maintained by more than one positive reinforcer (e.g., parental attention and access to preferred items) or by both positive and negative reinforcement. For example, a child's argumentative behavior can be at the same time positively reinforced by parental attention and negatively reinforced by task avoidance.

Establishing Effective Behavior Management Practices

A conversation involving BPT requires a discussion of definitional distinctions of discipline and discipline's place within evidence-based BPT programs. The word discipline comes from the Latin phrase "to teach" or, more specifically, "impart knowledge or skill" (Canadian Paediatric Society 2004, p. 37). Accordingly, discipline can broadly mean keeping children safe, teaching children effective ways of managing emotions, fostering development, and reinforcing prosocial behavior (see Sege and Siegel 2018). However, more conventional definitions of discipline often strictly describe methods used by parents and others (e.g., teachers) in response to child misbehavior (see Hembree-Kigin and McNeil 1995; McMahon and Forehand 2003). While discipline is not a synonym for punishment, effectively implemented discipline reduces the likelihood or intensity of the inappropriate behavior it follows (Dadds and Tully 2019). Not surprising, all evidence-based BPT programs employ discipline procedures to address problem behavior. For example, Kazdin's (2005) *Parent Management Training* program teaches parents to ignore mild forms of misbehavior or use timeout procedures when responding to more noteworthy problems. However, these same programs stress using discipline procedures within a larger reinforcement-based paradigm and avoiding harsh or overly punitive discipline (e.g., spanking; Shriver and Allen 2008). Evidence-based BPT programs also recommend substituting discipline strategies that have strong empirical support (e.g., timeout) for those that are not evidence-based (Sege and Siegel 2018).

Research has demonstrated that parenting practices involving harsh discipline (e.g., corporal punishment, coercion) are associated with significant childhood behavior problems (see Lochman et al. 2011; Neuhaus and Beauchaine 2017). Providing parents with more effective discipline methods and encouraging consistency when disciplining children highlight all evidence-based BPT programs. Clinicians work with parents to evaluate their current disciplinary practices and willingness to implement alternative approaches. During this process, clinicians educate parents about ineffective discipline methods and the hazards of using punishment to reduce and eliminate misbehavior (e.g., increased physical aggression and escape behavior). This dialog between clinicians and parents calls for sensitivity to possible cultural and historical differences in parenting (Garland 2018).

Both positive and negative punishments serve as the foundation for evidence-based disciplinary practices within BPT (e.g., Kazdin 2005; Shriver and Allen 2008). By definition, punishment decreases the behavior it follows, and here it is applied to inappropriate behavior. Typical examples of positive punishers used in discipline include reprimands, spansks, threats, and chores. Negative punishers involve the removal of something and, in practice, often take the form of the child losing something preferred such as a toy. Of course, the effect of a consequence on the behavior determines whether it is a reinforcer, a punisher, or neither a reinforcer nor punisher. Timeout and grounding, two evidence-based discipline procedures central to BPT, are highlighted below.

Timeout Timeout is the most common disciplinary procedure taught within BPT (Garland 2018). Timeout is an abbreviation of timeout from positive reinforcement, a procedure initially investigated using animals in laboratory settings in the 1950s (see Leitenberg 1965), and has since been used to address childhood misbehavior (Shriver and Allen 2008). Conceptually, timeout relies on the removal of positive reinforcement (e.g., social attention, preferred activities or tangible items), contingent on inappropriate behavior, for a brief period of time in an effort to reduce or eliminate the inappropriate behavior. Decades of laboratory and applied research with both animal and human models have found that timeout can markedly decrease behavior for which it follows. Friman et al. (2010) noted that replications of this effect combined with timeout being more socially acceptable than corporal punishment have led to timeout's popularity as a disciplinary practice.

Procedurally, timeout involves removing the child from a setting in which positive reinforcement is available to a place where access to positive reinforcement is restricted or withheld. This is most often accomplished by moving the child to a location that is away from social attention and pleasant activities or tangible items, although parents can decide to instead leave the child and remove reinforcement from the environment. Timeout's effectiveness relies on the stimulus change that occurs when the child moves from a reinforcing environment to an environment in which access to reinforcement is limited. Important for clinicians, parents frequently report that timeout does not work with their child. This implies that their version of timeout is not the equivalent of timeout procedures conducted in research contexts. Put differently, parental narratives that timeout is ineffective are likely a

function of them not implementing the procedures in a way that eliminates or substantially reduces the child's access to positive reinforcement (i.e., creates a stimulus change). Practically, parents have a difficult time creating timeout environments that are totally void of positive reinforcement. For example, a common experience is for children in timeout to call out, cry, or simply leave the timeout setting. All of these behaviors are likely to evoke attention from the parent, albeit unpleasant attention, which is reinforcing especially in the context of timeout where the child's access to attention has been limited. Research subjects in timeout had no chance of obtaining positive reinforcement nor was there anything for them to do that might evoke positive reinforcement.

Most parents have not been specifically taught to implement timeout nor have they been provided with opportunities to problem-solve typical issues that arise when using timeout (e.g., the child leaves the timeout area). BPT provides direction to parents on when to use timeout (e.g., aggression, noncompliance), how to identify appropriate locations for timeout (e.g., chair placed in a hallway), how to determine exit criteria and when to release the child from timeout (e.g., when the child is seated and quiet), what happens after timeout (e.g., parent reissues the initial request, and child apologizes for aggression), and procedures to address children who are uncooperative with timeout (e.g., teach the child to complete timeout during neutral times, response cost contingent on leaving timeout area). Parents often ask how long a child should remain in timeout following an inappropriate behavior. While research has failed to specifically answer this question, most evidence-based BPT programs recommend timeout last 1–5 min (see Morawska and Sanders 2011). Many clinicians recommend that the time begin when the child is calm, quiet, and compliant. Using timeout for behavior that is functionally maintained by negative reinforcement (e.g., escape from an aversive task demand) can also pose problems for parents (see Watson and Steege 2003). In these situations, a child's inappropriate behavior might be negatively reinforced when the task demand is removed because of the timeout. This is likely to result in the child's inappropriate behavior increasing in frequency because of the timeout. To address this, parents are instructed to issue one or two brief and simple-to-complete instructions to the child when timeout is over, praise the child for compliance, and reissue the initial instruction. Timeout is repeated should the child's noncompliance persist.

To summarize, timeout is a commonly employed disciplinary strategy used to address problem behavior of children between 2 and 7 years of age. Although often used ineffectively by parents, it can successfully reduce child misbehavior when implemented with fidelity. Clinicians working from a BPT paradigm help parents implement timeout procedures for inappropriate behavior. This often involves clinicians assisting parents to ensure social attention (e.g., warnings, criticisms) is eliminated while the child is in timeout, the child's inappropriate attempts to end timeout (e.g., calling out, tantrums) are ignored, and the child's environment when not in timeout is fun and filled with positive parental attention.

Grounding Although timeout can be effective for younger children, its success decreases as children grow older (see Friman et al. 2010). Parents looking for

alternative disciplinary approaches for older children and adolescents often turn to grounding. Traditional (e.g., time-based) grounding typically involves removing privileges or access to preferred activities or items for a predetermined period of time (e.g., restricting cell phone usage for 1 week following missed curfew). However, there are several problems with time-based grounding. First, the requirement for completing the grounding simply involves passage of time. There are no criteria or defined prosocial behaviors required to end the grounding. According to Friman et al. (2010), “if prosocial behavior does not lead to termination of grounding (i.e., an escape-based incentive for prosocial behavior is established), then coercive behavior (e.g., defiance, pouting, and/or aggressive behaviors) often emerges” (p. 403). Put differently, the adolescent has little incentive to engage in appropriate behavior while grounded. Moreover, the adolescent could begin engaging in high levels of antisocial behavior resulting in parents ending the grounding early. This consequence, something that is pleasant for the adolescent, could unintentionally negatively reinforce antisocial behavior. Second, time-based grounding is difficult to implement for high-frequency, low-intensity misbehavior. For parents, remembering multiple infractions and the corresponding punishments might be challenging and result in inconsistent implementation. Moreover, grounding for more than 1 or 2 weeks might not be feasible, as it requires parents to closely supervise adolescents and monitor their activities over that time.

Task-based grounding is an alternative to traditional grounding. Relying on behavior analytic principles of learning, task-based grounding combines features of time-based grounding (e.g., removing privileges) with behavior-based release criteria (see Friman et al. 2010). Adolescents, themselves, determine the length of the grounding by their own behavior (e.g., compliance). Parents begin by creating a list of extra household jobs not regularly assigned to family members or that do not require regular completion (e.g., emptying the dishwasher). These jobs should be approximately equal in difficulty and length of time required for completion. The adolescent also must be physically able to complete each job and have access to the necessary resources (e.g., working vacuum, bathroom cleaning supplies). Some examples include washing the kitchen floor, sweeping out the garage, washing windows and/or mirrors, cleaning the toilet, vacuuming the stairs, washing car hubcaps, or weeding a small flower bed. The steps of each job are listed on separate index cards. The adolescent is given cards following misbehavior and told that he or she is grounded until the jobs are completed. Grounded means restricted from all noneducational activities (e.g., social media, time with friends, video games). Ongoing misbehavior is addressed by giving the adolescent a second or third job and then grounding him or her to a nonpreferred location in the home (e.g., kitchen table) until the jobs are finished. Parents are instructed to avoid nagging or reminding the adolescent about jobs to be done, discussing the grounding, explaining the rules, or giving general lectures. The initial number of jobs earned should correspond to the severity of the infraction. For example, noncompliance with an instruction might result in one job, while verbal aggression might earn the adolescent two jobs. Jobs are considered complete only when approved by the parent. Similar to timeout, parents are instructed to reissue the initial command following the task-based grounding.

Using Antecedents Effectively

Most evidence-based BPT programs feature strategies for arranging antecedents to evoke higher rates of appropriate behavior such as teaching parents to issue instructions more effectively. In essence, changing the delivery of parental instructions improves stimulus control of parental instructions (see Shriver and Allen 2008). Parental instructions can serve as a signal to children that positive reinforcement is available for compliant behavior. However, parental instructions can be confusing and vague. Moreover, children might not always be fully attentive or understand the instructions. Finally, instructions that include too many steps or steps that require children to engage in unlearned skills are likely to be met with some level of resistance.

BPT experts have advised enhancing compliance by modifying parental language when delivering instructions, and research suggests that changes to parents' instruction-giving behavior can have a positive effect on children's compliance (see Blum et al. 1995; Roberts et al. 1978). Axelrod (2017) highlighted characteristics of effective and ineffective adult instructions delivered to children. Instructions should be brief, clear, direct, and specific. For example, "put your plate in the sink" is favored over "clear the table." In addition, "do" and "start" instructions are preferred over "don't" and "stop" instructions (e.g., "walk" versus "stop running"). Parents should consider delivering one instruction at a time, especially when issuing instructions to children who are more likely to be defiant, and avoid asking children to complete tasks categorically (e.g., "can you pick up your toys?") and, instead, use statements about specific tasks (e.g., "pick up the blue block"). Additional considerations include using a firm but nonthreatening voice, initially limiting instructions to behaviors that require low response effort from the child, and combining verbal instructions with physical prompts (see Axelrod 2017; Shriver and Allen 2008). However, changes in parental instruction-giving behavior will only produce improved compliance if there is a history of positive reinforcement for compliance following the delivery of instructions. Put differently, compliance with parental instructions must already be established as a signal for positive reinforcement.

Parents can also be taught to use behavioral momentum or high-probability command sequences to increase children's compliance with instructions. High-probability command sequences are a series of brief and simple instructions the child is likely to complete quickly and without resistance issued immediately before the delivery of an instruction that has a low probability of compliance. Positive reinforcement (e.g., praise) is provided following each instance of compliance. Behavioral momentum has been shown to be effective across instructions (e.g., academic tasks, household chores), settings (e.g., home, school), disabilities (e.g., attention-deficit/hyperactivity disorder, autism spectrum disorder), and age (e.g., young children, adolescents; see Axelrod 2017). There are several explanations for why behavioral momentum might be effective. For example, increased compliance with a low-probability command might be the result of "momentum" established by compliance with the preceding high-probability commands. Several successful

request-response-reinforcement trials are thought to increase the frequency of positive reinforcement associated with compliance as a response class regardless of the type of instruction.

Implementing BPT

BPT utilizes behavioral skills training to teach parents critical behaviors, skills, and procedures (Shriver and Allen 2008). Derived from an evidence-based model of learning, behavioral skills training involves direct and explicit instruction, modeling, practice or rehearsal, and feedback (Miles and Wilder 2009). This approach has been shown to be highly effective at teaching new skills and behaviors to children and parents (Axelrod 2017). For example, behavioral skills training has been successfully used to teach parents and caregivers guided compliance procedures (i.e., adult use of prompts, reinforcement, and error correction to teach complex skills to children) and other behavior management strategies (e.g., Wilder and Atwell 2006).

Instruction Behavioral skills training begins with instruction of a specific skill. Clinicians are typically direct and explicit with their instruction. Specifically, procedures (e.g., timeout) are explained in great detail for parents, with descriptions often accompanied by written protocols or scripts that can be taken home. Examples and non-examples provide further illustration of what is expected, and clinicians check for understanding by frequently evoking responses from parents through questions. Complex or multicomponent procedures are typically broken into smaller, more manageable parts. For example, teaching time-in might begin with attending skills such as active listening (e.g., describing, reflecting, restating), followed by praising desired behavior. Praise can be further reduced to getting the child's attention, stating the acknowledgment, and describing the observed behavior. Clinicians determine the degree to which components should be simplified by considering parents' existing skill levels. Clinicians can also teach component skills separately and then chain those skills together in an appropriate sequence.

Modeling Modeling provides a demonstration of component behaviors, skills, and procedures. Initially, the clinician might model the behavior, skill, or procedure with the parent acting as the child, although ideally clinicians should model directly with the child. Clinicians should obtain parental permission when modeling involves physical contact such as using physical touch to acknowledge desired behavior or guiding a child to timeout (Shriver and Allen 2008). Modeling is most effective when the model is acceptable to the parent, simple skills or procedures are modeled first, and the context matches those encountered by the parent (i.e., real-life situation). Modeling should also consider the range of conditions parents are likely to encounter. For example, modeling timeout might include scenarios in which the child fails to sit in the timeout location. Finally, modeling might involve exemplary and failed examples of behaviors, skills, or procedures.

Practice After receiving instruction and modeling, parents are provided opportunities to practice or rehearse behaviors, skills, and procedures. Practice allows parents to become more proficient engaging in the behaviors and skills and master specific procedures. Like modeling, practice should be sequenced so that easier skills are performed first followed by those that are more difficult or those that are later in the chain of a more complex procedure. Skills practiced in a clinical setting might not generalize to the home environment (Stokes and Osnes 1989). Consequently, practice situations should be designed to resemble the home. While it might be difficult for clinicians to supervise practice opportunities at home, alternatives are available and include practicing in as many locations in the clinic as possible (e.g., clinic office, hallway, waiting room) and having parents video record themselves completing relevant procedures in the home.

Feedback Clinicians provide parents with performance feedback throughout the behavioral skills training process. Effective feedback facilitates parents' mastery of procedures by shaping the necessary behaviors and skills. According to Shriver and Allen (2008), feedback should initially focus on reinforcing the development of skills rather than correcting mistakes, include clear descriptions of desired behaviors or skills, be delivered immediately, request parents correct one behavior at a time, and include prompting and additional modeling when necessary. Some clinicians favor bug-in-the-ear devices during BPT. In addition to being a mechanism for providing feedback, this technology allows the clinician to verbally prompt and correct parents as they interact with children.

Additional Features

There are several additional features common to BPT worth discussing. Clinicians frequently incorporate elements of child development and learning into the treatment via psychoeducation with the family. While some of these features are related directly to the procedures described earlier, readers should note that several are important for enhancing the social acceptability of BPT. In this context, social acceptability describes the degree to which parents perceive the treatment as appropriate for the problem and reasonable given available resources (Axelrod 2017). More specifically, social acceptability refers to a formal or informal agreement between the clinician and the parent on the treatment's goals, procedures, and criteria for success. Because parents might view problems as internal to the child (e.g., something wrong with the child's brain or character, a psychological disorder), there might be an expectation that treatment involve uncovering underlying causes and changing children's behavior through traditional models of psychotherapy (e.g., talk therapy) or therapies with little empirical support (e.g., play therapy). In these cases, parents could view their own contribution to the problem as minimal and challenge treatment approaches addressing their parenting.

Child Development Child development is one content area in which some knowledge might improve a parent's effectiveness (Friman et al. 2010). For example, recognizing developmental milestones (e.g., when children first begin to utter sentences or construct associations between experiences) might help parents set appropriate and realistic expectations. Friman et al. (2010) described the concept of conservation as being an important feature of child developmental that warrants discussion with parents. Conservation refers to a logical thinking ability that allows children to determine something will remain the same after an adjustment in shape or size. Developmental scientists have concluded that young children have a limited ability to conserve (i.e., tell that two objects are the same when their shape or size is altered) and that a full understanding of conservation of events (i.e., recognize how two events are functionally similar) only emerges in adolescence (Ormrod 2013). For parents, this means that referring to how a current and previous disciplinary interaction are similar (e.g., "Isn't this why you were given a timeout yesterday?") might not be fully understood by many younger children. Furthermore, many parents depend heavily on language to demonstrate to children how two events are similar or describe what children do wrong. There are three inherent problems with the overreliance on language to teach children behavioral skills: (1) success rests on the assumption that the child has the cognitive and language capacity to understand sometimes complex relationships; (2) language is social attention and social attention can positively reinforce inappropriate behavior; and (3) discipline involving too much language has the potential to escalate behavior problems. Psychoeducation focused on why language might interfere with children's learning appropriate behavioral responses could enhance parents' acceptance of the clinician's recommendation to limit language usage when correcting children's behavior.

Learning Learning is a function of doing followed by a consequence. Generally speaking, there are four classes of consequences that produce learning, two that increase the likelihood of behavior and two that decrease the likelihood of behavior. The two consequential events that increase the likelihood of behavior are getting something pleasant or preferred and avoiding or escaping something unpleasant or nonpreferred. The two consequential events that decrease the likelihood of behavior are getting something unpleasant or nonpreferred and losing something pleasant or preferred. While a behavior analyst might recognize these descriptions as less precise and technical explanations for positive and negative reinforcement and punishment, many non-behavior analysts including parents and many professionals often misunderstand the terms positive and negative when speaking about reinforcement or punishment. People often mistakenly describe disciplinary procedures (e.g., timeout) as negative reinforcement, referring to negative as bad (versus something is taken away). Rather than attempt to teach parents to speak of reinforcement and punishment more precisely, clinicians should, instead, encourage parents to realize how important consequential events are to children's learning.

Shaping Target Behaviors According to Kazdin (2005), parents often ask for too much of a target behavior before providing reinforcement. For example, a parent might initially expect immediate compliance with all commands, all toys picked up,

or perfect behavior in timeout. Shaping target behaviors involves providing reinforcement to a series of steadily chained, topographically different behaviors as the behaviors more closely approximate the target. For parents, this means reinforcing slight improvements and increasing the criteria for when a standard is met until the behavior resembles the expected target behavior. In addition, parents might occasionally observe their children engaging in a target behavior and then come to expect that target behavior each and every time. However, successfully doing a complex behavior is different than consistently doing that behavior. In BPT, shaping the target behavior and shaping consistency are viewed separately. Finally, clinicians should work closely with parents when selecting target behaviors. The social acceptability of BPT might be influenced by notable differences between clinicians and parents concerning behaviors identified for change.

Skills and Competencies Unique to BPT

Clinicians implementing BPT should possess a broad range of critical competencies ranging from relevant content knowledge to procedural expertise. Because psychoeducation is often a large component of BPT, there are several subject areas in which advanced knowledge enhances clinicians' ability to partner with parents to solve their children's behavior problems. The importance of a strong conceptual understanding of learning, shaping, and child development was discussed earlier. Other content domains specifically related to ABA that warrant a high level of conceptual understanding include behavioral function, rule-governed behavior, and establishing parameters to produce motivating consequences (i.e., abolishing and establishing operations). While these areas might not be entirely unique to BPT, explaining sometimes complex behavioral concepts to parents in easily understandable ways is a prerequisite communication skill necessary for improving parental acceptability of procedures and enhancing BPT's overall effectiveness. Additional content areas important to BPT include knowledge of educational and special education policies and procedures (e.g., limits to Individualized Education Plans), developmental psychopathology and systems commonly used to classify child and adolescent psychological disorders (e.g., *Diagnostic and Statistical Manual of Mental Disorders* fifth edition, American Psychiatric Association 2013), and pediatric health conditions that might affect children's behavior (e.g., chronic abdominal pain).

Conducting a comprehensive assessment of relevant child, parent, family, school, and community variables is the first step in BPT. Assessment is crucial for understanding the problem and identifying appropriate targets for treatment. Clinicians should have technical proficiency in conducting assessments that involve interviewing and direct observation skills and using questionnaires and standardized behavior rating scales (e.g., Child Behavior Checklist, Achenbach and Rescorla 2001).

Friman et al. (2010) recommended specifically conducting Typical Day Interviews and functional assessments when collaborating with parents to solve children's behavior problems. While functional assessments are likely familiar to clinicians working from an ABA framework, Typical Day Interviews might be a lesser known assessment technique. The Typical Day Interview involves a conversation between the clinician and parents during which the clinician asks for descriptions of the events of the child's day (e.g., bedtime, mealtimes, school). The focus is often on periods or routines that are especially problematic sources of conflict between parents and children. The result is a detailed picture of the child's day, problem behaviors and possible functions of those behaviors, parental expectations, current parental response to misbehavior and disciplinary practices, and potential areas to target for intervention.

Collaborating with parents to solve their children's behavior problems requires effective communication skills, a core competency in child-focused behavioral health specialties including clinical child and adolescent psychology, and pediatric psychology (Hoge et al. 2014). Effective communication practices can assist clinicians in building rapport and developing collaborative relationships, managing challenging relationships, and facilitating problem-solving among children, parents, and other professionals (Palermo et al. 2014). Often clustered within an interpersonal domain, these skills involve active listening, reflecting, clarifying, summarizing, using nonjudgmental language, and recognizing and adapting communication styles (McLeod and McLeod 2011).

Perhaps the most critical communication skill for clinicians involves speaking with parents using nontechnical terminology. Behavior analysts, psychologists, and clinicians from other mental health fields (e.g., marriage and family therapists) have a penchant for talking about familiar concepts using unfamiliar language (e.g., positive reinforcement; Friman et al. 2010). Although this rarely impedes effective communication between professionals, it can prevent effective communication between clinicians and parents. Emphasizing readily understood communication by discussing technical concepts using nontechnical language stands as another important core competency and should be a fundamental goal of all clinicians working to assist parents in solving their children's problems (Hoge et al. 2014).

Additional Information Relevant to Behavioral Parent Training

The following section highlights several important features relevant to the practice of BPT (i.e., ethical considerations, regulatory and licensing frameworks) and discusses supervisor competencies related to preparing clinicians to practice within a BPT structure.

Ethical Considerations

While specific professional ethics codes (e.g., *The Professional and Ethical Compliance Code for Behavior Analysts*, Behavior Analysts Certification Board 2014; *Ethical Principles of Psychologists and Code of Conduct*, American Psychological Association 2017) outline much of what might be expected of clinicians engaging in BPT, there are two features of practice that require special consideration. First, there are many ethical concerns related to the use of extinction and punishment (e.g., timeout, grounding) to decrease inappropriate behavior. For example, techniques relying on punishment can become coercive even when implemented properly by parents (see Kazdin 2005). Moreover, indirect effects of punishment including increased aggression, emotional reactivity, and social withdrawal can worsen existing concerns (Lerman and Toole 2011). Finally, parents might not be able to effectively and safely navigate through intense extinction bursts. Exacerbating potential problems, parents with children who engage in frequent and intense behavior problems often arrive at treatment wanting to learn more effective discipline strategies. Parents typically view discipline as a way to control their children's misbehavior and might only consider behavior management procedures that rely on punishment to change behavior (McMahon and Forehand 2003). Clinicians are encouraged to emphasize positive reinforcement and use antecedents effectively to promote children's prosocial behavior and assist parents in employing noncoercive discipline more sparingly. Put differently, ethical concerns related to the use of punishment might be avoided when BPT is based largely on positive reinforcement and strategic arrangement of antecedents.

Second, clinicians should consider the ethical implications of the scope of their education and experience relevant to BPT. Education includes formal graduate training including coursework and field-based experiences (e.g., practica, internship, postdoctoral fellowships), in-service workshops, and mentorship. Experiences involve direct work with children and parents in the context of enhancing parenting skills to increase children's prosocial behavior. According to Shriver and Allen (2008), clinicians are responsible for recognizing "the limits of their knowledge and skill base when working with children and families and to refrain from offering services that they are not trained to provide" (p. 191). Individuals seeking to broaden their skills to include BPT should seek out supervision while developing this skill set. Shriver and Allen (2008) also noted that clinicians must acknowledge their own unique strengths and limitations and consider if BPT is an appropriate professional fit. For example, effective practice requires a balance between being in an expert role and collaborating with parents to solve their children's behavior problems. Clinicians not accustomed to either role might experience challenges when working with families.

Regulatory and Licensing Frameworks

Variations of evidence-based BPT are most often delivered in clinical settings (e.g., outpatient clinics, primary care settings, community agencies) by clinical child and adolescent psychologists who receive referrals for children with behavior problems (Rushton et al. 2002; Shriver and Allen 2008). Within these settings, reimbursement from third-party payors, namely, insurance companies, is increasingly contingent on licensure at the state level. Unfortunately, licensure and reimbursement structures can become barriers for behavior analysts wanting to practice using BPT. While the licensure landscape has improved for those with board certification, not all states offer licensure options for behavior analysts without degrees in psychology, mental health practice, or clinical social work (Bruni and Lancaster 2019). Behavior analysts might consider career pathways that allow for flexible credentialing and licensure attainment (e.g., dually licensed as a psychologist and behavior analyst) through graduate programs that combine broad clinical training in mental health (e.g., clinical psychology) and a behavioral analytic perspective. Also, credentialing and licensure do not promise clinicians will be eligible to receive third-party payor reimbursements for BPT services. Payments might be denied for certain clinical activities (e.g., psychoeducation with parents) and services provided to children whose conditions fail to meet diagnostic criteria for a specific mental disorder (Stancin and Perrin 2014). Those engaging in BPT practices should be familiar with the relevant reimbursement structures and understand the implications of providing nonreimbursable services to children and families.

Supervisor Competencies

Technical proficiency with common BPT procedures described above (e.g., timeout) typically develops through didactic training, modeling, and opportunities to practice followed by feedback from a supervisor. As a result, supervisor competencies should align closely with clinical expectations within BPT. More specifically, supervisors should be well versed with evidence-based BPT models including their scientific foundation, conceptual framework, and procedural methods. Perhaps most important, being technically proficient with aspects of BPT, such as being skilled with timeout, is a prerequisite for taking on a supervisory or teaching role. Put differently, supervisors should be capable of providing effective BPT services themselves before taking on trainees. More broadly, supervisors are most effective when possessing both declarative and procedural knowledge related to BPT, competent with behavioral skills training, informed about the roles child development and learning play in child behavior problems, and skilled at communication.

Concluding Remarks

Drawing on a strong scientific foundation and over 60 years of research across populations and settings, ABA has developed into an active clinical field working to solve many socially important problems. Over the last several decades, ABA has expanded its influence to include applications in education, medicine, mental health, and public safety (Axelrod 2017; Bruni and Lancaster 2019). This chapter highlighted BPT, an evidence-based treatment model that teaches parents how to effectively manage their children's behavior problem. We focused on common but critical components of evidence-based BPT programs including strategic use of parental attention, discipline, and delivering effective instructions. We also presented behavioral skills training as the mechanism for teaching relevant skills and procedures (e.g., timeout) to parents. Finally, we emphasized the importance of using nontechnical language when communicating with parents. This is particularly important, as speaking with parents about concepts related to child development, learning, functions of behavior, and motivating operations in the context of a child's life will likely aid in building partnerships between clinicians and parents.

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Part III
Clinical Settings

Intensive Behavioral Intervention Units



Adam M. Briggs and Brian D. Greer

Abstract *Intensive behavioral intervention units* are clinical settings typically housed within a larger university-based or medical campus that exclusively admit clients referred for the assessment and treatment of severe problem behavior. The urgent and complex nature of these cases places exceptional demands on behavior analysts and requires a unique therapeutic approach and clinical structure to provide safe and effective service delivery. The purpose of this chapter is to orient those interested in pursuing a training experience on an intensive behavioral intervention unit by (a) outlining the requisite skills for effective clinical application, (b) discussing the unique structure of service delivery, (c) describing the specialized training and supervision that goes into managing behavioral staff, and (d) reviewing some considerations for successfully navigating regulatory and funding frameworks.

Keywords Behavior analyst · Ethics · Functional behavior assessment · Intensive behavioral intervention unit · Problem behavior · Supervision · Training · Function-based intervention

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Intensive Behavioral Intervention Units

Recent prevalence estimates indicate that intellectual disability affects between 11.0 and 13.4 per 1000 children, and developmental disability affects between 45.8 and 69.9 per 1000 children (Anderson et al. 2019). Intellectual disability is characterized by problems with both intellectual functioning (i.e., ability to learn, problem solve) and adaptive behavior (i.e., social communication, life skills). Developmental disability is a broader category of disability that often describes a lifelong disability that can be intellectual, physical, or both. Intellectual and developmental disability (IDD) often describes the combination of intellectual and other disabilities, including autism (AAIDD 2010; APA 2013).

Due to core deficits in the areas of intellectual functioning and social communication, individuals diagnosed with IDD are at high risk of displaying problem behavior (Emerson and Einfeld 2011; Matson et al. 1997). In fact, estimates of prevalence suggests that approximately 20% of individuals diagnosed with IDD engage in some form of problem behavior (Baker et al. 2002; Didden et al. 2012; Emerson et al. 2001; Holden and Gitlesen 2006; McClintock et al. 2003), with an increased risk in young children who present with more severe cognitive and communication impairments (Didden et al. 2012). Specifically, problem behavior may result from children's interactions with a social world that relies on progressive learning and responding to culture-specific cues and norms, including the appropriate expression of needs and preferences. Further, environmental factors can produce and maintain problem behavior. Paradoxically, caregiver or teacher strategies that might work with other children (e.g., removing a child from the group as penalty for engaging in aggression) may exacerbate the behavior of some children with IDD (e.g., providing a valuable break from interacting with others).

If problem behavior occurs infrequently and is relatively minor such that it poses no risk to the individual or others, then ignoring the behavior is often best. However, when problem behavior is severe and places the child or others at risk for injury, or interferes with participation in school and family activities, treatment by a professional may be needed. Although many children with IDD do not display problem behavior that warrants treatment by a professional, estimates show that between 9 and 12% engage in more dangerous forms of *severe* problem behavior (Cooper et al. 2009; Kahng et al. 2002). Commonly reported topographies of severe problem behavior in individuals with IDD include physical aggression (e.g., hitting, kicking, or pulling hair of others), self-injurious behavior (e.g., biting, scratching, or hitting oneself), property destruction (e.g., breaking, throwing, or defacing items), pica (i.e., ingestion of inedible items such as paperclips), and elopement (i.e., running away or leaving an area of supervision; Beavers et al. 2013; Hanley et al. 2003).

Because severe forms of problem behavior may result in harm to oneself, others, or the environment, they often lead to various challenges for the individual, families, service providers, and society as a whole (Doehring et al. 2014; Lloyd and Kennedy 2014; Taylor et al. 2011). Without proper and intensive treatment, the short- and

long-term outcomes for individuals with IDD remain poor (i.e., few have friends or jobs or live independently; Howlin et al. 2004). Additionally, the stressors placed on families of individuals with IDD are substantial, resulting in high divorce rates and stress-related mental health disorders (Dumas et al. 1991). Therefore, it is imperative that cases of severe problem behavior be addressed in a timely manner by qualified staff in a safe environment.

Intensive behavioral intervention units are clinical settings typically housed within a larger university-based or medical campus that exclusively admit clients referred for the assessment and treatment of severe problem behavior. Because the response topographies described earlier pose a significant danger to the client or others, the physical space is often protected with equipment (e.g., devices or specialized clothing either added to the environment or worn by an individual) to mitigate the health and safety risks associated with severe problem behavior (Fisher et al. 2013). Expert, doctoral-level clinicians closely manage each case in coordination with a dedicated team of well-trained and experienced behavior analysts and technicians.

Unfortunately, individuals in need of intensive behavioral intervention often spend time on a waitlist after referral, resulting in delays to service. This barrier is likely a product of several interrelated factors. First, intensive behavioral intervention units are located throughout the country in such a way that they typically service a multistate region whose demand for services are typically larger than the clinic's capacity. Second, the complexity of the cases often requires extensive admissions (e.g., 3–6 months), which slows the pace of serving new clients. Third, clinic capacity for admitting clients is often dictated by either (a) space constraints, (b) number, availability, and expertise of staff, or (c) a combination of both. Given the barriers preventing immediate access to services, there is not only a need for expanding our ability to offer services but also a need to provide high-quality training experiences for aspiring behavior analysts. However, the path toward proper training and practice might not be self-evident to students or professionals interested in pursuing this line of work.

The urgent and complex nature of these cases places exceptional demands on treatment teams, thus requiring a unique therapeutic approach and clinical structure in order to provide safe and effective service delivery. Working on intensive behavioral intervention units requires a high degree of proficiency across multiple behavior-analytic repertoires, as well as other professional skills. Therefore, the purpose of this chapter is to orient those interested in pursuing training and experience in an intensive behavioral intervention unit to (a) the requisite philosophical stance and clinical skills one should embrace, (b) the ideal service delivery and training structures one might arrange, (c) some challenges one might encounter, and (d) some potential solutions to successfully navigate these challenges. We review the foundational knowledge and skills required for effective clinical application and reference where these skills appear in the 5th Edition Task List (BACB 2017). Next, we discuss the unique structure of service delivery and the specialized training, supervision, and staff management that goes with overseeing

such a unit. Finally, we review ethical considerations and offer insights to consider when having to navigate regulatory and funding frameworks.

Foundational Knowledge

Father Edward J. Flanagan (1886–1948), the Catholic Priest who founded Boys Town, once opined, “There are no bad boys. There is only bad environment, bad training, bad example, bad thinking” (Reilly and Warneke 2008, p. 7). Had Father Flanagan been aware of behavior analysis in his day, he likely would have subscribed to some form of its underlying philosophy. Surely, Father Flanagan would agree that his philosophy of behavior extends readily to “bad” girls, “bad” men, and “bad” women, as well.

Stated so clearly by Father Flanagan is perhaps the single most important philosophical perspective behavior analysts take when working on intensive behavioral intervention units with individuals who engage in severe problem behavior – the environment is responsible for the types of behavior we see in the individuals we serve. By “environment” we are of course referring to events both external (e.g., social) and internal (i.e., physiological) to which behavior is sensitive or can be conditioned. Placing causation squarely on the environment encourages behavior analysts to seek out and identify those behavior–environment relations responsible for the maintenance of problem behavior (see A-2 of BCBA/BCaBA Task List [5th ed.]; BACB 2017). Once identified, altering those contingencies becomes a natural next step when attempting to change behavior. This worldview makes applied behavior analysts unique amongst other helping professionals and sets us apart in our approach to solving severe behavior problems.

Radical behaviorism (A-3; BACB 2017) also encourages some nontraditional views about “fault.” If the environment is responsible for the development and maintenance of problem behavior, can we fault the individual? Behavior analysts consistently strive to identify environmental contingencies that may support problem behavior, and they avoid “blaming the individual.” If professionals did not take this philosophical approach, they might assume a client is inherently “bad,” blame (or even vilify) them for their actions, and pursue unnecessarily intrusive forms of intervention, or they may simply avoid working with this population altogether. Just as child problem behavior is a function of its environment, so too is caregiver behavior. Thus, behavior analysts also understand that although caregiver behavior may support child problem behavior, caregivers are responding in precisely the way they ought to, given the historical and current environmental conditions (Allen and Warzak 2000). These sorts of reciprocal interactions paint a dynamic and nuanced worldview and comprise just a few of the philosophical underpinnings that guide our practice as behavior analysts.

Taking a deterministic view – shared generally by the science of psychology – has far-reaching implications for some of the most fundamental aspects of behavior analysis (A-2; BACB 2017). For example, determinism sets the stage for the use of

functional definitions of behavior–environment relations. An event is said to function as a reinforcer only when it has a certain effect on behavior. A response is said to be of the same response class only if it is controlled similarly by the same environmental events. Other concepts (e.g., motivating operations, stimulus control) are coherent within the deterministic view of behavior, and one might argue that this worldview helped early pioneers in the field to uncover and systematically describe such functional relations in the first place.

Taken together, behavior analysts’ reliance on a philosophical perspective that places causation of behavior on the environment and encourages investigation of these behavior–environment relations combine to suggest approaches for understanding why problem behavior occurs, thus paving the way for the development of effective behavior-change procedures.

Foundational Skills and Clinical Applications

It is imperative that behavior analysts working on intensive behavioral intervention units have a firm understanding of the foundations of behavior analysis. The Behavior Analyst Certification Board’s (BACB) 5th Edition Task List (BACB 2017) breaks down these foundations into four areas – philosophical underpinnings (Area A); concepts and principles (Area B); measurement, data display, and interpretation (Area C); and experimental design (Area D). We described in the section above a few of the philosophical underpinnings most relevant to working on intensive behavioral intervention units, and we touched upon how these philosophical underpinnings extend naturally to behavior-analytic concepts and principles. However, certain behavior-analytic concepts and principles are of special importance when assessing and treating severe problem behavior. We now turn to these in the context of clinical application.

The BACB’s 5th Edition Task List (BACB 2017) outlines five areas of application, three of which we will consider here as they relate to working on intensive behavioral intervention units – behavior assessment (Area F), behavior-change procedures (Area G), and selecting and implementing interventions (Area H). We give special consideration to the fourth and fifth areas of application, personnel supervision and management (Area I), and ethics (Area E), in the sections below. Before discussing behavior assessment, however, we point out a few particulars especially relevant to admission decisions for intensive behavioral intervention units.

An important question that frequently arises when working with individuals who engage in problem behavior is, “*At what point does problem behavior warrant admission to an intensive behavioral intervention unit?*” For obvious reasons, this can be a difficult question to answer. Just as no two individuals are identical, no two environments are the same. Environments differ in their capacity to manage problem behavior, and problem behavior manageable in one location (e.g., at school with dedicated paraprofessionals who are well-trained in behavior management) may be unmanageable in another (e.g., at home with siblings and a sole caregiver).

Problem-behavior severity can differ greatly across individuals as well as within individual but across different contexts. These factors can complicate whether to refer and admit an individual to an intensive behavioral intervention unit.

A primary consideration for admission to an intensive behavioral intervention unit is medical necessity. If the individual or others in his or her environment (e.g., peers at school, siblings at home) are unsafe because of problem behavior (e.g., high-intensity aggression directed toward peers), there may exist a medical necessity for admission. When medical necessity warrants admission to an intensive behavioral intervention unit, suspending other services (e.g., social skills group or other skill-acquisition programming) for the individual may be necessary at least until an effective treatment plan for problem behavior can be developed (F-2–F-3; BACB 2017).

Intensive behavioral intervention units often make admission decisions based on a confluence of factors, including whether sufficient space and staff are available to support the admission; if there is a waitlist for services, which individual is next on the waitlist; whether the current severity of problem behavior for that individual continues to warrant admission, and if so, how it compares to other individuals awaiting services; as well as individual-specific considerations (e.g., increased staff-to-client ratios needed to safely manage problem behavior, medical complications that require ongoing and/or onsite consultation from a healthcare professional). Strong demand for behavior-analytic services paired with a relatively weak supply of providers also complicates the admission decisions for an intensive behavioral intervention unit. Behavior analysts should base such decisions on objective data, whenever possible. For example, creating an objective system to assess problem-behavior severity (e.g., Greer et al. 2018) will pay dividends when determining which of many individuals to admit. Establishing clear, decision-making criteria for admitting an individual in crisis over other individuals who have waited longer for services but for whom caregivers are safely managing problem behavior helps streamline the admissions process while minimizing the influence of subjective opinions across decision makers.

Prior to the start date of a new admission to an intensive behavioral intervention unit, it is important to collect and review information that may be relevant to the case (F-1; BACB 2017). Individualized education programs (or individualized family service plans for young children) and educational assessments can help identify current academic goals and potential learning disabilities. School personnel also may have data on the occurrence of problem behavior and potentially relevant environmental events surrounding its occurrence. Medical records may include diagnoses (e.g., autism spectrum disorder, oppositional defiant disorder) relevant for billing and reimbursement purposes. Indirect (e.g., the Functional Analysis Screening Tool; Iwata et al. 2013) and descriptive (F-7; BACB 2017) assessments often are necessary to structure a later functional analysis. Additional information is typically necessary to plan for the first few days of an admission. For instance, documenting a list of approved caregivers helps if an unknown individual arrives for pickup, determining independence with toileting helps when planning the events of

each appointment, and knowing the individual's likes and dislikes will help when determining what stimuli to include in a preference assessment (F-5; BACB 2017).

Once admitted to an intensive behavioral intervention unit, behavior analysts use information from various sources (e.g., indirect and descriptive assessments, preference assessments) to develop test and control conditions of a functional analysis (Iwata et al. 1982/1994; F-8–F-9; BACB 2017). Because the purpose of a functional analysis is to uncover the environmental variable(s) that control the occurrence of problem behavior, isolating the individual contingencies that reinforce problem behavior is helpful when designing a function-based treatment. Treatment plans developed from such sources are less likely to include extraneous, nonfunctional procedures than when the individual contingencies reinforcing problem behavior remain ambiguous (cf. Fisher et al. 2016; Greer et al. 2020). Rarely, however, does one identify *all* of the contingencies that reinforce problem behavior by conducting a functional analysis. Luckily, treatment plans infrequently require such exhaustive information to produce a therapeutic outcome.

Much of the work conducted on intensive behavioral intervention units consists of (a) assessing the function (or cause) of the problematic response by conducting a functional analysis, (b) using information from the functional analysis to inform the development of a function-based treatment, (c) tailoring the intervention procedures to the unique needs of the individual and his or her caregivers, and then (d) training caregivers on the accurate and consistent implementation of the treatment plan while ensuring generalization of treatment effects to caregivers, home, school, and community settings. This process amounts to an extensive analysis of the variables controlling each individual's problem (and often appropriate) behavior as well as the crafting of a carefully designed strategy for making the intervention procedures practical for caregivers.¹ Therefore, behavior analysts working on intensive behavioral intervention units must have a firm understanding of (a) common reinforcement contingencies that maintain problem behavior (F-6; BACB 2017), (b) when and how to evaluate idiosyncratic reinforcement contingencies within the context of a functional analysis (F-8–F-9; BACB 2017), (c) how to develop an appropriate, function-based treatment based on the results of that functional analysis (C-11 & H-2; BACB 2017), (d) when and how to apply extinction in a functionally (and procedurally) appropriate manner (G-15; BACB 2017), (e) when and how to select and apply an appropriate punishment procedure (G-16; BACB 2017), and (f) when and how to thin schedules of reinforcement maintaining an alternative response (G-22; BACB 2017). When communication is a focus of treatment, behavior analysts also must be familiar with how to select and teach a communication response in a way that will not produce bursts of problem behavior (cf. Fisher et al. 2018). Behavior analysts must apply many of these same concepts and analytical skills to training caregivers and when generalizing treatment effects (G-21–G-22;

¹Presenting detailed information on the assessment and treatment process that occurs on an intensive behavioral intervention unit is well beyond the scope of the present chapter. We refer interested readers to other sources (e.g., Fisher et al. *in press*; Greer and Fisher 2017, Greer et al. 2018) for detailed reviews of the assessment and treatment process.

BACB 2017). Furthermore, the dangerous nature of working with individuals who engage in severe topographies of problem behavior often requires quick action and decision making; therefore, behavior analysts working on intensive behavioral intervention units also must be able to adapt assessment procedures proficiently and treatment protocols quickly, based on both routine, incoming data and emergent situations that require immediate action.

The concepts and principles we have touched upon in the sections above naturally give rise to our analytical tools. Behavior analysts working on intensive behavioral intervention units develop clear operational definitions of behavior (C-1; BACB 2017) and routinely assess interobserver agreement (C-8; BACB 2017) to ensure reliable data collection. They use assessment methods and data collection procedures that best allow them to capture the relevant dimensions of the response (e.g., considering a latency-based functional analysis to assess elopement, conducting a precursor analysis to assess a later, and particularly severe, member of the same response class). When individuals are referred for the assessment and treatment of multiple topographies of problem behavior, behavior analysts plot each response topography separately and consider whether independent functional analyses of each topography are necessary. Finally, behavior analysts evaluate the effects of various independent variables on responding by plotting relevant dimensions of behavior in ways that clearly summarize important behavior–environment relations (e.g., measuring and plotting the progression of a persistent wound produced by self-injury during baseline and throughout treatment).

Behavior analysts distinguish between correlation and causation, and those working on intensive behavioral intervention units have a firm handle on experimental design, and they progress through phases in an analytical manner, with each step clearly informed by the results of prior evaluations. Within-subject experimental control is part and parcel of behavior analysis (D-3–D-5; BACB 2017), and this is particularly true for applied behavior analysts working with individuals who engage in problem behavior. Behavior analysts working on intensive behavioral intervention units tend to be less interested in how improvements for one individual compare to improvements for other individuals (unless, for example, the question pertains to the efficacy of a particular approach to assessment or treatment). Instead, each client serves as his or her own control (D-3; BACB 2017), and progress is measured by demonstrating improvements in critical dimensions of responding when compared to that same individual’s performance at an earlier point in time and often under a different set of environmental conditions. As such, repeated measures, prediction, verification, and replication are critical features of data plots for evaluating performance on intensive behavioral intervention units (D-3; BACB 2017).

Behavior analysts take a scientist-practitioner approach to assessing and treating problem behavior by experimentally ruling in or out variables that may control behavior. Thus, the appropriate experimental design is the one which allows the behavior analyst to most effectively and efficiently accomplish this goal for the empirical question and circumstances at hand. All experimental designs have unique

strengths and weaknesses, some of which are magnified by the unique abilities of the individual. For example, reversal or pairwise designs are better suited when discrimination between the rapidly alternating conditions of a multielement design is of concern. Careful attention to these sorts of analytical decisions, both at the level of experimental design and at the condition and contingency levels, can pay dividends for the meticulous behavior analyst. Modifying the precise contingencies operating across test and control conditions, for instance, can lead to better isolation of the variable(s) of interest. Furthermore, deviating from standard conventions (e.g., always conducting at least three sessions per phase, relying on a standardized control condition) may be necessary under certain conditions. The true analytical power of within-subject experimental designs can be fully realized when one carefully considers what they intend to evaluate and how best to go about doing so.

While in treatment, behavior analysts retain effective procedures, discard, or modify ineffective ones until they become effective and continue this process until achieving a therapeutic outcome (H-7; BACB 2017). Behavior analysts experimentally validate the necessity of both the treatment plan and any effortful or questionable components of the treatment plan. This is of utmost importance when the treatment plan includes a punishment component (e.g., timeout, response cost, physical restraint). Increments and decrements in performance are often judged in relation to baseline performance (e.g., Greer et al. 2016) or to performance during an alternative treatment approach (e.g., Saini et al. 2016).

Behavior analysts working on intensive behavioral intervention units know and discriminate between the wide array of behavior-change procedures (G-1–G-11; G-13–G-22; BACB 2017) at their disposal, and they understand when and how to select and apply those procedures in an efficacious and ethically defensible manner (H-1–H-9; BACB 2017). Once therapeutic outcomes have been achieved, behavior analysts working on intensive behavioral intervention units ensure the practicality of the treatment plan by thinning schedules of reinforcement maintaining alternative behavior (e.g., the functional communication response; G-22; BACB 2017) and generalizing treatment effects to caregivers and to settings outside the unit (G-21; BACB 2017), while continually soliciting caregiver input and, thus, assessing social validity (H-3; BACB 2017). Behavior analysts work closely with caregivers and other relevant providers (e.g., school personnel) to ensure that the assessment and treatment approach are socially valid (H-9; BACB 2017). For example, functional analyses should evaluate contingencies that typically arise for the individual outside the clinic (e.g., not assessing a tangible function of problem behavior if caregivers do not arrange such contingencies). Likewise, the treatment plan needs to address the individual contingencies maintaining problem behavior while remaining sensitive to the unique constraints of the caregivers (e.g., not terminating reinforcement schedule thinning until achieving a practical schedule of reinforcement for the family or school setting). Involving caregivers and other relevant providers at this stage of the admission is critical for ensuring long-term success of the treatment plan.

Structure of Service Delivery

Given the severe and complex nature of the problem behavior described above, one might expect that intensive behavioral intervention units require a unique structure to ensure effective service delivery. This structure often entails a clinical case hierarchy where services are delivered by front-line behavioral technicians who receive training and oversight from case supervisors who in turn work closely with a case manager to ensure timely clinical decision making. Below, we describe key components of an effective service-delivery structure, which includes (a) a tiered model of service delivery, (b) a forum for making decisions related to selecting and implementing interventions, and (c) a system for providing ongoing personnel supervision and management.

The tiered-model approach toward service delivery consists of several key team members whose contributions to the case vary as a function of their role within the team. Board-certified behavior analysts at the doctoral level (BCBA-Ds) or BCBAAs with extensive training and experience in the assessment and treatment of severe problem behavior function as *case managers*. Case managers are positioned at the top of the tiered model and make decisions related to selecting and implementing interventions (Area H; BACB 2017). This is typically done in collaboration with other BCBAAs or newly minted BCBA-Ds who serve as the *case supervisor*. The case supervisor's primary responsibility is to ensure the remaining team members are trained to properly implement the behavioral programming (Area I; BACB 2017). Specifically, the case supervisor, along with support from *case assistants* (board-certified assistant behavior analysts [BCaBAAs]), ensure that *behavior technicians* (registered behavior technicians [RBTs]) have the necessary skills to implement behavioral programming accurately and consistently. Behavior technicians form the base of the tiered model and serve as front-line staff. Typically, the primary responsibility of the *case lead* (either a BCaBA or RBT) is to ensure that the team of behavior technicians assigned to the case is implementing the behavioral programming as directed by the case supervisor and case manager. When presented with questions or challenges related to the case, the case lead is responsible for bringing these to the attention of the case supervisor and case manager and addressing the concern(s) together. Another important responsibility of the case lead is to build a strong working relationship with caregivers (and other relevant service providers) so that effective lines of communication are established to ensure cohesion throughout the admission.

Next, a system structured to facilitate ongoing case management is a critical component for timely clinical decision making. This structure should include programmed opportunities for the case manager to meet regularly with all teams to ensure each case is progressing properly (Area H; BACB 2017). Two methods that facilitate the case manager's close involvement include (a) scheduling frequent team meetings while also (b) adhering to an "open-door" policy. To accomplish this, we recommend scheduling clinical case review meetings that occur at least one-to-two times per week with the entire clinical staff prior to clients arriving for the day

(e.g., Monday and Wednesday mornings from 8:00 am until 9:00 am). The format of these meetings is similar to that of the “grand-rounds” model of assessing patient care. That is, each case lead presents a brief overview of their client, which includes relevant background information, results of recent assessments, progress made toward treatment goals, and game plan for the day. This information may be presented in the form of (a) verbal report, (b) client data, (c) video review, or (d) some combination of these forms. The case lead also presents any challenges they have encountered, including how they have attempted to navigate them, and then solicits guidance from the case manager. The order of case presentations is typically discussed among the case leads prior to the meeting, and priority ordering is ultimately generated based on urgency. Not only is this an important learning experience for all involved, but it provides the case manager with the opportunity to learn about client progress, ask questions related to each case, and make informed decisions that will ultimately guide the action plan (H-6–H-8; BACB 2017). Beyond these scheduled meeting times, it is important for the case manager to remain as available to the team as possible to ensure that pressing questions or behavioral challenges can be addressed in a timely manner without delaying client progress. Therefore, we recommend an “open-door” policy. That is, case managers should remain onsite, and they should encourage and reinforce attempts from the team to check in (as needed) to promote ongoing communication and ensure treatment decisions are made in a timely manner. If the case manager does not have an onsite office or will not be immediately available, the team should have a plan in place to ensure timely decision making. This may include an agreement that the case manager will respond to inquiries within a certain timeframe or that someone else is responsible for making decisions while the case manager is unavailable. Programming frequent clinical case reviews and being open to check-ins throughout the day ensures that the case manager is familiar with the case, able to catch and address potential issues in a timely manner, make decisions efficiently, and maximize client progress.

Next, a structured system for case supervisors to observe behavioral-technician performance is a critical component for monitoring the integrity of procedural implementation. It is important for all members of the treatment team to understand that the purpose of supervision is to improve and maintain the behavior-analytic, professional, and ethical repertoires of the trainee and facilitate the delivery of high-quality services to the trainee’s clients (BACB 2019). Further, it is equally important for these team members to be aware of the potential risks of ineffective supervision (I-1; BACB 2017). Specifically, if a case supervisor fails to monitor the behavioral technician implementing behavioral programming with their clients, this ineffective supervision might lead to the case supervisor missing (a) opportunities to provide feedback on the behavioral technician’s improper implementation of procedures (i.e., technical drift), which can lead to (b) the behavioral technician not feeling supported (which may result in staff turnover) and/or (c) increased risk of client or staff injury. This is especially important given the sophistication of the behavioral interventions prescribed for the dangerous instances of severe problem behavior in these settings. Thus, it is critical that case supervisors train personnel to competency

on intensive behavioral intervention procedures (I-4; BACB 2017) because implementing interventions with less-than-optimal integrity may delay the effects of the intervention or result in an increased rate or severity of problem behavior. Specifically, improper implementation could (a) occasion resurgence of problem behavior (Briggs et al. 2018), (b) delay treatment outcomes and extend time in intensive therapy, (c) prevent the client from transitioning to a less-restrictive therapeutic environment, or (d) result in some combination of these events. Finally, because intensive behavioral intervention units often serve as premier training environments for aspiring behavior analysts, those receiving training and supervision are likely to go on and become professional behavior analysts who will be expected to train and supervise others. Therefore, it is highly likely that these initial training and supervision experiences will greatly influence the quality with which future generations of aspiring behavior analysts will be trained, which is critical to the overall development of our field and its practice (Sellers et al. 2016).

Ethical Considerations

The *Hippocratic Oath* is an oath taken by physicians swearing to uphold specific ethical standards in their medical practice. Of particular importance, the oath includes the promise “to abstain from doing harm.” The BACB’s *Professional and Ethical Compliance Code for Behavior Analysts* (BACB 2014) embodies this maxim, and behavior analysts agree to uphold this promise. Specifically, our mission is to protect, accord dignity to, and provide evidence-based, best practice for clients admitted to intensive behavioral intervention units (E-1–E-5 & E-9; BACB 2017). First and foremost, it is imperative that behavior analysts provide a safe environment for individuals admitted for the assessment and treatment of severe problem behavior (E-2; BACB 2017). This sentiment also holds true for the staff responsible for implementing the assessments and behavioral interventions. In order to maintain a safe environment, behavior analysts must consider (a) a physical space that is protected with equipment added to the environment (e.g., padded walls) or worn by an individual (e.g., a padded helmet), (b) staff trained in crisis-management procedures, and (c) an administrative panel that frequently reviews all incidents and monitors staff responses for quality control. When a client presents with behavior that puts themselves or others at risk, it is important for the clinical team (consisting of behavior analysts, caregivers, and other relevant providers) to conduct a risk assessment to determine the cost-benefit ratio associated with one or more types of protective equipment. For instance, considering the extent to which the equipment might interfere with the individual’s movement compared to the amount of protection it offers is important for identifying the most effective but least intrusive form of intervention for each individual. This same assessment can be used for identifying the amount of protective equipment worn by clinical staff (e.g., long sleeves vs. arm guards) or determining the proper environment for conducting sessions (e.g., furnished, classroom environment vs. barren, padded environment;

see Fisher et al. 2013 for additional information on the use of protective equipment in the management of severe problem behavior). To further protect the client and others from harm, staff should be trained in general behavior management and crisis intervention strategies. This involves training staff to proficiently implement both preventive strategies and procedures for responding to severe forms of problem behavior, which might include strategic application of restraint and protective holds as a last resort (see Reed et al. 2013 for additional information on therapeutic restraint and protective-holding procedures). Objective and reliable data are necessary components for monitoring staff implementation as well as client response to the use of protective equipment and specific behavior management and crisis intervention strategies. We recommend actively monitoring (a) integrity of implementation, (b) client problem behavior, and (c) any adverse incidents (e.g., bruising of the skin) that may occur in order to determine whether the procedures are being implemented correctly, whether they are resulting in a decrease in problematic behavior, and whether they reduce the overall number of injuries. An administrative panel charged with monitoring these procedures and evaluating their effectiveness should convene frequently (e.g., monthly) to review the data and make decisions as to whether modifications are needed to further protect the client and others from harm (E-2; BACB 2017).

Behavior analysts often encounter clients with very limited repertoires who remain vulnerable and dependent on those in their environment to afford them dignity and to advocate for them. Therefore, it is the behavior analysts' responsibility to practice with extreme care as we advocate for the individuals' rights while considering their preferences and best interests (E-2; BACB 2017). Beyond treating clients with care and compassion, behavior analysts working with individuals on intensive behavioral intervention units attempt to understand the functions of the clients' problem behavior (E-3; BACB 2017) and then teach more adaptive, prosocial behavior for accessing reinforcers (E-4; BACB 2017). In addition, attempts to consider client preferences are programmed throughout the assessment and treatment processes. This information can be helpful when advocating on behalf of the client (e.g., for one intervention procedure over others).

It is especially important for behavior analysts to (a) rely on scientific knowledge when designing behavior-analytic programming and making clinical decisions, (b) provide services only within the boundaries of their competence, and (c) maintain competency through professional development (E-1; BACB 2017). Behavior analysts should prescribe only those practices that are evidence based and supported by the relevant research literature. This is especially true when working with individuals who engage in dangerous forms of severe problem behavior because the application of interventions involving arbitrary components could be contraindicated, effortful to manage, and/or risk iatrogenic emergence of problem behavior (cf. Greer et al. 2020; Retzlaff et al. 2020). Often, cases referred to intensive behavioral intervention units for the assessment and treatment of severe problem behavior are complex and might also require management of variables that fall outside the scope of competence for some behavior analysts (e.g., feeding disorders, sleep disturbances). Scope of competence refers to the activities a behavior analyst has

training in and experience implementing with clients (Brodhead et al. 2018a). Therefore, behavior analysts should know how to self-evaluate their own scope of competence, recognize if they should expand their scope of competence, and seek support when needed (Brodhead et al. 2018b). Additionally, behavior analysts should maintain and hone their current competence through attending professional development opportunities (e.g., conferences) and staying in contact with the scholarly literature (Carr and Briggs 2010).

Navigating Regulatory and Funding Frameworks

Behavior analysts working on intensive behavioral intervention units may be surprised to learn that a significant portion of their job has little to do with behavior analysis or with the assessment and treatment of problem behavior. Behavior analysts are increasingly responsible for understanding important regulatory and funding frameworks relevant to their practice. These frameworks are particularly important for behavior analysts working on intensive behavioral intervention units, where missteps can have legal and/or disciplinary implications.

Many states in the United States have laws that regulate the types and nature of restraint (e.g., mechanical, physical) and timeout (e.g., seclusion) procedures that may be used on an intensive behavioral intervention unit. Local governments may have their own statutes that can supersede those at the state level. When this happens, local laws are likely to place additional restrictions on the use of restraint and timeout than what state law describes. Licensed healthcare facilities may or may not be exempt from such laws. Therefore, it is imperative that behavior analysts working on intensive behavioral intervention units be familiar with current legislation impacting their practice and update unit policies and protocols as legislation changes.

Another point to consider is whether the intensive behavioral intervention unit is administratively housed within a larger organization (e.g., a hospital or healthcare facility). Larger organizations may have internal policies that have direct bearing on behavior-analytic practice; thus, it is wise to be aware of such policies and modify unit policies and protocols accordingly.

In locations where no state or local laws exist to govern the use of restraint and timeout, local school districts often have guidelines on the use of these procedures that may be helpful, both for understanding what the school district deems acceptable practice and for knowing what you can and cannot expect of school personnel who may need to implement unit-developed treatment plans. Therefore, a reasonable approach to developing or refining unit policies and protocols related to the use of restraint and timeout would be to base these documents on what the school district can implement, ensuring that school personnel can implement any unit-developed treatment plan. In those situations when a client's treatment plan requires modification beyond the school-district guidelines, district supervisors (e.g., director of special education, district superintendent) can often grant exceptions to school-district guidelines on a case-by-case basis.

Successful navigation of funding frameworks is also critical for the success of intensive behavioral intervention units. However, learning this portion of the job may seem equivalent to obtaining another advanced degree. Insurance reimbursement is a complicated, lengthy, and multi-step process, with each insurance provider having a unique system to learn and navigate. Recognized billing codes differ across insurance providers, and contracts between the intensive behavioral intervention unit and a given insurance provider may dictate the use of billing codes and/or units seemingly inappropriate for the service and/or time rendered. Furthermore, the recent development of Current Procedural Terminology (or CPT) Codes relevant to behavior-analytic services has introduced a new set of rules and regulations to be learned by behavior analysts, as well as insurance providers. Finally, contract negotiations with insurance providers can be a similarly complicated process, especially when determining reimbursement rates. School contracts tend to be much simpler to navigate, but it may take years for local school districts to recognize the value of outsourcing services to an intensive behavioral intervention unit. Finally, high staffing ratios often required by intensive behavioral intervention units tend to make admissions cost prohibitive for families seeking private pay.

We hope to have convinced you at this point of the value in hiring, or at the very least consulting with, an expert who can successfully navigate various funding frameworks, especially those frameworks that relate to the specialized nature of behavior-analytic services on an intensive behavioral intervention unit. It is critical from an operations perspective to have an expert oversee these processes to ensure compliance with various billing and service requirements. If hiring or consulting with such an expert is impractical, the websites and training opportunities offered by various professional organizations (e.g., Association of Professional Behavior Analysts) can be an excellent resource for navigating such funding frameworks independently.

Conclusion

Working on intensive behavioral intervention units requires a high degree of proficiency across multiple behavior-analytic repertoires and other professional skills. We outlined the skills needed and described effective service delivery and training structures one might arrange on an intensive behavioral intervention unit to produce optimal client and staff outcomes. Further, we reviewed ethical considerations and offered insights for navigating regulatory and funding frameworks. In sum, the behavior-analytic repertoires necessary to become a skilled behavioral technician, case lead, case assistant, case supervisor, and case manager within an intensive behavioral intervention unit requires a substantial amount of well-supervised, high-quality experiential learning opportunities which are offered only at a handful of clinical sites within the United States. We hope the information provided within this chapter serves as a useful resource for those interested in pursuing training and experience in an intensive behavior intervention unit and that it supports workforce development.

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Competency in the Assessment and Treatment of Pediatric Feeding Disorders: Training and Ethical Considerations



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Abstract Pediatric feeding disorders are a growing field of application in behavior analysis. Due to its complex etiology and technical skills needed, it is important that individuals providing services have the competency and proper training to work with this population. Therefore, the purpose of this chapter is to provide a brief overview of the assessment and treatment of pediatric feeding problems emphasizing the importance of competency and considerations for ethics and training in this subspecialty area of applied behavior analysis. In this chapter, first, we provide an overview of pediatric feeding problems including evaluation and treatment based on behavioral principles. Then, we discuss how content from the Behavior Analyst Certification Board's fifth edition task list (Behavior Analyst Certification Board 2017) can be used to guide supervision practices and discuss implications from the *Professional and Ethical Compliance Code for Behavior Analysts* (BACB, Professional and ethical compliance code for behavior analysts. Author, Littleton, 2014) related to practicing ethically and competently. Finally, we provide an overview of settings and practice considerations for individuals seeking to practice in the area of pediatric feeding problems. We highlight the importance that experienced behavior analysts provide appropriate training to individuals both seeking and continuing to provide services in this area in order to maintain rigorous levels of competency within the field.

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Keywords Applied behavior analysis · Behavioral assessment · Behavioral treatment · Ethics · Feeding therapy · Multidisciplinary approach · Pediatric feeding disorders · Training

Feeding-related problems are among the most commonly reported problems by parents of young children (Friman 2010). It is estimated that feeding problems occur in approximately 35% of children without diagnoses and 80% of children with developmental disabilities (Bachmeyer 2009). Ensuring proper food consumption is important since it allows the ingestion of nutrients necessary for a child's physical and cognitive development. On the contrary, inadequate food consumption will have both short- and long-term detrimental consequences, among which are weight loss, malnutrition, and physical and cognitive impairments. Additionally, inadequate food consumption generally co-occurs with inappropriate mealtime behavior, such as negative vocalizations or physical refusal, all of which generate high levels of stress for family members as well as prevent socialization between children and their friends and family (Williams and Foxx 2007).

Within the research, feeding problems consist of varying topographies, the majority of which can be considered refusal behaviors. Some refusals are related to the acceptance of bites, typically including elopement from the feeding chair, head turning, blocking of the cup or spoon, swiping food, self-injury, aggression toward a feeder, clenching or refusal to open the mouth, or refusal to self-feed when the skills are present (Laud et al. 2009; Riordan et al. 1984; Tanner and Andreone 2015). In some cases, acceptance will occur, in which the child opens their mouth upon presentation of a bite or drink, but then inappropriate mealtime behavior (IMB) may occur. These behaviors can include expulsion (food actively pushed out of the mouth or allowed to fall out of an open mouth via gravity), packing/pocketing, gagging, or vomiting (Laud et al. 2009). Behaviors such as the preceding serve as an impediment to typical feeding behaviors and can result in diminished food intake.

In addition to the differing topographies of food refusal behavior, pediatric feeding problems present on a continuum from mild (e.g., food selectivity) to severe (e.g., total food or liquid refusal). Food selectivity refers to the consumption of a limited variety of foods, refusal to consume foods from at least one major food category, or refusal to consume novel foods (Levin and Carr 2001). Total food refusal has been defined as refusal to eat all or most foods presented, resulting in either failure to meet caloric needs or dependence on supplemental tube feeds (Williams et al. 2010). These feeding problems are conditions in which physiological and behavioral factors co-occur; thus, a multidisciplinary approach is sometimes indicated in order to evaluate the presence of comorbid medical problems along with environmental factors maintaining feeding disorders (Sharp et al. 2017). Because of this, training on assessment and treatment of feeding problems is imperative, and any intervention should be implemented within the scope of competence; implementation of treatment by untrained personnel can worsen the feeding problem and have detrimental effects on the client's health, including a risk for serious physical

harm (e.g., pulmonary aspiration). Taking this in consideration, the goals for this chapter are to (a) provide a brief overview of pediatric feeding problems including their evaluation and treatment, (b) discuss how content from the Behavior Analyst Certification Board's (BACB) fifth edition task list (BACB 2017) can be used to guide supervision practices, (c) discuss implications from the *Professional and Ethical Compliance Code for Behavior Analysts* (BACB 2014) related to practicing ethically and competently, and (d) discuss an overview of various settings and practice considerations for individuals seeking to practice in the area of pediatric feeding problems.

This chapter is not designed to cover all the necessary training required or serve as a complete guide to all ethical situations that trainees may encounter as they develop competence in pediatric feeding disorders. Furthermore, the field of pediatric feeding disorders is evolving; thus, as the research base expands, behavior analysts must remain up to date on the best practices related to the assessment and treatment of feeding disorders as well as a variety of other competencies, including knowledge of practice guidelines, ethical codes, recommended practices in supervision and training, and possible state and national laws that may influence competent practice in this area. Additionally, this chapter does not address feeding disorders outside of the pediatric population, as the research referenced is not necessarily applicable to adult or aging populations with feeding problems resulting from factors such as acute illness, stroke, dementia, or other degenerative diseases and their subsequent medical interventions.

Overview of Etiology

As already mentioned, the etiology of pediatric feeding problems can be characterized as biobehavioral. Some physiological factors that influence the occurrence of a feeding problem may include anatomical or functional difficulties such as cleft lip or palate or esophageal stricture (Burklow et al. 1998); deficits in oral-motor development, e.g., lack of chewing and poor lip closure (Seiverling et al. 2016); and compromised medical status in the form of gastrointestinal or neurological conditions (Lukens 2011). Various medical conditions are more prevalent in children with developmental disabilities in comparison with children of typical development, which could partially explain the elevated prevalence of feeding problems in children with disabilities (Ibrahim et al. 2009; Sharp et al. 2010; Vissoker et al. 2015). Due to the range of underlying physiological conditions that could be present for individuals with feeding difficulties, it is important that the respective specialists have ruled out these conditions or treated them before implementing any behavioral assessments or treatments (Friman and Piazza 2011). Additional sections of this chapter will reemphasize the need for medically integrative teamwork and the dangerous situations that could arise from lack of training or neglect of the multifaceted aspects of eating behaviors.

Behavioral factors refer to the effects of environmental conditions that potentially promote or maintain feeding problems. For example, removing the demand to eat a particular food, supplying attention, or presenting a highly preferred food after inappropriate mealtime behavior (IMB) have occurred could inadvertently increase the frequency of IMB. It is important to assess the environmental variables maintaining food refusal focus on identifying the relationship between environmental variables and their effect upon food refusal (i.e., functional relations). One effort to do just this is seen in the Brief Assessment of Mealtime Behavior in Children (BAMBIC), in which the presence of conditions such as limitations on snacks and positive persuasion is assessed (Seiverling et al. 2016).

Assessment and Treatment of Pediatric Feeding Disorders

As attention on pediatric feeding disorders continues to grow, steps are being executed to reach a consensus on a definition for feeding disorder that will be recognized across disciplines and regardless of the origin of the disorder (i.e., medical, nutritional, feeding skill deficit, and psychosocial elements) (Goday et al. 2019). The establishment of diagnostic validity is critical for determining the course of a disorder, its treatment, and outcomes (Feighner et al. 1972). If medical professionals can operate under the same assumptions of what a feeding disorder diagnosis entails, it will facilitate more effective and appropriate implementation of interventions, as well as afford the ability to draw accurate conclusions from research findings as to how other children may be able to benefit from interventions.

One recent effort to define feeding problems, avoidant/restrictive food intake disorder (ARFID), was introduced into the DSM-5 in 2013. This diagnosis requires that the individual display a sustained failure to meet nutritional and/or caloric needs associated with any of the following factors: weight loss, significant nutritional deficiency, tube/supplementary nutrition dependency, and significant disruption to the individual's psychosocial functioning (American Psychiatric Association 2013). The widespread use of ARFID within the feeding literature in recent years reflects not only the need for effective diagnostic criteria but the desire for clinicians and researchers to effectively define the behaviors that they are observing and treating. ARFID as a diagnosis has met some criticism for its lack of clear diagnostic criteria. It has been argued that the definition of the disorder fails to meet the Feighner criteria (Strand 2011). Meeting the Feighner criteria entails the seeking and developing of the following information related to the proposed disorder: clinical description, laboratory studies, delineation from other disorders, follow-up, and family study.

The lack of an operational definition for feeding disorders and the ambiguity of ARFID as a diagnosis may have contributed to the existing practice of each discipline implementing its own variation on not only the treatment of disordered feeding but also the definition used to describe the presenting problem. These variations

reflect the lens of expertise of each given field of study, for example, speech pathologists' emphasis on oropharyngeal function (Strand 2011). This practice results in the inclusion of varying topographies of behaviors being categorized under the umbrella of "feeding disorder" within the literature. The question can then be posed of whether empirical findings can be compared across studies and if these variations create limitations when drawing conclusions based on the literature (Eddy and Thomas 2019). The field of behavior analysis is no different than others in regard to using a specialized operational definition, focusing on the observable feeding behaviors of the child and feeder (when applicable), as well as topographies of IMB. Therefore, in practice, clinicians must exercise discretion by identifying their own limitations. The ethical responsibilities of the behavior analyst will be detailed in the coming sections.

Currently, efforts to establish an encompassing definition for pediatric feeding disorder are being made in the medical community. By considering the World Health Organization's definitions of functioning and disability in the most general terms, the following definition of feeding disorder is proposed: "Impaired oral intake that is not age-appropriate, and is associated with medical, nutritional, feeding skill, and/or psychosocial dysfunction" (Goday et al. 2019). This broad definition takes into account the varied contributing factors to pediatric feeding disorders in a conceptual manner. Once a child is deemed to have a feeding disorder under these general criteria, the behavior analyst acting as a service provider may then evaluate the contributing environmental variables responsible for the feeding problem behavior topographies present.

The steps taken to arrange an intervention generally involve (a) conducting a multi- or interdisciplinary evaluation, including a medical evaluation and assessment of oral-motor deficiencies; (b) if present, treating medical problems by the corresponding specialist and obtaining recommendations on whether behavioral interventions may proceed and how to safely implement them; (c) performing behavioral evaluations to assess the severity of the feeding problem, identifying environmental variables that maintain it, and obtaining information about possible treatment options; (d) establishing clear outcomes (e.g., increasing the volume or amount of food consumed, the variety of foods consumed, decreasing IMB) and proposing an intervention linked to the results of assessment; (e) evaluating the effects of treatment on the relevant dependent measure(s); (f) fading intervention components and increasing the likelihood of generalization; (g) training caregivers to implement treatment; and (h) conducting follow-up to ensure maintenance of treatment gains.

In the following section, we will briefly describe some behavioral assessment and treatment approaches. A complete and thorough overview of each and all of these components is beyond the scope and goals of this chapter; however, for more information about effective assessment and treatment procedures, readers are encouraged to consult the citations found in this text as well as additional chapters, reviews, and research in the assessment and treatment of pediatric feeding disorders.

Behavioral Assessment

A fundamental component for designing an effective intervention is the initial assessment (see Gulotta and Girolami 2014; Lukens 2011; Piazza and Roane 2009). There are two broad classifications of assessment methods: indirect and direct. In the first, the evaluation is based on a proxy report of the child's behavior via clinical interviews and feeding inventories (e.g., Brief Assessment of Mealtime Behavior in Children BAMBIC; Seiverling et al. 2016), interviews with caregivers, food diaries and logs, or discussions with the child themselves. In contrast, direct methods refer to observation of the child's and feeder's behaviors immediately prior to, during, and immediately following mealtimes, as well as observations of environmental conditions that could be mediating the observed behavior.

Prior to the onset of feeding therapy, the child will typically receive an intake evaluation and assessment to document their medical history, record past and current medications, and note prior and current therapies or interventions. In the review of prior medical records, the behavior analyst may discover aspects of the child's medical status or feeding skills that need to be further examined prior to starting a behavioral intervention. Some examples relevant to feeding include swallow safety, tethered oral tissue (e.g., tongue tie), unmanaged acid reflux, low muscle tone, food allergies, dental concerns, and the nutritional needs of children with certain syndromes or disorders. It is necessary to be in consultation with the necessary and related medical professionals as well as the caregivers so they may arrange for further medical specialty services and seek out professional advice and treatment as needed. At intake, a caregiver report of currently accepted foods (i.e., food record), typical meal arrangements (e.g., seating, utensils), strategies employed to get the child to eat, and caregiver goals is obtained as well, to guide the course of treatment.

Direct assessment methods will also be implemented in an effort to (a) evaluate patterns of food consumption and refusal, for example, if a child is food selective by type or texture; (b) systematically observe and describe social and physical conditions that may maintain food refusal; (c) experimentally determine the environmental conditions that maintain food refusal behavior; and (d) obtain baseline measures of performance. The overall function of assessment is typically to evaluate the extent to which a problem is occurring, identify variables that influence a behavior, and prescribe possible treatment components. For example, assessment may consist of exposing the child to different food types or textures and measuring consumption and IMB in their presence (e.g., Ahearn et al. 2001; Fisher et al. 1992; Munk and Repp 1994). Munk and Repp (1994) exposed five children to several different types of foods across different textures (from level 1 [puree] to level 4 [regular texture]) and measured acceptance and IMB. According to the results, they identified four general patterns: total food refusal, selective by type, selective by texture, or selective by both type and texture. These findings suggest that it may be possible, through such an assessment, to determine which food properties occasion refusal behaviors in an individual and then increase acceptance of nonpreferred variety by modifying the texture or type of food presented in accordance with the individual's preferences.

Descriptive evaluations provide information regarding parent-child interactions to determine possible functional relations (e.g., Borrero et al. 2010; Piazza et al. 2003a; Sanders et al. 1993). Borrero et al. (2010) evaluated the interaction of 25 caregiver-child dyads admitted to a residential program to treat feeding problems. The researchers obtained the likelihood of occurrence of three different kinds of consequences delivered by caregivers following IMB: attention, access to a preferred food, and escape from the demand to eat a nonpreferred food. Results showed that escape from the demand to consume the food and attention after IMB were the most likely consequences. Although this assessment provides valuable information of the possible relation between parent and child behavior, analyses were correlational. Thus, it is possible that certain caregiver consequences incidentally co-occur with other functional variables but not affect IMB.

Functional analysis allows the establishment of causal functional relations (e.g., Bachmeyer 2009; Najdowski et al. 2008; Piazza et al. 2003a). In this procedure, antecedent conditions and consequent events to problem behavior are manipulated to determine the variables influencing that problem behavior. The contingency maintaining problem behavior is identified when the test condition results in differentially higher levels of problem behavior relative to the control condition. For example, Piazza et al. (2003a) conducted functional analysis of IMB for 15 children using several test conditions (i.e., attention, escape, tangible) and a control condition. A nonpreferred food was presented across all conditions. In the attention condition, the experimenter provided attention (e.g., verbal interaction) contingent on each occurrence of IMB. In the escape condition, food was removed for a short period of time contingent on IMB. In the tangible condition, a preferred toy was presented contingent on IMB. Finally, in the control condition, the participant had access to preferred items, and the researcher provided attention continuously. The researchers found that, for cases with differentiated results, 90% of functional analyses indicated IMB was maintained by social-negative reinforcement in the form of escape from the demand to eat and 80% of functional analyses indicated IMB was maintained by multiple sources, for example, both social-positive (attention) and social-negative (escape) reinforcement.

Behavioral Treatments

Once the variable(s) maintaining IMB have been identified, it is possible to propose an intervention (see Bachmeyer 2009). Treatments based on behavior analytic principles focus on manipulating antecedents and consequences to decrease IMB and increase acceptance and consumption. Antecedent-based treatments are implemented typically before food is either presented or accepted, and their aim is to either decrease the motivation to engage in IMB or facilitate acceptance and consumption. Consequence-based treatments are implemented following the presentation of food and are interventions incorporating procedures following the occurrence of either IMB or acceptance or consumption. Research suggests that

antecedent-based treatments can be effective for mild cases of feeding problems, that is, children with mild food selectivity and without concurrent medical complications (Seubert et al. 2014). Consequence-based treatments, and especially the use of procedures incorporating an escape extinction component, have been effective and often necessary to produce changes in IMB and consumption in severe cases. The decision of using one approach over another or a combination of treatment components will likely be influenced by the severity of the problem, recommendations from other professionals, results of the functional analysis, safety and risks of implementation, facility resources, competence of the staff, and parent consent.

Among some of the antecedent-based treatments, we found simultaneous presentation of preferred and nonpreferred foods, blending and fading procedures, the high-probability sequence (HPS), noncontingent reinforcement, and preemptive prompting procedures or bolus placement.

Simultaneous presentation refers to placing a preferred and nonpreferred food together on a spoon and presenting them at the same time (e.g., Ahearn 2003; Piazza et al. 2002; Tiger and Hanley 2006). For example, Piazza et al. (2002) compared the effects of simultaneously presenting a preferred food and a nonpreferred food versus sequentially (i.e., first present the nonpreferred food and then the preferred food) on consumption for three children with food selectivity. The researchers found simultaneous presentation to be more effective than sequential presentation for two out of three children.

Fading procedures refer to the gradual change in stimulus control from one context in which the participant is already eating to another where food was not originally consumed (e.g., Hagopian et al. 1996; Knox et al. 2012; Luiselli et al. 2005). Fading can be implemented with characteristics of the food such as increasing or decreasing the texture, changing the proportion of one food to another (i.e., blending), and the size of the bolus or amount of drink or with the proximity of eating utensils. For example, Luiselli et al. (2005) successfully implemented a fading procedure by gradually increasing the concentration of whole milk for a child diagnosed with autism spectrum disorder (ASD) who drank liquids but rejected whole milk.

Another kind of antecedent-based procedure is the high-probability instructional sequence (Dawson et al. 2003; Hernandez and Fernand 2018; Mace 1988; Patel et al. 2007; Penrod et al. 2012; Silbaugh et al. 2019). This procedure involves delivering several instructions that the child usually follows (i.e., high-probability instructions) before delivering the target demand (i.e., low-probability instruction). Penrod et al. (2012) employed a high-probability instructional sequence in combination with demand fading to increase acceptance of nonpreferred foods with two children who engaged in food selectivity. The high-probability instructions were the more distal steps in a chain to eating readily completed by the child (e.g., smelling the food, picking it up), whereas the low-probability requests were closer to the target goal of consuming the food (e.g., put food inside mouth). Two high-probability instructions were presented prior to the low-probability instruction, and previous instructions were gradually removed as new low-probability instructions were

introduced into the sequence. By the end of the intervention, participants increased their consumption of previously nonpreferred foods.

When referring to consequence-based treatments, differential reinforcement involving escape extinction is a common component of treatment packages for feeding problems. In the case of differential reinforcement procedures, they consist of delivering a reinforcer (e.g., a preferred food, toy, or social interaction) contingent on food acceptance (Brown et al. 2002; Riordan et al. 1980, 1984). Brown et al. (2002) implemented a reinforcement-based procedure with a child who engaged in food selectivity by presentation, i.e., he only ate when food had been presented in a particular manner. The procedure consisted in presenting food in the preferred format, contingent on consumption of food in a nonpreferred format. After implementation of this treatment, the number of accepted bites of food presented in the nonpreferred manner increased.

Escape extinction typically consists of presenting the nonpreferred food without removing it contingent upon IMB (e.g., Ahearn et al. 1996; Anderson and McMillan 2001; Cooper et al. 1995; Hoch et al. 1994; Piazza et al. 2003b). For example, Hoch et al. compared the effects of nonremoval of the spoon (NRS) procedure and positive reinforcement, treating two children with chronic food refusal. Both children were more likely to accept food only after implementation of the escape extinction component. Within the literature, escape extinction has been implemented widely for IMB that are being maintained by social-negative reinforcement, with positive results. These findings are consistent with the Piazza et al. (2003a) conclusion that IMB is often maintained by social-negative reinforcement. Despite the ubiquity of escape extinction in research, its clinical implementation requires training for timing and techniques. Some procedures, such as blocking the child's hand from coming into contact with the spoon or from swiping food from the table, present limited risk of adverse effects. As procedures become more intrusive, additional considerations must be made. In nonremoval of the spoon NRS, a very common EE procedure, a bite is presented to the child's mouth in close proximity until the child accepts the bite (Bachmeyer 2009). By waiting for active acceptance of the bite, proper execution of this procedure minimizes potentially adverse outcomes such as choking or aspiration pneumonia. In a more intrusive procedure, such as physical guidance (gentle pressure to the mandibular joint in order to open the mouth, following by depositing of a bite), risks may be mitigated by presenting a reduced bolus or empty spoon until acceptance is achieved (Kerwin et al. 1995). Some of the potentially aversive properties of EE may be avoided through the methods used, for example, setting a maximum session length or using guided compliance to reduce the amount of time the child spends exposed to EE (Freeman and Piazza 1998). Implementation of an EE procedure in a feeding context should always include consent, training on the exact treatment procedures as described and supported in the research, and regular supervision to avoid potentially severe and dangerous outcomes. Given that there are a number of feeding interventions shown to increase acceptance in the absence of EE (Bachmeyer 2009), such approaches should be considered as options before incorporating an EE procedure.

Applying the Fifth Edition Task List to Training in Pediatric Feeding Difficulties

The BACB fifth edition task list (see BACB 2017) includes the general knowledge and skill content areas, to be considered by individuals preparing for certification or for application of their skills to an alternate practice area (i.e., subspecialty) post-certification. Two major content areas comprise the task-list sections: (a) knowledge of foundational skills and understanding of behavior analytic principles and (b) practice-oriented skills and how to apply those skills in the respective contexts. The purpose of this section is to highlight some of those task-list items as they relate to training for competency in pediatric feeding difficulties.

Foundations

The foundations section includes four subsections, each comprised of numerous task-list items. The subsections included under foundational knowledge and skills are philosophical underpinnings; concepts and principles; measurement, data display, and interpretation; and experimental design. It should be noted that many of the task-list items that pertain to fundamental knowledge and skills should be readily generalizable to assessment and treatment of pediatric feeding difficulties. This said, ongoing training, supervision, and mastery of skills in this practice area are required.

Philosophical Underpinnings When examining the task-list items under the philosophical underpinnings subsections, these content areas include training in which a behavior analyst should be able to identify the goals of behavior analysis as a science, explain the philosophical assumptions underlying the science of behavior analysis, describe behavior from the position of a radical behaviorist, and so forth. Instruction and training within this content area is likely to remain consistent in form across specific subspecialty training or practice areas. That is, quality instruction in this content area should serve as the foundation for future and detailed training in any subspecialty area. However, supervisors training individuals to be competent in the area of pediatric feeding disorders may still wish to provide case examples or literature in pediatric feeding disorders in conjunction with teaching these task-list items. For example, when teaching the seven dimensions of ABA as described by Baer et al. (1987) and as outlined by task-list item A-5, a supervisor may wish to provide additional readings on applied studies in the assessment and treatment of feeding problems emphasizing how these studies meet the dimensional standards set forth by this article. As the philosophical underpinnings are learned, it may be of value to a supervisee to simultaneously learn these particular components of the task list as well as how they apply to feeding problems.

Concepts and Principles The concepts and principles section of the task list includes training content across the various overarching behavioral concepts and principles a supervisee must be familiar with in order to sit for certification. Being able to define and provide examples of concepts and principles such as positive and negative reinforcement, schedules of reinforcement, operant extinction, and stimulus control is foundational knowledge all behavior analysts should obtain and be able to apply to any behavior as it occurs across organisms. Similar to the prior section, instruction and training across the task-list items within the concepts and principles subsection should involve readings and examples related to pediatric feeding disorders as the supervisee is learning more about this particular subspecialty and how these concepts and principles relate to feeding problems. For example, when being able to define response class broadly, supervisors may also discuss how IMB, expulsion (i.e., spitting out accepted food), and packing (i.e., pocketing or holding food in the mouth) may covary, and consumption may not increase unless contingencies are in place for each topography. One reason increases in expulsion or packing may occur following interventions to increase acceptance is that each topography of IMB, including expulsion and packing, may be members of the same response class and serve the same function (Sevin et al. 2002). As previously mentioned, supervisees gaining experience in the area of pediatric feeding disorders should be well aware that IMB is often maintained by social-negative reinforcement in the form of escape from eating (e.g., Girolami and Scotti 2001; Hodges et al. 2018; Najdowski et al. 2003; Piazza et al. 2003a) and will have implications for designing treatments with procedures that likely terminate the previous negative-reinforcement relationship (i.e., nonremoval of the spoon). In some circumstances, food (or certain food types) may function as conditioned aversive stimuli. If the acceptance, swallowing, or consumption of food (or food types) has been repeatedly paired with pain or uncomfortable sensation, these behaviors will decrease as a function of positive punishment. Undesirable behaviors, which in feeding scenarios may include clenching of the jaw, pushing away the spoon, and the topographies described above, would then increase as a function of negative reinforcement. In certain situations, such behaviors could be considered adaptive, considering the conditions under which they develop (Iwata 1987). The presence of these factors and potential that multiply controlled behaviors exist would help to inform treatment in a more nuanced manner than EE alone, for example, using graduated exposure or systematic desensitization to mitigate the aversive properties of the food (Tanner and Andreone 2015).

Measurement, Data Display, and Interpretation A thorough understanding of how to select a dimensional quantity to measure, design a data collection system, quantify and visually depict those data, and interpret possible patterns is critical skill set of any behavior analyst and is likely why the BACB fifth edition task list contains numerous items within this section that highlight the need for these skills. Specific to training in feeding problems, individuals should be aware of the relatively standard behavioral categories and definitions typically used in this subspecialty. Although these definitions might not change much over time, following the

use of these definitions in the literature and in practice is critical for maintaining competency related to measures within this subspecialty area. For example, food acceptance can be measured via latency (e.g., within 5 s; rapid acceptance). Further, there are occasions in which understanding of which dimension is the most relevant measure will be important for individuals seeking to obtain knowledge in how to assess and treat certain topographies; for example, inter-response time is a crucial dimension for establishing rates of eating (e.g., eating too rapidly) and will be the primary dependent measure when intervening on the pace of eating. Finally, there are some challenges that exist when measuring behavior that is private, as it largely occurs within the mouth and is difficult to observe directly. For example, chewing may be difficult to see, identifying the position of the tongue may be impossible, and swallowing can only be inferred from the absence of food particles remaining in the mouth (e.g., mouth clean), as food may be pocketed while swallowing occurs. Thus, individuals may need to measure jaw movement without direct evidence of mastication (i.e., you can move your jaw without placing food between the teeth) and make some assumptions about the occurrence of behavior by either checking on bite placement or examining features of the food (i.e., products of behavior). Just as in any practice area, providers must maintain competency in measuring different topographies related to eating while building the flexibility to design measurable units with clinical significance.

In addition to measuring various topographies of behavior emitted by the child, measurement of the feeder's behavior (if the child is not engaging in self-feeding) is critical for obtaining treatment fidelity measures. Depending on the procedures being conducted (i.e., types of pretreatment assessments, baseline, and treatment conditions), correct responses could be defined by components such as allowing escape, presenting the correct amount of food, presenting the spoon and maintaining a certain distance to the child's lips, providing noncontingent reinforcement on a specific schedule, representing expelled bites, providing differential reinforcement, performing a mouth clean check, or so on. Errors in implementing intervention procedures may reduce treatment gains. It is beneficial to use behavioral skills training and other empirically validated training approaches to help increase the integrity of the intervention (Seiverling et al. 2012), considering that some feeders, such as parents, may have little to no previous exposure to such procedures.

Barriers to implementation increase when clinicians must measure multiple behaviors at once. As outlined above, multiple dependent measures for the child, feeder, or both may be necessary for a comprehensive understanding of the influence of treatment variables on various topographies and for treatment fidelity measures. An ongoing evaluation of treatment effectiveness hinges on training. Clinicians must take data accurately, and in general, it is recommended to emphasize accuracy over number of measures. Supervisors should not only monitor a feeder's implementation of intervention components but also the accuracy of their recorded data by performing interobserver agreement checks to ensure that they are able to collect accurate data across measures. Supervisees can, of course, be trained broadly to graph and interpret data; however, once again, supervisors may expose

trainees to specific test trials involving graphing and interpreting dependent measures related to treatment of pediatric feeding problems.

Experimental Design The final foundations subsection of the task list includes several items centered around knowledge and the use of single-subject experimental designs. Once again, a general foundational knowledge lends itself to a variety of applications and not necessarily just to the assessment and treatment of feeding difficulties. However, knowledge of single-subject design methodology and being able to identify designs that may lend themselves well in evaluating variables that are influencing a feeding problem will be prerequisite to being able to practice case management and implementation (see Sect. “Application”) under the supervision of a behavior analyst with experience in the assessment and treatment of pediatric feeding disorders. Here, supervisees may benefit from reading research articles related to treating a variety of different feeding problems to understand the use of designs in this area. As in other areas of research, there are ethical considerations that must be heeded when developing feeding treatment design. These points include holding a participant in baseline just long enough to establish stability in responding and obtaining consent for temporarily withdrawing potentially effective procedures, as in the A-B-A-B design (Engel and Schutt *n.d.*).

Applications

Ethics Training in how to practice ethically and in making ethical decisions as applied to this area may require more explicit training than some of the other task-list content areas previously described as many supervisees may not have had the opportunity to apply certain codes or be able to readily extend their knowledge of specific codes to practicing in the treatment of feeding difficulties. Furthermore, ethical dilemmas are likely to arise when behavior analysts trained in an alternate practice area apply their skills to feeding problems without training, including potential harm (e.g., exposure to possible allergens, risk of aspiration, lack of consultation with other disciplines, failure to rule out medical conditions). Although later sections will cover specific ethical codes that may be of particular interest to those gaining competence in treating pediatric feeding problems (see Sect. “Ethical Considerations”), in a general sense, supervisors building the ethical competence of their supervisees should rely on describing the task-list items as it relates to both the overarching ethical requirements of the field and the specific requirements to be a professional practicing within this subspecialty. In addition, over the course of supervision, the supervisor should allow the supervisee to practice ethically under close supervision as they build competence in making independent decisions in the case conceptualization and management of clients who exhibit feeding difficulties.

Behavior Assessment This BACB fifth edition task-list subsection contains numerous items related to applying foundational knowledge and skills as it relates to performing behavioral assessments competently, including performing record

reviews, determining the need for behavior analytic services, conducting skills assessments, performing preference assessments, conducting and interpreting outcomes from functional analysis, and so on. Supervisees should be aware of these task-list items and related ethical codes (see below) that govern practices in the area of behavioral assessment of feeding problems. Individuals must review medical records to examine medically related historical and current information prior to performing behavioral assessments or treatments. If potentially relevant records do not exist, the clinician will need to direct their client to consult with professionals to identify and test for a variety of medical variables (e.g., allergy testing, tests for gastroesophageal reflux, swallow study) to ensure proceeding with behavioral treatment is not only warranted but safe as well. The interpretation of medical records and subsequent recommendation for feeding services should be determined by the provider who has ordered the testing, as those medical professionals have the expertise and training to draw meaningful conclusions from the results. The role and responsibility of the behavior analyst would be to stay within their scope of practice and ensure that addressing the observable mealtime behaviors with feeding therapy is not contraindicated by test results or the recommendations of the child's team of specialists. This consultation may include a variety of professionals, including gastroenterologists, dietitians, speech-language pathologists, pulmonologists, and pediatricians, depending on the child's medical status (Peterson 2019). In addition, supervisees will need to be familiar with relevant questions to ask other professionals and caregivers regarding the etiology of the feeding problem and what variables may impact either the start or continued course of behavioral assessment and treatment. For example, if a child engages in excessive drooling, is reported by caregivers to pack food (i.e., pocket food in the mouth for lengthy periods of time without swallowing), and has a history of gagging and choking, the supervisee should be able to identify these as red flags for oral-motor skill deficits and refer to professionals who have expertise in oral-motor evaluations and treatments (i.e., speech and language pathologists). In this particular scenario, these factors will, at very minimum, result in guiding the course of treatment if they do not prevent a behavior analyst in proceeding altogether until those factors are remedied.

Ample research exists in the area of conducting pretreatment preference assessments, typically to identify potential reinforcers to use as an intervention to increase behavior. When it comes to the treatment of pediatric feeding problems, a variety of preference assessment considerations may be important to understand before proceeding. For example, although the paired-stimulus preference assessment (Fisher et al. 1992) is effective in identifying a hierarchy of preference for preferred stimuli, many stimuli will be avoided, rejected, or result in other various topographies of problem behavior if the stimuli used within the assessment are aversive (i.e., nonpreferred foods). Thus, if the goal of assessment is to identify whether an individual will or will not consume a food, then a single-stimulus preference assessment (Pace et al. 1985) may accomplish that goal in a potentially shorter period of time. Further, if attempting to identify potential reinforcers, individuals may attempt to include only preferred stimuli; for individuals who consume a

limited number of foods or who do not consume orally altogether, the preference assessment will likely not contain foods at all given the low probability of any foods being consumed.

Behavior Change Procedures We previously provided brief descriptions and examples of some intervention strategies that have been used to decrease IMB and increase consumption. Although we do not provide an exhaustive list of intervention procedures (e.g., procedures to increase lip closure, prevent expulsions, decrease packing), there exists a wide range of interventions and treatment packages which combine multiple techniques to effectively address feeding problems. We would like to emphasize that the BACB fifth edition task list contains a list of procedures that are established in the literature, including but not limited to the use of positive and negative reinforcement, interventions to manipulate motivating operations and discriminative stimuli, prompts and prompt fading, high-probability instructional sequences, extinction, and procedures to promote generalization and maintenance, many of which have been used to treat a variety of different feeding problems. Seeking out recent literature reviews of feeding studies can be an effective way to contact the most up-to-date practices and their applicability (Volkert and Vaz 2010). When wanting to implement interventions, supervisees should ensure that they have received training in those interventions, and supervisors should ensure their supervisee is competent in implementing those procedures prior to independent implementation.

Selecting and Implementing Interventions This section of the BACB task list provides a guide in training supervisees to identify potential interventions based on assessment results or empirical evidence, planning for possible side effects of intervention procedures, monitoring client progress, making data-based decisions regarding the effectiveness of treatment and the need for ongoing treatment, and collaborating with others. Supervisees will likely benefit from practical experiences in selecting interventions, making ongoing decisions, and managing cases for clients who exhibit feeding difficulties as many of these skills cannot be taught merely through instruction alone and will require a supervisor to continue to both mentor and monitor the supervisee's skill development.

Personnel Supervision and Management The general behavior analytic research and resources in best practices regarding supervision and training others are likely to be applicable for this section of the task list. Specifically, this section highlights that training supervisees to train others is of importance. Furthermore, supervisors should be establishing clear expectations, building the skill set of the supervisee through assessment and appropriate intervention, and evaluating the effects of their supervision. Supervisees who have been well trained in the previous sections of the task list can perform many of the necessary skills to assess and treat pediatric feeding disorders competently. However, supervision skills are different from behavior management skills. Thus, supervisors should assign a variety of readings and provide explicit training in supervision practices, so the supervisee can become an effective supervisor.

Multidisciplinary Feeding Programs: Practice Settings and Other Considerations

Behavioral feeding therapy, although not widely available as a standalone treatment, is currently being implemented by behavior analysts in a variety of settings including multidisciplinary therapy centers or hospitals, schools, the client's home, and the community. In this section, we hope to provide a brief overview of settings that a supervisee or behavior analyst seeking to practice in this area may find themselves as well as highlight some considerations that may need to be made with those various models.

Upon initial diagnosis of a pediatric feeding disorder, it is still common practice for primary care physicians and other pediatric specialists to refer patients and their families to clinicians with training in speech and language pathology or occupational therapy. In many cases, in order for a caregiver to obtain insurance coverage for behavioral-based feeding therapy, the child must first fail to show progress with these other, more typically prescribed therapies. However, awareness of behavioral feeding therapy as an appropriate alternative to the more established treatments is growing, especially as the positive outcomes of behavioral therapy become known.

Clinic-Based Therapy

In clinic-based feeding therapy, the client may take part in a dedicated feeding program or may be addressing feeding goal(s) as part of their general ABA treatment package. Clinic-based therapy can range from less-intensive (outpatient, consultative) to intensive (inpatient) models. These clinic-based options have some notable similarities and differences.

With intensive clinic-based therapy, clinicians ranging in training from RBT to BCBA-D conduct feeding therapy sessions in a highly controlled environment pending an intake and assessment by other professionals indicating a behavioral intervention is safe. The therapy room, seating arrangement, feeding utensils/tools, and the visual presentation of the food or drink will be consistent, and any changes are made in a systematic fashion. Therapy sessions often resemble published research protocols in design and rigor, and intensive and thorough data collection is commonplace. The feeding procedures are typically taken directly from the existing feeding literature or are being evaluated within a clinical-research model.

Within an intensive treatment day, the child will take part in multiple feeding sessions. These sessions may take place during regular scheduled mealtimes. This type of schedule may occur when a goal is increasing volume to age-typical portions or reducing mealtime duration. Early on in therapy, feeding sessions are often conducted more frequently. Examples of goals that would be addressed with a more rigorous session schedule include establishing acceptance of small volumes of novel foods or increasing feeding skills using a chewing exercise. Because the child

is not likely to become full during such sessions, clinicians are able to conduct a larger number of daily sessions as compared to instances when full meals are presented.

There are many benefits to an intensive, clinic-based approach. In the clinic, variables can easily be held constant or manipulated as needed to address the child's needs. Sessions are likely to be conducted with high integrity, as therapists have undergone theoretical and clinical training. Consistent monitoring through data and video recordings allows for the immediate identification of negative trends and the onset of novel problem behaviors.

Drawbacks to inpatient therapy are primarily related to generalization of the feeding protocol to the home environment and the ability of caregivers to maintain the accomplished goals post discharge from the clinic. In transitioning to the home environment, adequate parent training is essential. Clinicians should observe the parent conducting feeding sessions, offer feedback, allow for caregiver questions, and provide them with a thorough written feeding protocol. In addition, scheduling follow-up consultations by phone, video, or in vivo may prove helpful in establishing an effective home feeding routine. Another potential challenge is that because feeding protocols are conducted with such precision in the clinic setting, the child may not respond well when slight variations are present (e.g., serving the food on a different plate, variations in seating arrangement, other family members are present).

Inpatient feeding therapy is typically recommended or sought out in order to address severe feeding disorders or in the case of high levels of IMB which have eliminated less-intensive approaches as viable options for treatment. There are barriers to accessing this type of therapy though. Geographically, it is likely that an intensive inpatient facility may not exist locally, so travel costs, absence from work, etc., would have to be considered. Also, the cost is significantly higher than other forms of feeding therapy due to its comprehensive nature, and it may be challenging to receive insurance authorization for treatment.

Outpatient clinic-based feeding therapy, while following the same principles as the more intensive model, varies in some significant ways. Because the clinician is not afforded the time and resources of inpatient therapy, he or she must prioritize feeding goals and develop a protocol that can be effective with the caregiver as the therapy provider. Sessions are generally conducted on a weekly, biweekly, or monthly basis, for no more than an hour or two at a time.

An intake evaluation and assessment will be conducted in a similar manner to an intensive program but may rely more heavily on the caregiver report. A thorough review of the child's medical history and readiness for feeding therapy is still required for outpatient therapy. The child will be observed while eating and may also be exposed to some contrived situations in which problem behaviors or feeding challenges may be observed. As opposed to the highly controlled food preparation of the intensive clinic, caregivers will generally prepare food and drink at home and bring them to the clinic, along with the utensils typically used.

During outpatient therapy, the caregiver is typically present in order to observe the session and to talk with the clinician. Outpatient sessions can vary more significantly in terms of structure, depending on the preferences of the clinician and the

child's needs. The clinician may choose to work with the child one-on-one while the parent observes, which can help in effective plan development. This ensures that the child can be successful with the feeding recommendations before assigning them to the parent.

In some cases, the clinician may ask the caregiver to present the food, drink, or exercise during the therapy session. This can be helpful when targeting parent training or when the problem behavior is more likely in the presence of the parent. Some feeding protocols may involve a complex series of steps that, if not followed closely, will not be effective. For example, when a clinician aims to reduce expulsion, the consistent and immediate execution of each step is often critical to changing the behavior. A procedure of this kind depends on behavioral skills training to set the caregiver up for success.

Additionally, consultation with the caregiver is a likely element of any outpatient treatment model. Whereas direct observation is generally preferred, the child may behave differently in the clinic versus the home setting. Parent report or home observations are necessary to identify and address barriers, so the child can meet their goals across settings. If the caregiver is a poor reporter, the clinician might request video documentation of a home situation in which the behavior occurs. Poor proxy reports may be due to lack of understanding of what types of information are relevant to the clinician or inadequate observation of their child's behavior during meals.

In outpatient therapy, goals are less comprehensive than those of the intensive model. Rather than focusing on several goals (e.g., increasing acceptance of a variety of purees, drinking with a straw, and chewing hard solids which quickly soften or melt), the clinician would establish only one of these goals before moving on to the next. For example, once the child reliably consumes three pureed foods from each food group, the caregiver may keep that routine constant while adding a drinking component with a straw. This limitation on how goals are addressed is inherent to the model. There is a lack of time for sessions in the clinic setting. If goals are too ambitious or too many, the child may engage in IMB during the session, impeding the implementation of an effective plan within the allotted time for any one goal. Secondly, the caregiver must be competent to implement the recommended feeding protocol. If caregivers have to attend to too many goals, too soon or all at once, protocols are not likely to be executed as designed.

Additional limitations of the outpatient model include the aforementioned reliance on the caregiver to conduct treatment and provide accurate reports, as well as potential challenges with generalization from the clinic to home environment. These issues can be addressed by intermittent in vivo or video consultations or, when available, with the support of in-home ABA providers. If communication between members of the child's treatment team is prompt and efficient, consistent and steady progress toward goals is possible.

Outpatient therapy is typically best suited for children who already have an established support team of other therapists, behavioral or otherwise. The caregivers of children who engage in high levels of IMB (during but not limited to feedings) are likely to require more support than can be provided on an outpatient basis.

In-Home Therapy

In-home behavioral feeding therapy can occur in a range of intensity levels depending on the child's needs and the preferred model of the clinician. Assessments are conducted in similar fashions across settings, as all of the same information is required. At home, observations during sessions may be more representative of how the child typically behaves in a familiar environment. A home-based evaluation also allows for the clinician to see exactly what occurs during setup, the meal itself, and how the meal is terminated. Distractions that are common in the home environment, such as other siblings, the TV, etc., may provide additional information.

Whereas the general course of treatment for in-home therapy is generally going to be the same as clinic-based (matched for intensity level), in-home therapy offers some advantages to the clinic-based setting. One large advantage is that the clinician is not relying on caregiver report to draw conclusions about the factors that may be impeding progress in reaching the feeding goals. The clinician can directly observe the mealtime/feeding sessions to ensure that the procedures are being followed with fidelity. Another benefit is that barriers to generalization may not be as prominent. Considering that the majority of meals are typically conducted at home and require some driving on the part of the clinician, it may also be easier to address meals elsewhere (school lunch, weekend outings) without reducing the effectiveness of the treatment. Another advantage to in-home therapy is access to the child's most preferred items and potential reinforcers. Because reinforcing feeding behavior can be challenging when edible reinforcers are not appropriate and preferred items may not be of sufficient reinforcement potency, it can be helpful to have various preferred items and activities available to make feeding sessions as preferred and reinforcing as possible.

While in-home assessment and treatment has many advantages, families may have difficulties obtaining access to in-home feeding therapy, due to insurance regulations or lack of in-home providers in a given region.

Other Therapy Options

There are a few avenues in which behavioral feeding therapy has been made more accessible to individuals with feeding deficits. One such way is through the formation of multidisciplinary feeding programs. These programs are typically developed in the hospital or research setting and involve collaboration with professionals that may include behavior analysts, pediatric gastroenterologists, psychiatrists, speech and language pathologists, occupational therapists, registered dietitians, and more. These programs can be relatively easier to obtain through insurance as they may be viewed as a first-line means of addressing feeding disorders.

Another way that the reach of behavioral feeding therapy has grown, at least for children diagnosed with ASD, is through the implementation of a feeding goal(s)

into a child's comprehensive ABA program. While some ABA companies refuse to address feeding goals due to lack of specialized staff or requirements to solely address other areas of need (academic, self-help, behavior reduction, etc.), those agencies with experienced clinicians are introducing feeding goals with success pending the scope of agency services allows clinicians to proceed with treatment. These goals can be implemented in clinic, home, school, or community settings, with either a clinician or caregiver providing the intervention.

Virtual consultation is an expanding area in the ABA field, and feeding therapy is part of that growth. A clinician specializing in feeding behaviors can consult with caregivers and other BCBA's in order to develop feeding goals and protocols for children with feeding disorders. This technology can help to address the issue of access to providers in some cases. While research in this area looks promising, there are shortcomings to solely using virtual therapy. The clinician will be relying caregiver report more so than with the other models. Review of video-recorded sessions, observations during live therapy sessions, and input from other authorized therapists can help to inform the clinician's decisions outside of these reports. As with the other less-intensive therapies, it is best when the child has a variety of therapist supports as goals are addressed.

Obtaining Treatment

Once an appropriate behavioral program has been identified for the child, obstacles often still remain in regard to commencing treatment. Some caregivers are willing and able to pay out of pocket for feeding therapy but may find that there are extensive waitlists due to limited providers. Many families will not be able to proceed with therapy without approval from their medical insurance, due to the inherent cost. Even when behavioral feeding therapy is indicated by a medical professional and a formal referral is produced, there are typically several additional steps that must be taken for an authorization to even be considered by insurance providers.

A child who does not have a diagnosis of ASD will be denied behavioral therapy out of hand in virtually all circumstances across insurance carriers and plans. This is because, as it stands, ABA therapy is not established as an approved feeding intervention for children who do not have a diagnosis of ASD. Currently, behavioral feeding therapy (in cases where it has been authorized) is billed under the standard ABA current procedural terminology (CPT) codes. These codes are subject to change as insurance company policies and legislation dictate. Insurance claims are automatically rejected if the child's diagnosis code is not compatible with the CPT code provided (e.g., if the child does not have a diagnosis of ASD, then ABA codes would be denied).

Even for children with ASD, an insurance provider may deny claims because the feeding specialist is not providing a comprehensive ABA treatment package or because a different ABA company is already authorized to provide general ABA therapy (some companies will only authorize a single ABA provider). In addition to

these challenges, representatives of insurance providers often do not have a great deal of knowledge regarding what ABA therapy is or what the child's health plan covers. An authorization could be granted for a BCBA-level feeding therapist to provide services for a child with an ASD diagnosis, because at the surface level, the codes match up. However, once the claim is submitted, it may be denied because the reports do not reflect a complete ABA program (i.e., the report and goals are limited to feeding-related behaviors).

In these circumstances, a caregiver can dispute the denial using the avenues that are laid out by their particular insurance company. This can involve many steps, including submission of documentation that reflects lack of progress in one or more previous feeding therapies, letters from the caregiver, and reports from the child's medical team. The supervising behavior analyst or the caregiver may need to meet with a specialist employed by the insurance company to further determine medical necessity.

A major limitation to the expansion of behavioral feeding therapy as a field is that, as insurance companies continue to deny requests for the therapy, it may continue to be erroneously viewed as a therapy only appropriate for individuals with an ASD and a therapy of last resort or, worse, as an unsubstantiated treatment approach. In dealing with large companies, progress in this area can be slow going, as it requires a departure from the status quo. However, some suggestions can be made toward helping to advance the acceptance of behavior analysis in treating feeding disorders in a broader pediatric population. Since multidisciplinary feeding programs may be more likely to treat clients with conditions other than ASD, the resulting research demonstrating positive outcomes in non-ASD children may prove powerful support in advocating for behavioral feeding interventions. Advocacy for the inclusion of behavior analysts as qualified and effective treatment providers may also be called for at the administrative level as well, with influential behavior analysts engaging with insurance providers or other professional associations in the medical community.

Ethical Considerations

As previously implied, many ethical considerations should be made by individuals not only acquiring competence in the assessment and treatment of pediatric feeding disorders but those who are continuing to practice and supervise in this area as well. This is especially relevant given that behavior analysts treating individuals with feeding problems often need to make numerous decisions to reduce the risk to their clients as well as ensure they are operating within both their scope of practice as a behavior analyst and their scope of competence relevant to their education and training. The goal of this section is to further highlight some specific codes within the *Professional and Ethical Compliance Code for Behavior Analysts* (BACB 2014) as they relate to practicing ethically in this subspecialty area.

Subspecialties involve many considerations that must be made prior to practicing in a specific area. BACB Code 1.02 (boundaries of competence) is an especially relevant guideline when seeking to practice skill sets that the supervisee has not been directly trained in. Scope of competence has been previously defined as the range of professional activities deemed to be performed above a minimal standard or level of proficiency (Broadhead et al. 2018). While it may be within the scope of practice for an individual to work with a certain population (e.g., individuals diagnosed with ASD), such population-based heuristics are insufficient and potentially harmful. Having managed verbal skills-building and other behavioral interventions with one particular population does not prepare behavior analysts for competence (a) in procedures related to eating or feeding problems with that same population (e.g., nonremoval of the spoon) or (b) in interventions on specific topographies of behavior displayed by that population (e.g., premature swallowing, chewing deficits). A BCBA may conclude that work with a population (e.g., neurodevelopmental disabilities) squarely belongs into the field of ABA, yet they would practice outside of their scope of competence.

Competence, as stated in BACB Code 1.02, is determined by the individual's previous education, training, and supervised experiences. An individual can gain competence in a subspecialty area by furthering one's education, training, and experiences within that practice area. LeBlanc et al. (2012) suggested considerations for expanding behavior-analytic services to a new population. Although their examples pertained to the extension of behavior analytic services to individuals with neurocognitive disorders, their discussion of specific codes is relevant and applicable to gaining competence in other practice areas. The authors also provided several general strategic recommendations for increasing professional competence including reviewing the literature, joining relevant professional groups, pursuing retraining and supervision, and identifying professional credentials. Many of the specific strategies they outlined in their article are sound recommendations for individuals wishing to increase competence in the area of pediatric feeding disorders and include but are not limited to accessing behavioral journals and reading empirical articles, books, handbooks, and manuals; attending conferences, workshops, and other training opportunities; and contacting a professional mentor for guidance in training or supervision. Intensive clinic-based behavioral feeding programs, which are often affiliated with academic and medical institutions, are excellent sources of experiential learning when the opportunity is available. These programs integrate experimental design, clinical application of interventions, and multidisciplinary approaches into each client's treatment, demonstrating effective applications of current practice while also occasioning the development of advancements in the field (Peterson 2019).

There may be a number of factors that influence whether an individual will practice outside of their scope of competency. As discussed by Broadhead et al. (2018), these factors may include (a) an increased demand for services and possible risk that the client will experience either a delay to accessing treatment or not be able to access treatment at all, (b) the perception that the individual is qualified to provide the service because they may seemingly be more qualified than other

people, (c) the high cost and effort related to referring to alternate services, (d) the skill deficit related to self-identifying when practice falls outside one's scope of competence, and (e) the misunderstanding that just because behavior analytic principles apply to behavior in general, the individual is also able to freely practice applying them. However, regardless of the reason for practicing beyond the scope of competence, behavior analysts not only place their client at increased risk of harm, but they also place themselves at risk for ethical infractions and our field at risk for ineffective if not harmful practices.

Behavior analysts abide by several codes including, but not limited to, BACB Codes 2.01 (accepting clients), 2.03a (consultation), 2.04 (third-party involvement in services), and 2.09 (right to effective treatment). BACB Code 2.01 specifies that behavior analysts only accept clients whose services would be appropriate given the behavior analysts' education, training, experience, available resources, and organizational policies or, in lieu of these conditions, in consultation with a behavior analyst who is competent in performing the services. Given that many behavior analysts work with individuals diagnosed with ASD and many of whom likely display some form of feeding difficulty (Ledford and Gast 2006), behavior analysts are likely to find themselves confronted with the pressure of requests to treat feeding problems. However, even when there is a high demand for the service or context in which access to treatment is sparse, the behavior analyst is obligated to refer to an alternate provider(s) for the service (BACB Code 2.03a) if they are not competent in providing treatment.

Furthermore, behavior analysts working with pediatric populations must operate in the best interest of their client (BACB Code 2.0); however, they are also often providing services at the request of other parties (e.g., caregivers, schools, other professionals) and will need to ensure the caregiver or third party is informed of the scope of services (BACB Code 2.04c) and ensure that if third-party requests are not in alignment with the behavior analyst's empirically based recommendations and data-based decisions, then they have attempted to either resolve those conflicts (BACB Code 2.04d) or appropriately transition services (BACB Code 2.15). Ultimately, the client has a right to effective treatment (BACB Code 2.09), often of which may include the use of escape extinction procedures. As previously stated, implementation will necessitate medical and safety resources that may be beyond the training or setting constraints the behavior analyst finds themselves practicing. Even under the context in which a behavior analyst may have some competence in treating feeding problems (e.g., fading procedures), they are obligated to inform caregivers of the limitations to their scope of competence and how that may impact future recommendations to treat through an alternate provider if more intensive services are needed. As ethics standards relevant to feeding interventions continue to evolve, it is important to advocate for a client's best interests within the behavior analysts' scope of practice while also considering that in many instances, a client may be subject to other medical conditions and concurrent treatments that may impact treatment efficacy, for example, changes in medication type or dosage which impact appetite (Newhouse-Oisten et al. 2017).

Due to the multifaceted etiology of many feeding problems as well as the likelihood of many other professionals in other disciplines (e.g., gastroenterologists, dietitians, speech and language pathologists, occupational therapists) needing to be involved either prior to or concurrently with the implementation of behavioral treatment, several codes pertaining to medical consultation (BACB Codes 2.03a and 3.02), working with other professionals (BACB Code 2.03b), and seeking assistance from other professionals (BACB Code 4.07) become highly relevant. As previously discussed, underlying medical problems are likely to be present in children who display feeding disorders, and ensuring the appropriate professionals have examined potential variables contributing to the feeding problem is required by the behavior analyst. Furthermore, maintaining competence through professional development (BACB Code 1.03) is not only important for staying in contact with current behavioral literature in the assessment and treatment of feeding problems but may also include the behavior analyst engaging in a number of professional activities within related disciplines (e.g., dietetics, speech and language pathology).

Conclusion

The purpose of this chapter was to provide a brief overview of the assessment and treatment of pediatric feeding problems stressing the importance of competency and considerations for ethics and training in this subspecialty area of ABA. As discussed, assessment and treatment of pediatric feeding problems are complex often because they necessitate competency not just specific to behavior analytic procedures covered by the BACB 5th-edition task list and the different skills that must be acquired to work safely with this population (e.g., procedures to safely present food) but the consideration of biobehavioral factors and working with other disciplines in a multidisciplinary approach as well.

We can expect that, as evidence continues to show the efficacy of behavior analytic principles used in the assessment and treatment of feeding problems, the demand for services will likely expand as well. Thus, it is highly important to maintain rigorous levels of competency by conducting appropriate training to individuals seeking and continuing to provide services in this area. Because of this, research on models of training and best practices in feeding disorders is encouraged.

The present chapter is meant to serve as a starting point for people interested in assessment and treatment of feeding problems, but it is not a comprehensive review and cannot replace proper hands-on training. Instead, people working in this area are encouraged to improve their skill set and understanding of feeding problems by looking for supervision in this area and reviewing the vast and growing literature in this area. As individuals seek to treat even the perceived mildest cases of feeding problems, they should obey the ethical guidelines described in this chapter and obtain necessary training and consultation in an effort to ensure competency prior to proceeding.

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Suitability of Behavior Analysis in Pediatric Primary Care



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Abstract The scope of applied behavior analysis has been narrow, and behavior analysts have focused their attention on special populations. Concurrently, there are many children and adolescents outside of these special populations who may benefit from interventions based on behavior analytic practice and who do not access evidence-based treatments. By implementing interventions in the pediatric primary care setting, behavior analysts could expand the scope of practice in the field while improving access to behavioral health treatment for children and adolescents. Behavior analysts have the foundational skills to provide brief, solution-oriented, and problem-focused evidence-based treatment and, with the appropriate training, would be well-suited for work within a fast-paced pediatric primary care setting. There are current health care system barriers, such as licensure concerns, training barriers, and the need for experience functioning as a provider within a multidisciplinary team, that exist for behavior analysts providing services in this setting. Recommendations for how behavior analysts could overcome these barriers and gain competencies necessary for Behavior Analyst Certification Boarding behavior analytic services in pediatric primary care are discussed.

Keywords Integrated care · Behavioral health providers · Training · Healthcare systems

Introduction

Applied behavior analysis (ABA) emerged in the late 1960s as a branch of behavior analysis that focused on changing socially important behavior (Baer et al. 1968). This aligned with Skinner's vision of a science of behavior that could be applied broadly to solve complex, real-world problems. The applied practice of behavior

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analysis grew dramatically over the next several decades, and this fast-paced growth broadened the reach of ABA. Expansion of the applied branch of ABA was not without growing pains, however (Critchfield and Reed 2017). Many believed that the applied nature of many applications of ABA moved the practice away from its scientific foundation and methodological rigor, resulting in an increased emphasis on the analytical and behavioral dimensions of ABA. This movement was largely due to a perception that ABA was being packaged as a set of techniques instead of a serious scientific and data driven discipline (Hayes et al. 1980). As a result, the scope of ABA narrowed and behavior analysts focused their attention on special populations and complex problems for which ongoing data collection, experimental analysis, and direct observation of behavior could be feasibly completed (Critchfield and Reed 2017; Friman 2010a, b). Consequently, the success and effectiveness of the application of behavior analysis to special populations have made it difficult for the field to expand its scope of practice more broadly (Friman 2010a, b). Currently, over 75% of board-certified behavior analysts (BCBA's) are working with individuals diagnosed with autism or developmental disabilities (BACB 2018). While the continued work with autism and developmental disabilities remains exemplary, the expansion of ABA to the broader population continues to lag. If ABA could replicate the impact it has had on the 7% of children diagnosed with autism or developmental disabilities with the 50% of children in the broader population with behavioral health problems, that would increase the impact of behavior analysis by over 600% (Merikangas et al. 2010; Zablotsky et al. 2017). In order for ABA to continue to grow as an applied discipline, it must expand its reach beyond these special populations to, as Friman (2010a, b) described, the “mainstream” (p. 20). One way this can be done, as Friman argues, is through the application of ABA within medical settings, specifically primary health care. The purpose of this chapter is to review the application of ABA within pediatric primary care settings.

Main Body

Current prevalence data suggest that between 20 and 50% of children and adolescents will experience a behavioral health problem before the age of 18 (Costello et al. 2003). The majority of children who would benefit from behavioral health services never access treatment. Less than 20% of children who need behavioral health services ever receive treatment (Costello et al. 2014; Wu et al. 1999). In contrast, approximately 90% of children in the United States receive some form of primary care (Stancin and Perrin 2014). Pediatricians have become the most preferred provider by parents and, as a result, parents of children and adolescents with behavioral, emotional, and psychosocial concerns present to their pediatricians' office seeking treatment (Polaha et al. 2011). In fact, behavioral health concerns are the primary reason for visits to pediatricians in 15–21% of cases. Even during routine medical visits, such as well child visits, behavioral health concerns are frequently brought up by parents (Lancaster et al. 2018; Polaha et al. 2011; Sharp et al. 1992; Wildman and Langkamp

2012). Thus, it is estimated that pediatricians are providing up to 80% of behavioral health treatment for children. Unfortunately, pediatricians report barriers to adequately addressing their patients' behavioral health concerns. Not only do pediatricians have insufficient training in behavioral health assessment and treatment (Biel et al. 2017; Horwitz et al. 2007), the average primary care visit only lasts 13–17 minutes, giving providers very little time for assessing and treating these concerns in addition to medical concerns (Cooper et al. 2006). Pediatricians often rely on referring their patients to outside specialty mental health services with low follow-up rates due to a variety of reasons including long waits (Laureer et al. 2018) and lack of knowledge regarding appropriate referrals (Green et al. 2017). When patients return to pediatricians with untreated behavioral health concerns (Briggs-Gowan et al. 2000), pediatricians may rely on medications, even when the evidence shows that behavioral treatments are just as effective (Epstein et al. 2014), if not more effective in the long-term, especially in cases of ADHD and mild to moderate depression.

To address the need to treat behavioral health concerns where they commonly present, integrated pediatric primary care involves integrating a behavioral health provider within the pediatric primary care office. Adding behavioral health providers to the team can shift the behavioral health care away from the pediatrician and to a provider within the office who has the expertise in evidence-based behavioral assessment and treatment. Because primary care visits with behavioral health concerns last longer, reducing pediatrician productivity and taking time away from medical care (Meadows et al. 2011), primary care providers welcome the support of a behavioral health provider. Well-child visits often screen for these concerns early on and offer an opportunity for catching problems before they significantly impact other areas of functioning (e.g., academic functioning; Talmi et al. 2016). A majority of behavioral health problems that present in primary care include ADHD, behavioral or conduct problems, anxiety, and depression, all of which can be effectively treated with behavioral therapy (Perou et al. 2013). When these behavioral concerns are identified in primary care, referral to a behavioral health provider in the office demonstrates higher rates of follow-up than when pediatricians refer to an outside specialty mental health provider (Wildman and Langkamp 2012). Providers report satisfaction with integrated behavioral health because of the increased continuity of care for their patients and families (Hine et al. 2017). Some barriers (e.g., stigma, new location) to receiving behavioral health care are reduced because parents can come to the same clinic where they are accustomed to taking their child for routine medical care (Wildman and Langkamp 2012). Lastly, children who receive care in a clinic with integrated pediatric primary care demonstrate better outcomes than those who do not receive medical care in a clinic with integrated pediatric primary care (Asarnow et al. 2016). Integrated pediatric primary care can increase access to quality, evidence-based treatment, which demonstrates better outcomes for children than usual care (Weisz et al. 2013). Thus, pediatricians, parents, and children all benefit from integrating behavioral health care into primary care.

In response to early results demonstrating the benefit of integrated behavioral health in pediatric primary care, organizations such as the American Academy of Pediatrics support this model of care (Stancin and Perrin 2014). Despite the acceptability of

integrated behavioral health by pediatricians, parents, and organizations, the majority of pediatric primary care clinics do not employ integrated behavioral health services, and those clinics who have integrated care typically utilize behavioral health specialists in the field of psychology or social work (Kaslow et al. 2015; Kazak et al. 2017; Rozensky 2014). Because practicing in primary care differs from the traditional outpatient mental health settings, where most psychologists and social workers receive training, their current practice does not directly translate to primary care.

Medicine is evidence based and tends to be protocol driven, thus behavioral health providers practicing in this setting should also be implementing evidence-based interventions. This is problematic because not all mental health professionals currently utilize evidence-based interventions (Institute of Medicine 2006). Furthermore, with a constant referral source from PCPs, behavioral health providers must also prioritize efficiency. Primary care is a fast-paced setting, and, thus, behavioral health providers have to practice in a way that aims to increase access to care. Mental health professionals typically orient toward helping few, whereas integrated care has to focus on helping many (O'Donohue et al. 2014). This can be difficult for behavioral health providers who have to move away from models of care typically used in traditional mental health settings (e.g., 50-minute therapy hour, once weekly sessions, and long-term therapy). Pediatricians expect that the presence of a behavioral health care provider will increase access to these services for their patients, but if behavioral health providers do not have availability to schedule their patients, it is of no benefit to them. This means that behavioral health providers have to maintain a solution-oriented and problem-focused approach and have the skills to delivery evidence-based interventions in a brief format. Because behavioral health providers are required to adapt treatments to the primary care setting, it is also necessary that they use data to demonstrate the interventions delivered in this setting are effective.

Despite being skilled at implementing treatments for behavioral health concerns that often present in pediatric primary care (Friman and Piazza 2011), behavior analysts have been excluded from discussion of behavioral health providers suitable for integrated pediatric primary care. Psychologists have been the trail blazers in integrated care, advocating for their spot on a child's health care team. As a field, psychology has defined specific competencies in response to the unique set of skills required of a behavioral health provider in primary care (Hoffses et al. 2016; McDaniel et al. 2014). It can be argued that behavior analytic providers already possess the necessary skills to provide brief, solution-oriented, and problem-focused evidence-based treatment and, with the right training, would be well-suited for work within a fast-paced primary care setting.

Training Issues for Providing Behavioral Health Services in Pediatric Primary Care

The difference between providing services in a traditional outpatient setting and providing services within the medical setting, such as a pediatric primary care clinic, is not simply a setting change. All aspects of care delivery are impacted and

thus require specific training for any behavioral health provider looking to provide services in pediatric primary care. The following section will review training that is necessary for providing effective services in this setting.

Behavior analysts have knowledge in behavior change procedures that could benefit patients who present to pediatric primary care with behavioral health concerns. Specifically, behavior analysts receive training in behavioral principles that are integral to many of the treatments utilized in pediatric primary care. While behavior analysts are well suited to provide services in the pediatric primary care setting because of their knowledge about behavioral principles, applied behavior analysis training alone is not sufficient. Although behavior analysts have an in-depth understanding of behavioral principles that most evidence-based interventions are based upon, they do not receive the training necessary to implement these interventions. Due to its success in the treatment of individuals within special populations, most applied behavior analysis training experiences are specific to applying behavior change procedures to children with autism and developmental disabilities. This training is not sufficient for behavior analysts to implement other evidence-based behavior interventions. Adolescent depression, for example, is a common presentation in the primary care setting (Sterling et al. 2018). Although behavior activation is based on behavioral principles (e.g., reinforcement and punishment; see Kanter et al. 2005 for review), a behavior analytic provider may not have had the training experiences necessary to implement behavior activation effectively with typically developing adolescent patients.

Behavioral health providers working in this setting should be competent with assessing and treating the wide variety of problems that most often present in primary care. ADHD, behavior problems, feeding problems, weight issues, developmental delay, and mood disorders are among some of the most common presenting problems addressed by behavioral health providers working in pediatric primary care (Talmi et al. 2016). Behavioral health professionals who want to deliver services in primary care would need supervision relevant to the above presenting concerns in order to implement evidence-based interventions such as exposure, behavior activation, and parent-management training. More so, given the fast-paced nature of the integrated pediatric primary care setting, evidence-based interventions need to be tailored for delivery in pediatric primary care. This means that providers should not only have knowledge of these interventions, but also know how to implement them in a brief format (see Bruni and Lancaster 2019). Habit reversal, for example, consists of many components. Research has shown that increasing awareness and learning an opposite action are the most essential components of this treatment. While providing the entire treatment protocol in traditional outpatient behavioral health settings is feasible, providers in pediatric primary care implement this treatment in a brief format of the treatment focusing only on these two components (Bruni et al. 2019). By understanding the basic principles that are the responsible for behavior change in evidence-based interventions, interventions could be implemented more efficiently. Cognitive behavioral therapy, for example, is effective for treating depression; however, behavior activation alone has been found to be equally effective on its own, especially among special populations (i.e., pediatrics) (Jacobson

et al. 1996). While psychologists practicing in specialty mental health may have the luxury of implementing a full CBT protocol, in primary care, behavioral health providers need to improve symptoms quickly in order to promote a low-touch high-volume mode of service delivery (Maragakis and Hatzigeorgiou 2018).

Behavioral health providers in the primary care setting are delivering services within the medical model, which requires knowledge about diagnoses, including the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition (American Psychiatric Association 2013) and the *International and Statistical Classification of Diseases and Related Health Problems* (World Health Organization 2015). Mental health diagnoses in the primary care setting are used to bill for services and communicate information to other providers. The goal of integrating behavioral health providers into the medical setting is to provide comprehensive, quality care that is more efficient than what can be provided when medical and behavioral health care are provided separately (Kelly and Coons 2012). To meet this goal, it is particularly important that behavioral health providers have knowledge of medical conditions, behavioral health, and how to tailor treatments accordingly. When functioning as a part of the medical team, behavioral health providers working in pediatric primary care must also learn how to effectively communicate with medical providers through means other than documenting a mental health diagnosis. Both face-to-face communication about treatment and adequately communicating information to other providers through shared electronic health records should be addressed in training (Knowles 2009). One aspect of providing care in a medical setting is understanding medication, its uses, potential side effects, and how medications may impact treatment. Behavioral health providers functioning as a part of the primary care team should have enough knowledge to communicate with primary care providers. Because behavioral health providers spend more time with patients, they may have data that could inform primary care providers. With toileting, for example, behavioral health providers may have data to show pediatricians to help determine whether they have prescribed the correct amount of medication administered to address constipation symptoms. With ADHD, behavioral health providers can provide data to determine whether a medication is effectively managing inattention, hyperactivity, and/or impulsivity across settings. Because behavioral health services have traditionally operated as their own separate entity, not all behavioral health training adequately prepares a behavioral health provider to work in conjunction with medical providers. Typically, behavioral health providers are trained to write lengthy and thorough notes. In primary care, however, notes should be more succinct so that they are also useful for pediatricians who may also read notes to inform medical care.

Behavior analysts have skills that could also be utilized in other areas important to a developing area of practice such as integrated behavioral health in pediatric primary care. Behavior analytic providers possess research skills that are consistent with quality improvement (Maragakis et al. 2019) and applied research designs (Riley and Freeman 2019). Their knowledge of time-series, single-case, and evaluation design technology has the potential to move the field forward by providing evidence for effectiveness of interventions used in pediatric primary care (Lavigne 2016). Behavioral health providers who can demonstrate treatment effectiveness in

this setting can promote the continued delivery of data-driven evidence-based care for pediatric primary care patients.

Licensure Issues with Providing Behavioral Health Services in Pediatric Primary Care

There are also systems level barriers to behavioral health professionals providing services in the integrated pediatric primary care setting (Cederna-Meko et al. 2016). There are specific licensing requirements to bill for services that are provided in the primary care setting. Currently, there is no way for a behavior analyst to bill for services in pediatric primary care due to the absence of state-level credentialing that would allow payment from third-party payers and other barriers related to billing (e.g., cannot bill for two services on the same day, low reimbursement for health and behavior codes). Billing practices, however, are constantly evolving as behavioral health professionals become more integrated in the medical setting. Currently, there are options to become licensed as a master's level provider to provide billable services in pediatric primary care, but this varies greatly by state. Licensed clinical psychologists who hold a doctoral degree can bill for behavioral health services they provide in this setting. Therefore, those who are interested in providing services in this setting would need to obtain a degree that would allow them to obtain one of these licensures.

For those who already have a BCBA-D, depending on state requirements, some states allow clinical psychology re-specialization, which permits professionals who already hold a doctoral degree to receive additional education and training to change their specialty. This option would allow behavior analysts to gain necessary additional training and earn credentials that allow them to bill for their services. However, because this option would require taking all of the courses required for a clinical psychology doctorate degree, it would be time consuming and not cost effective. A more efficient option would be to receive training in a program that both teaches students the same behavioral principles while also preparing them to more broadly apply behavioral principles in a medical setting. Currently, there are few clinical psychology master's and doctoral programs that can satisfy both of these requirements, including some that prepare graduate students for dual licensure (e.g., LLP or LP, and BCBA, see Bruni and Lancaster 2019).

Ethical Considerations for Providing Services in Pediatric Primary Care

Applied behavior analysts are guided by the *Professional and Ethical Compliance Code for Behavior Analysts* (Behavior Analysis Certification Board 2014). Therefore, any board-certified behavior analyst who provides services in the

pediatric primary care setting would need to consider how their ethical code would guide their actions and approach to potential ethical dilemmas around providing services within the integrated pediatric primary care setting. Given that behavior analysts are not regularly integrated in the primary care setting, behavior analysts may find it difficult to adhere to standard 1.03, which states that behavior analysts should maintain competence through professional development. Even though the suitability of behavior analysts in pediatric primary care has been a topic of discussion for some time (Friman and Piazza 2011), there are not many behavior analysts working in pediatric primary care and thus few opportunities for ongoing learning, practical training, and supervision exist in this setting.

While the ethical standard 3.01 states the type of assessment used should be determined by environmental parameters, assessments in primary care will be brief in comparison to settings behavior analysts typically provide services. Behavior analysts working in primary care do not have the time for full functional assessment, direct observation in natural environment, or experimental functional analysis or graphically displaying data. Thus, behavior analysts need to know how to conduct functional assessments that are brief yet still inform treatment.

Behavior analysts might be given referrals from providers that are outside of their scope (2.01); thus behavior analysts would need to ensure they have both breadth in training to provide services to the variety of presenting problems in pediatric primary care and knowledge regarding when to refer patients who may benefit from other services. Additionally, behavior analysts working in pediatric primary care may find it difficult to consult for cases given that few behavior analysts work in this setting.

As discussed in the previous section, however, in order for a behavior analyst to provide services in the integrated pediatric primary care setting, they would need to hold licensure that allows them to bill for services. Thus, those interested in providing services in this setting need to be familiar with other ethical codes and how ethical codes may conflict. While there are similarities between the Ethical Compliance Code for Behavior Analysts and American Psychological Association (APA) Code of Ethics, discussions regarding these ethical considerations for providing behavioral health services in primary care typically reference the APA ethical guidelines. Providing services in the medical setting is accompanied by daily ethical dilemmas that may only be encountered infrequently in typical outpatient specialty mental health settings.

Compared to typical outpatient specialty mental health settings, behavioral health providers collaborate frequently with the patients' medical team. Collaboration and communication with the medical team require consent but do not require a release of information. As described earlier, behavioral health providers function as a part of the medical team, and, therefore, notes are shared using the same electronic health record to facilitate communication regarding patients' care. Because pediatricians and other medical providers in the health system may read behavioral health notes, there are additional considerations for note writing. Most behavioral health providers are trained to write notes for themselves, whereas in integrated care, it is important for the note to be written with the expectation that other providers will be

reading it (Kelly and Coon 2012). Communication about patient care also occurs outside of the electronic health record through informal curb-side consults or through formal case conferences. To some providers such communication practices would seem to pose problems surrounding issues of confidentiality, which providers in traditional mental health settings deem necessary for establishing a therapeutic alliance. Communication about patient care, however, is necessary for providing behavioral health services in integrated pediatric primary care. Behavioral health providers should be cognizant of differing views regarding confidentiality among health professionals and discern that shared patient information need be for the benefit of the patient and family (Hoffman and Koocher 2018). Disclosure of the limits of confidentiality and existence of shared medical records may be important at the outset of treatment; so patients are aware of who has access to their information and also are made aware of the benefits of coordinated care.

Standard 2.04 states “*psychologists’ work is based upon established scientific and professional knowledge of the discipline.*” Because integrated primary care is a new area of practice, there is little scientific knowledge to guide behavioral health providers in terms of treatments shown to be effective when implemented in the medical setting (Maragakis et al. 2018). As described above, the effectiveness of empirically supported treatments is determined by application of the treatment in typical outpatient specialty mental health settings. Thus, behavioral health providers in integrated pediatric primary care are adapting evidence-based treatments to a new context (Koocher and Hoffman 2019).

Best Practices in Supervision

Any individual who has interest in working as a behavioral health provider in pediatric primary care should have a supervisor who works in the medical setting (Blount and Miller 2009). For all the reasons described, there are skills trainees should acquire that are unique to medical settings and a supervisor who works in traditional mental health settings will not be able to shape the required skills to be successful to practice in pediatric primary care. Supervisors should be familiar with competencies to evaluate trainees. Supervisors should also be knowledgeable about the different models of integrated care that exist in practice (e.g., Primary Care Behavioral Health Model, Co-Location Model, Fully Integrated Approach, and Coordinated Care Approach) to prepare trainees to work in a variety of settings.

Conclusion

Integrated pediatric primary care is a relatively new area of practice that benefits pediatricians, parents, and children. Because it is new, behavioral health providers are still trying to determine how to effectively provide services and what type of

expertise is needed to effectively implement treatment protocols in a fast-paced integrated primary care setting. Although behavior analysts would need to be more flexible in the application of their treatment protocols and systems level barriers to behavior analysts providing services in this setting exist, an opportunity exists for them to broaden their scope of practice to meet the behavior health needs within pediatric primary care.

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Outpatient Interventions in Clinical Behavior Analysis



Sabrina M. Darrow, Thomas J. Waltz, Claudia Drossel, and Brenton Abadie

Abstract Clinical behavior analysis (CBA) is the term used to refer to applications of behavior analysis to behavioral health presentations, such as anxiety, depression, or other disorders that interfere with quality of life. Assessment and intervention typically address lifestyle changes (e.g., management of sleep, diabetes, or hypertension) and build novel repertoires (e.g., in the case of mood disorders or serious mental illness). Therapists who consider themselves clinical behavior analysts translate the philosophy and science of behavior into action, implementing strategies consistent with a radical behavioral epistemology and based on behavioral principles emerging from the experimental analysis of behavior. The range of settings in which clinical behavior analysts work is expanding as the relationship between behavior and overall health is increasingly recognized. An overview of behavior analytically informed cognitive behavior therapies (CBTs) is provided as well as a description of the assessment, treatment, and broader professional repertoires necessary to be successful in this diverse profession.

Keywords Behavioral health · Clinical behavior analysis · Competencies · Health services · Licensed psychologist

Introduction

We are in a dynamic period of change for mental health care. With new legislation affecting health care, new stakeholders, and new ways to conduct clinical research, the traditional intervention development “pipeline” is being transformed. [...] Treatment should be accessible across socioeconomic levels and among diverse groups (e.g., sex, gender, age, racial,

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217

ethnic, cultural), usable in diverse settings and with individuals with a range of illness severity and treatment responsiveness. (National Institute of Mental Health, Strategic Objective 3 (2015))

Clinical behavior analysis (CBA) is the term used to refer to applications of behavior analysis to behavioral health presentations, such as anxiety, depression, or other disorders that interfere with quality of life. Assessment and intervention typically address lifestyle changes (e.g., management of sleep, diabetes, or hypertension) and build novel repertoires (e.g., in the case of mood disorders or serious mental illness). Therapists who consider themselves clinical behavior analysts translate the philosophy and science of behavior into action, implementing strategies consistent with a radical behavioral epistemology and based on behavioral principles emerging from the experimental analysis of behavior. They understand behavior in terms of patterns, emerging from the antecedents and consequences that functionally influence clinically relevant behaviors. At its heart, behavior analysis is a pragmatic approach to problems of living. The goal of therapy is to make clinical behavior analysis services superfluous as clients become their own behavioral self-managers.

Outpatient interventions take place in a variety of settings, including academic medical centers, veteran's health-care systems, university clinics, community clinics, and private practices. Some settings focus on age cohorts (e.g., adolescents in pediatric clinics, college students in student counseling centers, older adults in geriatric clinics) or diagnostic categories (e.g., mood and anxiety disorders), whereas other settings provide services to a broad range of clients and issues. The breadth of settings continues to expand as the impact of behavior on overall health is increasingly recognized (American Psychological Association 2019). For example, many primary care clinics emphasize availability of behavioral health services to address behavior change. Interventions are typically delivered in the format of outpatient psychotherapy: Clients visit an office at a scheduled time, typically once a week, for about 45 to 60 minutes each meeting. Integrative medical settings usually offer shorter, 30-minute sessions for behavioral management. In general, the format depends on the intensity of the intervention and the specific setting (Kelly and Coons 2012). Additionally, exciting new opportunities are developing as advances in digital technology expand access to interventions that historically required in-person meetings.

Individuals who receive assessment and interventions are referred to as patients, clients, or consumers, depending on the specific setting and/or professional field. Therapists refer to "clients" or "consumers" to decrease stigma and capture the expectation of active participation (rather than passive receipt of treatment). This chapter will use the term "clients."

As already implemented, this chapter will call behavioral health providers who deliver outpatient services "therapists," as there are many paths to become trained and licensed to practice therapy (in most states, "psychotherapy"). Students interested in clinical behavior analysts must become familiar with their state's licensure laws for therapists, to find out what courses and practicums are required. Requirements vary by type of license as well as by state.

Graduate-level training is required for basic therapy skills and access to applied experience. Supervised externships or other training-level positions are only available to those in a master's or doctoral training program; an undergraduate degree in psychology or related field is not enough. Therapists may only practice independently if they have a doctoral-level license (doctor of philosophy, PhD, or psychology doctorate, PsyD). Currently, very few states offer a limited license in psychology at the master's level, which allows a master's level therapist to practice with ongoing supervision by a fully licensed doctoral-level psychologist. Alternatively, licenses for independent practice at the master's level are available in other fields, such as marriage and family therapy or clinical social work. Of note, the curriculum varies considerably among programs, particularly in the degree to which a behavior analytic foundation and evidence-based practices are included. The difference between degrees is the focus on research; generally, PhD programs require research. The goal of PhD programs is to develop faculty and researchers. An empirical approach to clinical problem-solving is a key feature of the scientist-practitioner skill set valued by psychology as a profession. This emphasis is unique among the professions and differentiates doctoral-level psychology from other fields, such as psychiatry, social work, marriage, and family counseling. This chapter will provide a brief introduction of the necessary skills, important system of care issues, common ethical dilemmas, regulatory practices, and supervision requirements. Due to space limitations, the examples will focus on those most relevant to clinical behavior analysts with training in doctoral-level psychology, although similar issues and regulations apply to master's level clinicians. Chapter "Scope of Practice and Standards of Training Across the Clinical Professions" of this volume provides more detailed comparisons and contrasts involving these differing training routes to licensed practice.

Many strategies present in today's evidence-based psychotherapies can be traced back to translational research, implementing and disseminating basic behavioral principles. An understanding of the history of behavior therapy helps to elucidate this foundation; it has been described as happening in three waves (Hayes and Hofmann 2017). Behavioral principles were the most obvious in the first wave of behavior therapy as the initial clinical applications were direct translations of approaches to behavior change developed in behavior research laboratories. The second wave involves the emergence of cognitive behavior therapy (CBT) and includes a focus on assessing and intervening upon verbal behavior ("restructuring"), with the assumptions that verbal behavior must change before other behavior can. The third wave of CBT has moved away from a focus on changing verbal behavior and emphasizes effective action. It initially applied Skinnerian philosophy (i.e., verbal behavior as not different in kind from any other behavior; behavior changes regardless of concurrent verbal behavior) and rule-governed behavior, including more recent (1970s–1980s) accounts of emergent verbal stimulus control, such as equivalence (Sidman et al. 1974) and relational frame theory (Hayes et al. 2001). CBT approaches that are grounded in behavior analytic philosophy put "workability" into the center of treatment. Workability refers to the client's experience with implementing a solution and observing and evaluating the outcome in

relation to long-term, overarching values. Other than the experimental approach taught within the second wave of CBT (observing whether one's verbal behavior is confirmed or disconfirmed by experience), modern behavior therapies emphasize a long view and pattern-building. This strategy equips the client with a flexible toolbox from which to pick and try which approach supports movement into a valued direction. As a result, symptoms may persist at least initially; however, the desired outcome of treatment is not a reduction in symptoms but increased functional status or quality of life.

Brief Introduction to Behavior Analytically Informed CBTs

Many modern CBTs rely on practitioners' firm grounding in behavior analysis to maintain treatment fidelity while encountering the unique features of individual clients. This part of the chapter will provide only a brief synopsis of some example clinical behavior analytic therapies: behavioral activation, functional analytic psychotherapy, acceptance and commitment therapy, contingency management, problem-solving therapy, and dialectical behavior therapy.

Behavioral activation is an intervention designed for use with clients who have behavioral deficits and lack engagement – social and otherwise – and whose withdrawal from activities interferes with daily living (“depression”). A functional analytic approach is taken with the symptoms of depression (e.g., inactivity, social seclusion, etc.; see Ferster 1973), and interventions focus on increasing positive reinforcers and addressing any avoidance repertoires that may compete with repertoires necessary for accessing positive reinforcers (Jacobson et al. 2001). A period of focused activation typically includes selecting values-based activities, methods of monitoring activity, monitoring the impact of activity on mood and well-being, engaging in a series of tasks graded by difficulty, and the scheduling of activities regardless of the client's mood.

Functional analytic psychotherapy (FAP) utilizes the effectiveness of contingency management in session (i.e., therapist-delivered interventions; Baruch et al. 2009; Kohlenberg et al. 1993). The client and therapist collaboratively develop treatment targets. Intervention plans typically include extinction or punishment of social behaviors that are agreed upon as interfering with social interactions (e.g., inappropriate joking, remarking on therapist's appearance) and shaping or differential reinforcement of those behaviors that promote a more effective social skill set. To make the therapist superfluous, it is important that improvements will be maintained by nonarbitrary reinforcers. Enhanced and explicit feedback may be used by the therapist during sessions, but repertoires need to be maintained by reinforcers naturally occurring in social interactions to achieve desired therapy outcomes.

Acceptance and commitment therapy (ACT) was developed to “address verbal barriers to pursuing meaningful life directions” (Waltz and Hayes 2010, p. 159). Therapists help clients change their relationship with verbally governed behavior

(Hayes et al. 1999) through psychoeducation, experiential exercises, and homework (Hayes et al. 2006).

Contingency management for substance use typically uses differential reinforcement techniques to provide a variety of nondrug (often monetary) opportunities to individuals who abstain from substance use. Reinforcers such as retail prizes (Petty et al. 2007), vouchers (Lussier et al. 2006), services such as housing or work therapy programs (Schumacher et al. 2007), or cash (Festinger et al. 2014) are most often used. Biological samples are collected, and reinforcement is delivered or withheld based on confirmation of compliance with drug abstinence (Prendergast et al. 2006).

Problem-solving therapy focuses on behavioral skills training. It teaches an explicit problem-solving skills sequence and an adaptive worldview with the goal of increasing effective coping in response to life stressors (Nezu et al. 2013). It has been used to treat a variety of problems such as depression (Bell and D’Zurilla 2009), physical health problems (Malouff et al. 2007), and caregiver mental health outcomes (Garand et al. 2014).

Dialectical behavior therapy (DBT) was initially developed to treat suicidality and borderline personality disorder (M. M. Linehan and Wilks 2015). It shapes adaptive skills to replace behavior patterns that are harmful, interfere with therapy, or decrease quality of life. Key aspects of treatment include skills training delivered by a skills training team in a group setting, concurrent individual treatment focused on the generalization of skills through client-specific examples, and availability of between-session phone coaching. Treatment tools in individual therapy include contingency management in session (see FAP above), behavioral activation, exposure, and problem-solving techniques. Unique is the team consultation model to maintain adherence to the behavioral model and support the therapeutic team (please refer to section “[Tolerating distress](#)”).

As with most evidence-based therapies, these treatments are disseminated and evaluated as packages using treatment manuals that outline specific approaches for specific problems (Follette 1995; Follette and Hayes 1992; Follette et al. 1992; Hofmann and Hayes 2019). However, there are broader, foundational principles that are present in these CBA treatments, and the remainder of this chapter will focus on these, including a brief synopsis of how evaluation and dissemination efforts are evolving.

Assessment, Treatment, and Therapist Repertoires in Clinical Behavior Analysis

Diagnostic Assessment

Currently, mental health services are mostly organized according to a diagnostic framework; understanding this system is a basic skill necessary for therapists who wish to work in an outpatient mental health setting. Disorders are classified based

on symptom counts, and the goal of treatment is to decrease these symptoms. In the USA, the *Diagnostic and Statistical Manual of Mental Disorders* (DSM; American Psychiatric Association 2013) is the main framework that guides diagnostic assessment; international work uses the *International Statistical Classification of Diseases and Related Disorders* (ICD) classification system (World Health Organization 2004), and the current versions of these systems are quite similar. The DSM is currently in its fifth edition, and each revision has been controversial (e.g., see Follette and Houts 1996; Greenberg 2013; Whitaker and Cosgrove 2015). A common diagnosis is major depressive disorder, which requires that five of nine of the following symptoms to occur in a two-week period: depressed mood, diminished interest or pleasure, significant weight loss or gain, insomnia or hypersomnia, fatigue or loss of energy, feelings of worthlessness or inappropriate guilt, diminished ability to concentrate or indecisiveness, and recurrent thoughts of death. Importantly, these symptoms must also cause the individual “clinically significant distress or impairment in social, occupational, or other important areas of functioning” (p. 161).

The gold standard method for categorizing the problems of a particular individual is to conduct a semi-structure diagnostic interview (e.g., the Structured Clinical Interview for DSM-5 Disorders (SCID-5; First et al. 2016), Kiddie-Schedule for Affective Disorders and Schizophrenia Screen Interview (KSADS; Kaufman et al. 1997)). These instruments guide the assessor through a decision tree to determine which diagnoses best match an individual’s description of their problem and concurrent behavioral observations.

Knowledge of latent constructs and self-report measures that assess symptoms is also important. An example of a common self-report measure is the Beck Depression Inventory (BDI), which asks individuals to report on the severity of each depression symptom in the past 2 weeks (Beck et al. 1996). Measures such as the BDI are commonly used to screen individuals for further assessment and intervention as well as to track treatment progress.

Functional Assessment

While the practice standards of psychiatric diagnosing promote nomothetic assessments, idiographic assessment approaches are familiar to behavior analysts and used by clinical behavior analysts. Rather than the frequency count of symptoms, their different functions are important. Clinical behavior analysts work to specify behaviors (referred to as “target behaviors”) that are relevant to the problems that bring each individual client to seek services as well as the relevant conditions in their psychosocial setting that evoke and maintain them. This assessment goes beyond the topographical assessment of behavior (i.e., basic descriptions of form, magnitude, or frequency of behavior, feelings, and thoughts). For example, functional assessment of behavior relevant to depression will examine disruptions in established behavioral sequences (Skinner 1953), deficits in identifying situations and behaviors that could lead to positive reinforcement, high rates of escape and

avoidance behavior, schedules of reinforcement that result in a lack of behavior variability (Ferster 1973), or low rate of response-contingent positive reinforcement (Lewinsohn et al. 1974). An assessment of this type is likely to lead to different conceptualizations of the same behavior for different people. For example, staying in bed (as an example of depressed behavior) may function to avoid distressing interactions due to ineffective social skills for one individual, whereas parental reinforcement of staying in bed may best describe the contingencies operative for another individual. Thus, the same functional thinking that behavior analysts learn is important for applying behavioral principles in outpatient mental health settings; however, the methods and skills to accomplish a functional assessment in these settings are quite different. The traditional form of functional assessment, accomplished via an experimental functional analysis, involves generating specific hypotheses about the controlling variables of an individual's behavior and manipulating variables *in vivo* to observe changes in the target behavior and test the hypotheses (Iwata et al. 2000). However, this methodology does not lend itself well to the complex social behaviors that one encounters in an outpatient mental health setting, where therapists have little access to the environment that evokes and maintains clients' problems.

Therapists in outpatient mental health services typically rely on their clients' self-report to determine the potential functional relations that relate to their presenting problems. In effect, as noted before, clients must become self-managers or their own behavior technicians. They must learn to observe and record antecedents, behaviors, and consequences (e.g., in DBT's descriptive chain analyses). Evoking descriptions that elucidate these relationships is key and often a behavior to shape, as clients' descriptions may not initially include relevant contextual information (e.g., "I did it because I was angry"). Thus, therapists benefit strongly from training in the analysis of verbal behavior, functions of verbal behavior, and how to shape verbal behavior. In-session contingency management is crucial (see FAP above): Therapists observe client behavior in the room; in other words, therapists may notice patterns about how a client interacts with them that may be relevant to the presenting problem and help elucidate relevant functional relationships. For example, a therapist might observe that any talk of changing client's behavior evokes crying, complaining about client's spouse, criticisms of therapy, or other behaviors that function to punish or extinguish therapist change talk. Further assessment to determine whether this represents a clinically relevant target, part of the treatment plan developed with the client, might include the client observing if and when these behaviors occur outside of session. Functional assessments in outpatient mental health settings occur throughout treatment as client and therapist narrow the controlling variables and test out hypotheses, both in session and as clients go about their daily life.

Haynes and O'Brian (1990) described a methodology for developing and testing the utility of a functional analysis. Their guidelines for clinical assessment ask therapists to focus on variables that can be understood as (1) causal (reliably covary with target behavior), (2) important (variables which account for a large amount of variance in target behavior), and (3) changeable (variables which can be altered in

the current environment). Another heuristic that may help therapists conduct a functional analysis is to identify deficits related to the three-term contingency (i.e., identify problems with antecedents, responses, and consequences; see Follette and Darrow 2010; Follette et al. 2000). Self-report questionnaires developed as descriptive functional assessments assist therapists in this process (Callaghan and Darrow 2015). The ultimate goal of an ongoing functional assessment process is to develop and refine an individual case conceptualization that summarizes the behaviors and stimulus conditions relevant to a client's presenting problems, grouped by function, that will be used to guide collaborative treatment decisions.

Assessing Verbal Behavior

Clinical behavior analysts also need to be particularly fluent in conceptualizing verbal behavior, both applications of traditional Skinnerian verbal behavior (Skinner 1957) and more recent developments reflecting emergent stimulus control (e.g., Hayes et al. 2001; Sidman et al. 1974). Two relevant classes of verbal behavior particularly relevant to emotional expression and therapy are tacts and mands. Tacts may be understood as labels; they are verbal behaviors maintained by generalized conditioned reinforcers (Skinner 1957). A mand is a verbal operant reinforced by that which is specified by the verbal behavior (Skinner 1957). While these two classes are technically distinct and there is evidence that they can be acquired separately (Lamarre and Holland 1985; Twyman 1995), they are often formally similar and hard to distinguish by topography. Expressions of hopelessness may have tact or mand qualities, depending on the social context. For example, voicing despair may result in decreased demands from a partner and, thus, function as a mand and help maintain depressed behavior. Both tacts and mands are essential for effectively navigating social environments, i.e., stating preferences, responding to others, and effecting change in one's environment (see Darrow and Follette (2014) for an example of conceptualizing verbal behavior relevant to mental health problems).

Assessing the function of verbal behavior is key to functional assessment in outpatient mental health settings. Maintaining a functional approach to verbal behavior is challenging to clinical behavior analysts as they participate in at least two verbal communities. First, clinicians are members of the broader linguistic community in which they live that reinforces behaving with respect to verbal behavior based on its content and features of the delivery. A functional analytic approach to verbal behavior often requires clinicians to step away from content (i.e., how verbal behavior ought to function based on the denotative meaning of the utterance) and look at verbal behavior functionally. This stance requires substantial training and supervision before it can be implemented fluently in clinical practice.

Treatment Planning

Functional assessment and case conceptualization are the cornerstone of clinical behavior analysis (Haynes et al. 2011). Hypotheses about functions of behavior are generated, an intervention is tried, and the results are used to further refine hypotheses and plan next steps of treatment. Therapists aim to make this a collaborative process and provide education on relevant behavioral principles. Case conceptualizations are shared with clients, and agreements are made about the goals for treatment and how to reach them. Through this process, the therapist and client establish individualized goals that go beyond the reduction of symptoms. For example, a goal for an individual who reports fear of social situations might be to make a friend. Also critical is an agreement on some way to assess progress. This may include the use of a daily diary card to track the frequency of certain behaviors, a validated self-report measure, or both. These data are used to iteratively refine a case conceptualization and adjust a treatment plan.

Treatment Principles

As the majority of treatment development and outcome research has taken place under the DSM framework and followed a clinical trial model adopted from medical research, different treatment protocols have been developed for particular disorders, and lists of treatments with empirical support for particular disorders have been developed to guide treatment choices (Chambless and Ollendick 2001). A lot of clinical training now centers on teaching particular protocols or manuals for specific conditions, and therapists are held accountable for adhering to the delivery of interventions as specified in these treatment manuals (Waltz et al. 1993). However, this nomothetic approach to matching individuals to treatment package has encountered many barriers (Hayes et al. 1995; Kazdin and Blase 2011). Alternative approaches, such as protocols designed to work for multiple diagnoses (i.e., transdiagnostic treatments; Farchione et al. 2012) and identification of empirically based principles that support a more idiographic approach (Beutler and Castonguay 2006), are becoming more common (Farmer and Chapman 2016).

Specialized training in cognitive-behavioral treatments has historically been considered a matter for internship or postgraduate training. For the purpose of training doctoral students with proficiency in the foundational principles of CBT, the Association for Behavioral and Cognitive Therapies recently led a multi-organizational task force in developing guidelines for cognitive behavioral training in psychology doctoral programs (Klepac et al. 2012). Clinical competencies within these guidelines include numerous skill areas rooted in behavior analysis:

- Contingency management
- Stimulus control
- Shaping of complex chains of behavior

- Self-management including self-monitoring/habit reversal
- Arousal reduction strategies (e.g., relaxation training, biofeedback, hypnosis, meditation)
- Distress tolerance
- Emotion regulation
- Extinction/exposure strategies
- Behavioral activation
- Interpersonal skills training (e.g., assertion training, interpersonal problem-solving, validation)
- Modifying cognitive processes (e.g., reappraisal, reframing, restructuring)
- Modification of core cognitive beliefs/tacit knowledge structures
- Defusion/distancing
- Enhancing psychological acceptance
- Motivational strategies
- Values clarification
- Crisis management/strategies to assess suicidality

The following section highlights some principle-based strategies for intervening from a clinical behavior analytic framework and coincides with the clinical competency guidelines presented above; it is not meant to be a comprehensive review.

Stimulus Control

Stimulus control is a commonly used principle to help with both increasing and decreasing behavior. It is a necessary first step to any well-developed safety plan when trying to decrease life-threatening behaviors such as suicide or self-injury. These, and other behaviors that may be understood as “impulsive,” can be greatly decreased by removing the means of carrying them out (e.g., ask clients to throw out razors used for self-harm, lock all medications and weapons). Alternatively, building stimuli into a person’s environment to serve as “reminders” for behaviors to increase can be an effective use of stimulus control.

Implementation of Extinction: Exposure

Behaviors that function to avoid or escape from certain stimulus conditions are common targets in outpatient mental health settings and come in many forms. Anxiety and trauma symptoms can often be understood as behaviors that are maintained by escape or avoidance contingencies. Some treatment techniques are meant to target overt avoidance behaviors, such as avoiding important meetings at work due to distress experienced when talking in front of colleagues. Other treatment techniques are meant to focus on more subtle avoidance behaviors (“experiential avoidance”; Hayes et al. 1996). These techniques are generally referred to as exposure as clients are exposed to aversive stimuli and safety behaviors are blocked or reduced. The

main goal of exposure is to help individuals tolerate short-term discomfort to realize long-term gains and may be understood as shifting a discounting curve (Waltz and Follette 2009). This might include in-session exposure; for example, disclosing something embarrassing to the therapist, role plays of meetings, or describing memories of traumatic events may create aversive stimulus conditions in the treatment setting that belong to the same stimulus class as those the client avoids in daily life. These in-session exposures thus provide opportunities for clients to practice approach behaviors. Also important are planned exposure activities outside of therapy (i.e., in vivo exposure). Research has shown that flooding (i.e., individuals approaching the most highly distressing situation) is an effective exposure technique (Zoellner et al. 2003). However, clients may not agree to this, and most treatment packages include building a treatment hierarchy (i.e., a list of stimulus situations to approach ordered from least to most distressing) to shape approach behaviors.

Behavioral Activation

Activity scheduling or behavioral activation is another common technique that derives from behavioral conceptualizations of depression as a low rate of response-contingent behavior (Ferster 1973; Lewinsohn et al. 1974). When implementing behavioral activation, therapists strive to increase client's behavior that will lead to response-contingent reinforcement (Lejuez et al. 2001; Martell et al. 2001). Commonly misunderstood as increasing topographically "pleasant" behaviors, a principle-based understanding of behavioral activation is based on increasing engagement in behaviors that will be reinforcing for a particular individual in relation to their long-term goals or values (Martell et al. 2001). Understanding of molar functional relationships, such as the matching law, can also serve as a useful heuristic to applying the principles of behavioral activation to a broad range of presenting problems (Waltz and Follette 2009). For example, a client who struggles with negative body image may be encouraged to increase behaviors related to any other values as a way to decrease time spent thinking about body image.

Shaping and Generalization

Applying these principles is not as straightforward as it may seem. Individuals who are depressed and infrequently getting out of bed are not going to find it easy to change their behavior. The principle of shaping is helpful, and therapists may need to find creative ways to build in reinforcing contingencies to support behavior change. Therapists can make use of either arbitrary or naturalistic reinforcers (i.e., those which occur regularly outside of therapy) as both can be helpful to support complex behavior changes. For example, a therapist may offer an arbitrary reinforcer to help a client begin to engage in the behavior change process (e.g., "I'll buy you a coffee if you complete your goal this week"). Natural social consequences, such as expressing disappointment or excitement based on whether a client follows

through on commitments, may also function to bring about behavior change as the therapist and client develop a relationship. It is also important to plan for generalization, as incidental reinforcement inherent in everyday life interactions will need to maintain a behavior beyond a time-limited mental health intervention (Follette and Bonow 2009). The prototypical therapist response to emotional disclosures, “thank you for sharing,” is not likely to occur outside of therapy (and may not function to reinforce disclosures); as therapy progresses, therapists may want to respond in ways that are more typical of naturally occurring responses in the client’s social community. Working in an outpatient environment often means that therapists have little access to the environment in which a client’s behavior change needs to occur. Rather than directly manipulate the frequency and timing of reinforcing consequences, therapists have to work with clients to change their own environment.

Building Motivation and Addressing Resistance

Resistance, a term used to describe client behavior that is counter to goals of therapy, was originally used in psychoanalysis. Unfortunately, it is still used frequently today, and this construct tends to orient therapists to something internal that is wrong with clients rather than follow the behavioral maxim that “the subject is always right.” From a behavior analytic perspective, failure to make progress toward agreed upon goals can be interpreted as a signal that further assessment is needed to understand the competing contingencies. A client may have every intention of going to work when talking about it in the therapist’s office; while verbal behavior is governed by one set of contingencies, there may be reinforcing contingencies for staying at home that have yet to be identified or modified, and it may be necessary to revisit the case conceptualization. Molar behavior relations, which describe patterns of contingencies over time, may be useful heuristics and orient the therapist to alternative ways to intervene (Waltz and Follette 2009). There are also many times when clients may willingly come to therapy but express ambivalence about changing the behaviors that seem to be contributing to their problems. Simply educating a client about the long-term negative effects of smoking cigarettes is not likely enough to change behavior. Rather, a therapist is tasked with building motivation (i.e., creating the stimulus conditions to evoke change). Christopher and Dougher (2009) provide an analysis of motivational interviewing (MI), a set of techniques with empirical support for building motivation, from a behavior analytic viewpoint that can serve as a useful framework in these circumstances.

Therapist Repertoires

Building Relationships

Research on psychotherapy outcomes has demonstrated the importance of forming a strong therapeutic alliance/relationship. The relative contribution of the therapeutic relationship to treatment outcome has been the subject of controversy as some

argue that this “common factor” across therapy approaches is all that is needed for change, while others highlight the necessity of evidence-based techniques (Castonguay and Beutler 2006). Applying principles of behavior analysis to understand what makes a strong relationship and why this might be important for behavior change is one way to synthesize these two sides. One of the first efforts to do this appears in writings and research on functional analytic psychotherapy (FAP; Follette et al. 1996; Robert J. Kohlenberg and Tsai 1991; Tsai et al. 2009). One can understand a “strong relationship” as becoming a person that matters/has an impact on ones’ behavior; in other words, forming a relationship is a process of establishing oneself as a source of social reinforcement. At the simplest level, this would appear to be a basic building block of any intervention; a client will only listen to a therapist if the therapist matters (i.e., therapist behaviors function as discriminative and reinforcing stimuli for behavior change). Figuring out how to become a source of social reinforcement for the diverse individuals that seek services at any outpatient mental health setting is challenging and requires insight into one’s own stimulus properties, a repertoire for monitoring one’s impact on others (i.e., assess function of your actions on their behavior) and their impact on you (i.e., assess how client’s behavior functions to shape your behavior). Therapy approaches differ in the extent and method of focus on repertoires to establish and maintain therapeutic relationships. Given the diversity of behaviors addressed in outpatient mental health settings, the level of insight needed into one’s own behavior may also differ; treating a straightforward spider phobia through exposure will likely require less focus on the therapeutic relationship compared to helping someone improve their ability to relate to others and maintain healthy relationships.

Tolerating Distress

Another key therapist repertoire is the ability to cope with strong emotions and use skillful means to prevent burnout (Norcross and Vanden Bos 2018; Simionato and Simpson 2018). While talk of self-care has become increasingly common, it is particularly important for working in outpatient mental health settings where one is stepping into the private emotional struggles of clients. In asking clients to do exposure, therapists are also exposed to highly distressing stimuli (e.g., narratives of traumatic events when doing exposure for post-traumatic stress disorder). Coaching someone to change their behavior in the long term is likely a path full of short-term disappointments; being able to tolerate frustration and staying oriented to long-term contingencies is key to helping clients do the same. Providing hope that things can change for the better may be key to continued efforts. As experts in behavioral principles, we know that people never “unlearn” behaviors. Thus, clients are likely to continue to behave in the ineffective ways that brought them into therapy as they learn new skills. Treatment failures, where environmental contingencies to support more effective behavior are not available or clients are not able to change, are inevitable; so far, there is not a therapy that is effective 100% of the time. The need for a repertoire to tolerate distress may vary greatly with the type of work being done and

organizational factors as well as therapist-specific factors (e.g., work-life balance) (Simionato and Simpson 2018). Therapist factors, such as anxiety, have been identified as barriers to implementing evidence-based exposure therapies for clients with relevant presentations (Meyer et al. 2014). Some therapy approaches have recognized the importance of supporting therapist tolerance of negative affect. For example, dialectical behavior therapy, which aims to decrease suicidal and self-injurious behaviors, includes a weekly team consultation meeting to address any factor that may interfere with sticking to a treatment plan, including the therapist's own treatment-interfering behavior (M. Linehan 1993).

System of Care Issues

Biopsychosocial Framework/Collaborative Care

Historically, the majority of psychotherapy was not integrated into the medical care system (Alexander et al. 2010). However, there has been an increase in the recognition that multiple factors contribute to an individual's health and a push for more integrated care (Richards 2012). Thus, it is essential to develop knowledge of the broader health-care system and to work collaboratively with people from many disciplines. The extent to which one collaborates and with which specific disciplines will depend on one's area of focus. The DSM includes a criterion for most disorders that the symptoms "are not attributable to the physiological effects of substance or to another medical condition." Thus, therapists need to be aware of medical conditions and substances that may cause certain behaviors (e.g., mania would not be diagnosed if a person was using cocaine or other stimulants – including those contained in over-the-counter decongestants). Additionally, therapists need to understand the effects of psychotropic medications (e.g., antidepressants, anxiolytics) and how these may interact with plans for behavior change (see, e.g., Tolin 2017). Understanding these variables, helping clients navigate the system of care, and developing collaborative relationships with multidisciplinary providers are key to success in outpatient mental health settings. While behavior change principles are applicable to a broad range of presenting problems throughout the life span, there is also a need to balance this with a depth of understanding important related biological, social, and systems factors.

Risk Assessment, Confidentiality, and Laws

Assessing whether someone is at imminent risk for harming themselves or others is a crucial skill set and a challenging one. While maintaining information disclosed in therapy confidential is critical to build trust and ethically mandated, therapists are also mandated to break confidentiality if they learn about imminent risk to self or

others. If a client cannot be safe in an outpatient environment, a therapist may need to break confidentiality to get them hospitalized in order to ensure their safety or inform police to keep others safe. Unfortunately, the literature on risk assessment shows that – in contrast to actuarial data and related long-term public health risks – short-term, imminent risk is not amenable to prediction (Glenn and Nock 2014; Woods and Lasiuk 2008). Yet keeping people safe is not only necessary for outpatient therapy to work, it is also mandated by law. While researchers work to identify better methods, individuals working in outpatient mental health settings need to stay up-to-date on best practices as well as related laws. There are also special protections in place for children, adults in later life, and other vulnerable populations; mandated reports are made when there is evidence of abuse or neglect, and the specific circumstances when these are made vary based on state law.

Insurance

New laws have mandated insurance benefits for mental health services that are similar to those provided for physical health (Druss and Goldman 2018). This should greatly impact individuals' access to the care they need. However, services paid for by insurance companies may also put restrictions on the frequency and amount of services that require different considerations in developing a treatment plan. Therapists in different settings will be confronted with this to different extents; many in private practice do not take insurance as they often do not have the infrastructure to navigate the complex reimbursement systems established by third-party payers.

Ethical Considerations

There are many ethical considerations when providing mental health services in outpatient settings. The American Psychological Association (APA) publishes and maintains an ethics code for all psychologists, the general principles of which are (A) beneficence and nonmaleficence, (B) fidelity and responsibility, (C) integrity, (D) justice, and (E) respect for people's rights and dignity (American Psychological Association 2017). This code also outlines specific ethical standards that are enforceable, and violation can result in a range of punishments (e.g., sanctions, notification of licensing boards) in relation to (1) resolving ethical issues, (2) competence, (3) human relations, (4) privacy and confidentiality, (5) advertising and other public statements, (6) record keeping and fees, (7) education and training, (8) research and publication, (9) assessment, and (10) therapy.

While it is beyond the scope of this chapter to review these standards, there are two areas worth highlighting: (1) respect for people's autonomy and (2) dual relationships. The APA ethics code provides that clients have the right to

self-determination, meaning that they should have their own values and that therapists should not unduly influence them. In contrast, the research literature demonstrates *values convergence*, client values becoming more similar to therapist's values, through the course of therapy. Applying this ethical code literally is problematic when the agenda for therapy is behavior change toward positive goals (see Bonow and Follette (2009) for a thorough discussion of this important issue). They highlight the need for transparency and informed consent when choosing target behaviors.

Dual or multiple relationships occur when a therapist is in another role or promises to be in another role with an individual while they are also their therapist. Romantic and sexual attraction is common among clients and therapists, and an alarming number of therapists act on these feelings (Sonne and Jochai 2014). While this is one extreme of therapists behaving unethically, there are other more common and subtle situations that deserve attention. Dual roles take many forms and are particularly frequent in small communities. Even in large, urban areas, a therapist may find themselves in a dual role; for example, a therapist treating adolescents may have a client who goes to the same school as their own children. Given the sensitive nature of the information disclosed in therapy, therapists need to approach these situations with caution and seek consultation in navigating unavoidable dual relationships.

Regulatory and Licensing Frameworks

As noted at the beginning of this chapter, attending a graduate program is the only way to get the comprehensive training needed to get licensed as a psychologist and competently preform outpatient mental health services. Graduate programs will include courses on clinical competencies and provide access to supervised applied experiences, which are requisite for obtaining the proper state license. While there is a lot of variability across states regarding the particular requirements for psychology licensure, most states require certain graduate-level course work, prefer graduate degrees from accredited programs, and require supervised applied experience (preferably through accredited internships). Some states also require additional supervised applied experience post-degree, and most states require certain number of hours of continuing education credits to maintain licenses. Accreditation is the process of evaluating the kind and quality of training that programs provide. For psychologists, the most widely recognized accreditation system for both graduate programs and internships is run by the APA. The Psychological Clinical Science Accreditation System (PCSAS) associated with the Academy of Psychological Clinical Science is another recognized accreditation system that was developed to better promote the clinical science model of training (Levenson 2017).

Certifications beyond a psychologist license are becoming increasingly common to distinguish providers with specialty proficiencies above and beyond the base proficiencies of the profession. The American Board of Professional Psychology (ABPP) has a certification program that is widely recognized. The basic ABPP

Board certification process includes review of credentials (graduate degree, state license, supervised experience, and training), peer-reviewed practice samples, and an oral examination. Specialty boards include behavioral and cognitive, clinical child and adolescent, clinical health, clinical, clinical neuropsychology, counseling, couple and family, forensic, geropsychology, group, organizational and business, police and public safety, psychoanalysis, rehabilitation, and school. While ABPP Board certification is not currently required to practice psychotherapy, regulators and third-party payers are increasingly interested in using ABPP to credential specialty services. This trend is similar to the one found in medicine.

Developers of specific therapy approaches (e.g., acceptance and commitment therapy [ACT], Hayes et al. 1999; dialectical behavior therapy [DBT], M. Linehan 1993) have also developed their own proficiency recognition processes. While many recognize the importance of quality training and fidelity to empirically based approaches, the need for certification, its costs, and whether it accomplishes its goal remains controversial.

Supervision

Supervised clinical hours are required to apply for a psychology license; supervisors must be licensed mental health providers, typically licensed clinical psychologists. Many states also require that these hours are done as part of an accredited program (e.g., APA-accredited internship). In addition to having an active license, some states have additional requirements for qualified supervisors. For example, licensed psychologists in California are required to take 6 h of continuing education credits on best practices for providing supervision every 2 years in order for supervised hours to count toward licensure. While supervision has been a key component of training, it has only recently been given attention as a specific area in which psychologists need to be competent (Hess 2011; Rings et al. 2009). This shift has led to new requirements for APA-accredited internships for trainees to get experience and supervision on providing supervision to others, as well as the publication of guidelines defining what competent supervision looks like (American Psychological Association 2014). The domains covered in these guidelines include (1) supervision competence, (2) diversity, (3) supervisory relationship, (4) professionalism, (5) assessment, evaluation, feedback, (6) professional competence problems, and (7) ethical, legal, and regulatory considerations.

Conclusion

Applying the principles of behavior analysis in outpatient settings is both challenging and rewarding. Yet, behavior analysts need to be aware of the many training, regulatory, and systems issues that require knowledge and skills beyond the scope

of most behavior analytic graduate programs. The behaviors targeted are diverse, and the clients' environments in which these behaviors need to be shaped and maintained are complex. While there is significant empirical support for clinical behavior analytic therapies, there is also a lot of room for improvement as currently not all clients benefit. The recent trend in the broader mental health field to increase focus on ways to personalize and improve mental health treatment (i.e., idiographic approaches) provides great opportunity for behavior analysts to contribute to the research and practice of psychotherapy in these settings.

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Opportunities and Considerations for Applied Behavior Analysis in Person-Centered Adult Services in Residential Settings



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Abstract A continuum of supports which have emerged following deinstitutionalization have created opportunities for behavior analysts to provide clinical services and design environments for staff and those served by them. Relatively recent advocacy efforts have created a climate which is deeply concerned with serving individuals with intellectual and developmental disabilities, and those who support them, in ways which earnestly approach the question of the intended outcome of services. Answering this question requires the navigation of a complex network of risks and values-based considerations. One way to make these decisions more effective may be through careful direct assessment of behavior, both verbal and nonverbal. While behavior reduction is still an area which may create inroads for behavior analysts, learning targets may also provide opportunities for individuals versed in functional assessment, foundational learning principles, and idiographic data analysis to impact the lives of unique and diverse individuals.

Keywords Residential treatment · Person-centered planning · Intellectual and developmental disabilities · Habilitation · Dignity of Risk

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Introduction

Becoming an adult is not simple to plan for; it is often a complex web of mistakes, successes, and lessons. The transition into adulthood places selective pressures upon one's developing repertoire in ever-changing contexts, creating the conditions for new behaviors to develop. To thrive in our adult lives, growth and adaptation are necessary. Pain and progress often occur simultaneously. It is not uncommon to hear a person report that their most formative, important, and even joyous life experience (in hindsight) occurred when things may not have seemed so great in the moment. We may look back fondly on a formative time when we were lonely, metaphorically "lost," had limited funds, used unhealthy/unsustainable amounts of a drug or alcohol, or something of this nature. Life's experiences are complex and often messy as we seek our purpose in life.

When treatment is a goal, seen in isolation, it is easy to spend our time alleviating pain and discomfort in those we serve and creating the conditions of limiting experience. Individuals with intellectual and developmental disabilities (IDDs) have often been deprived of fundamental learning opportunities like these (Verdonschot et al. 2009). The contemporary vision for people to become community members, fully integrated in society, necessitates a continued focus on eschewing paternalistic notions of their treatment. Simply treating individuals with disabilities with respect and kindness has been a noble talking point for the last 80 years. Restrictive clinical practices, including line-of-sight supervision, personal rights restrictions, aversive control techniques, physical restraints, and isolation, have not been eliminated in the twenty-first century (Ramcharan et al. 2009). Uninformed leaders, poor staff training and management, and inefficient organizational systems are not entirely uncommon. These considerations should remind us that we still have a long way to go before integration may be fully realized. This chapter will briefly review the history of people with disabilities in residential settings and the historical activities of behavior analysts in this area. The authors will review best practices in clinical behavior analysis related to supporting adults with IDDs as well as best practices regarding the management of others in human service settings with the hopes of creating a road map of effective treatment and a culture of respect and dignity.

History of Deinstitutionalization

The human population has always included individuals with disabilities. However, the disposition of communities to include and support those members across their life span has varied greatly over time and by region—even into the twenty-first century. Arguably, the treatment of adults with intellectual disabilities has often been oppressive and punitive in nature (Bailey and Burch 2016). Misguided attempts at managing society's disabled population throughout our history have ranged from euthanasia (e.g., ancient Sparta, Nazi Germany), sterilization (e.g.,

twentieth-century USA and Canada), and isolation (e.g., Bethlem Hospital in London circa 1676). These dismaying failures in policy highlight a need for continued attention to the foundations of inclusion and integration of people with IDD into society at large.

By the mid-twentieth century, overcrowding, funding cuts, reports of abuse, ill-treatment, and the growing volume and prominence of human rights advocacy began to paint a dismal picture of the future of institutionalization in North America (Tassé et al. 2020). With the advent of psychotropic medications in the 1950s and the US Community Mental Health Centers Act of 1963, the stage was set for a gradual deinstitutionalization movement to occur across the world. The challenge faced by lawmakers and service providers was now to develop community-based residential supports that did not restrict the rights of people with disabilities yet also ensured quality of care and oversight that protected an at-risk population from potential abuse, neglect, and exploitation. In the USA, many efforts focused on building models of care, federal legislation, state legislation, funding models, and a general strategy for the task of supporting people with IDD in community-based settings. Those efforts continue to the present day (for an in-depth history, see Kozma et al. 2009).

A Continuum of Residential Supports

Following deinstitutionalization, it was clear that the population of people with IDD had varying and unique needs and that service models had to offer a range of supports (Tassé et al. 2020). Available supports and their respective funding systems vary, both within the USA and across the globe. The variations occur with respect to the number of people with disabilities in one setting, the number of staff hours allotted, the policies for living spaces, the limitations of rights allowed under given circumstances, and the policies regulating restrictions on such things as guest visits. These unique variables combine to form different systems which may be described as institutionalization, 24-hour supported living homes, partially staffed supported living homes, host home/foster care models, intermittent supports with 1–10 targeted hours per week, and independent community living (Reynolds 1962). While it is important to note that recommendations and best practices may vary across these different systems of support, there is no definitive data regarding ideal support models. Exploratory approaches on subtypes of supports are only beginning to emerge (Hole et al. 2015).

The logic of a continuum of supports aims to match behavioral assessment to skill-building, opportunities for growth, and values held by the individual receiving services (Kim and Dymond 2020). There are many questions inside of this model that have yet to be addressed, from the basic one, “how do we identify who benefits the most from what type of support?,” to more specific ones such as, “how many people move to a less restrictive support level across a 10-year period?” Society in general and providers of adult services have a long way to go before these questions can be readily addressed. Behavior analysis is in a strong position to aid researchers

and advocacy communities in using naturalistic approaches to address these and other pressing questions.

Paths for Applied Behavior Science

Two general career paths for behavior analysts in this sector are predominant. These include (1) *clinical practice*, which includes consultation with clients and care providers, assessment and treatment of challenging behaviors targeted for deceleration, and skill acquisition using behavioral methods, and (2) *systems management and workforce development*, which includes staff training and evaluation, performance management, systems analysis, and workspace ergonomics (Reid et al. 2011). Additional pathways do exist and may be appealing to many behavior analysts, such as *community leadership and advocacy*. This particular career direction tends to emerge from diverse personal interests and experiences; however, research in this area is limited, and further exploration of this last option will not be included in this chapter.

Best practices for residential supports fall into multiple domains. These include assessment, treatment of clinically relevant behavior targeted for decrease, and skill-building. In addition to best practices for clinical work with adults with disabilities, there also are best practices for organizational behavior management (OBM) implementation including staff training, staff engagement, staff development, systems design, and data-based decision-making (Reid et al. 2012). Historically, however, the support for adult learners with disabilities has not been overseen by a regulatory body. Consequentially, the number of systematic reviews of evidence-based practices is quite small relative to the published reviews of procedures readily available for those who work in educational settings and psychotherapeutic settings or who work with young learners with autism spectrum disorders (Waldman-Levi et al. 2019). Identification and dissemination of evidence-based practice (and means of identifying those practices) are areas with much potential for behavior analysts who are interested in inductive research, dissemination, and systems design.

“Path One”: Clinical Practice

Decelerative Targets and Functional Assessment

Behavior analysis is often thought to be synonymous with the reduction of “undesirable” behavior (it is not uncommon for the word “behavior” to be heard almost exclusively in this context. For example, “we need to call a behaviorist because Johnny is having a lot of behaviors lately!”). These kinds of behaviors are targeted due to their relative frequency and are typically targeted for deceleration. They may be referred to as “clinically relevant,” “challenging,” or “problem” behavior (Lindgren et al. 2016). The authors prefer the term “decelerative targets.” Decreasing

the probability of occurrence via implementation of behavior support plans, staff training, and skill development typically occurs in the context of 3–6-month contracts, although in some regions these services may be provided for longer intervals.

Given their training in operant analysis, common practice for behavioral consultation includes functional analysis or assessment of decelerative targets. Traditional functional analyses attempt to identify the functional consequence of behavior and to subsequently select a functionally similar or equivalent replacement behavior which is taught in lieu of the decelerative target (Lindgren et al. 2016). Likewise, consultation may include evaluations of severity and necessity for intervention according to the magnitude and regularity of the behavior. After conducting assessments, the clinician may provide recommendations, direct support, training, or all three to members of the person's support team as needed. Analyses of effectiveness of the intervention should follow the initial assessment with ongoing adjustments made to the intervention protocols as a function of routine data analysis.

Skills-Oriented Assessments/Habilitation

Best practices in residential support for assessment of skills-oriented targets have a long history, dating back to the early 1960s (Binder 1996; Sidman 1990). Though less commonly requested in the context of consultation, skills assessments are important tools in clinical behavior analysis (Sturmeay 2020). Currently, adult assessment methodologies are typically provided by other fields, and they often rely on indirect assessment through ranking systems, verbal questionnaires, or interviews. While these assessments can be quick and relatively useful for determining the level of supports needed for effective action, concerns exist with regard to many assessment tools currently available. These include reliance on indirect observation and reports, low measurement ceilings, limited sampling procedures, and utilization of systems which typically do not account for degrees of mastery (Law and Malady 2018). Assessments often compare outcomes to a presumed and generalized normative range and do not provide direct measures of mastery or fluency.

Currently, behavior analysts practicing in the area have created approaches to global assessment based on adaptive behavior scales such as the Vineland Adaptive Behavior Scales Third Edition (Vineland-3). Assessments like the Vineland-3 are typically supplemented by either a structured or semi-structured interview and used to create specific behavioral targets that are further assessed with the variety of direct methodologies such as structural analysis, functional analysis, or a functional behavior assessment (Browder 2001; O'Neill et al. 1997). This combination of piecemeal assessment leads to idiosyncratic features based on the specific instructional, experiential, and scientific history of the behavior analyst. Alternative approaches may apply domains and skills assessments from tools that have been used in the Early Intensive Behavioral Intervention (EIBI), such as the Promoting Emergence of Advanced Knowledge (PEAK) assessment, the Assessment of Basic

Language and Learning Skills (ABLLS-R), the Assessment of Basic Learning Abilities (ABLA-R), or other traditional behavior analytic assessment systems.

When selecting assessment materials, thoughtful discernment is needed. It is important that the scope and depth of the assessment tool matches the needs of the consumer base. This should include consideration of new skills that may be valuable to the individual and worth exploration. Assessment materials should include direct assessment of skill repertoires (Cooper et al. 2019). In assessing skill repertoires, practitioners must give careful thought to the functions and non-functions of a given item. For example, it may not be appropriate to report that a person with a vision impairment demonstrates a limited tacting repertoire, simply because the protocols for assessing “tacting” suggest presenting visual stimuli to the learner. Assessments of skills should include a capability to display and share data for informed decision-making for all parties involved. Lastly, a chosen assessment tool should highlight the unique strengths of a person, any barriers to skill development, and potential areas for improvement. Recommendations should not take the form of *you should* directives and should instead be prioritized with regard to what the individual *wants*. In sum, an assessment tool must be (1) thorough and behavioral in nature, (2) should take long-term or even lifelong needs into account, and (3) be person centered in a way that provides the means of meaningful action for that person. Many adults with disabilities and their support teams have long histories with instructors making promises and dead-end curricula and are sensitive to being pushed into arbitrary skill-building programs. Applied behavior analysts have, at times, been criticized for overreliance on instruction meant to address perceived skill deficits (Johnston et al. 2006). Practitioners should take these outcomes in the context of community opportunities, natural supports, and environmental match in order to best provide recommendations for service and support (Browder et al. 1997). This is to say that assessments should be compassionate and person centered. To that point, a good assessment will often begin by asking earnest questions. For instance, “What is your ideal living situation? What compromises are you willing to make? How do you like to be supported? What kinds of support are likely to make you frustrated?” Whereas many traditional assessments tend to push individuals toward some unspecified, supposed norm, when we ask questions such as these, behavior analysts can begin to identify habilitative targets that will help facilitate growth toward an ideal future identified by the person they are there to support (Tincani 2007). With respect to the identification of daily living skill targets for adults in residential support settings, the authors feel that the following domains of repertoires are worth the reader’s attention.

Pivotal Learning Skills

Pivotal learning skills include skills and abilities prerequisite to more complex learning and verbal behavior. Some examples of behavioral technology that targets “pivotal learning” would be the ABLA-R and pivotal response training programs well known by those who practice Early Intensive Behavioral Intervention (Forbes et al. 2020). This domain is important when determining the full range of

skill-acquisition goals for the individual, as well as any additional supports that may be needed. Pivotal skills related to community living would include manding, imitation, and conditional discrimination responses. Expressing one's wants and needs, and identifying and behaving with respect to environmental changes, does not alone lead to the ability to live independently. Rather, these skills create the conditions for other skills to be acquired that would allow for independent community living.

Coordination and Movement

Intervention in such areas as ambulation, balance, and gross and fine motor tasks is often thought to fall firmly under the purview of other disciplines like physical and occupational therapy. However, behavior analysis has much to contribute in this domain (for some examples, see Ennett et al. 2019; Levy et al. 2016). This may be due to the technical and conceptual attention that is typically paid by behavior analysts to functional outcomes and shaping procedures in addition to the field's command of a strong base of literature in this area. In adherence with the guidelines provided by the Behavior Analysis Certification Board (BACB), which stipulate that behavior analysts must not practice outside of their area of expertise, recommendations for physical skill development should include an inventory of potential areas for further attention and highlight opportunities for partnership and collaboration with other specialists.

Skill development in areas of movement may, however, include identifying alternative actions that promote the same outcome or enhancing existing skills. Let's say, hypothetically, that we are working with Joan. Joan is an adult with cerebral palsy who uses a wheelchair. She has a limited range of motion in her left hand. Historically Joan has been able to move a few feet every 5 min which limits her ability to interact with the world around her with relative independence. With targeted instruction, Joan may improve her ability to move her wheelchair by optimizing points of contact with her right wheel for brief intervals. Targeted instruction can increase her rate of movement, decreasing the likelihood she will need a full-time aid for mobility supports. Thorough assessment of this skills domain is often a path to relative independence.

Relational Learning/Critical Thinking

Underlying much of our social behavior is a seemingly endless stream of private and overt verbal behavior. Verbal behavior includes operant learning processes such as thinking, listening, understanding, and speaking with meaning (Hayes et al. 2001; Hayes et al. 2017). Complex verbal responses, such as weighing the "pros and cons" in decision scenarios, have traditionally been relegated to the domain of cognitive psychology. Increasingly, however, behavior analysts are diving into this area and effectively producing materials and curricula that are successfully being used to teach generalized relational responses as a comprehensive approach to problem-solving, language comprehension, and the myriad latent factors captured by

“intelligence quotient” (IQ) tests (Stanley et al. 2018). Early work in this area is quite promising. However, at the time of writing, it is important to note that many of the emerging methods are just beginning to enter into core curriculum in ABA (Cooper et al. 2019). Practitioners who do not have direct experience in this area should seek guidance from other professionals who do.

When identifying relational skill sets, it is important that practitioners identify areas in the verbal repertoire of the learner that may appear to be functional but which actually may be composed of topographical responses that have developed over a prolonged period of exposure to a given verbal community. For example, let’s say that Jason is a 24-year-old man with an intellectual disability who lives with a roommate in a two-bedroom apartment. Jason’s roommate has asked him several times to keep the toilet seat down when he leaves the restroom. However, Jason has not changed his behavior. From a behavior analytic view, there may be several reasons why Jason is leaving the toilet seat up following these persistent requests. One potential reason may be that because he says “yes” there is reason to believe he understands the request. Jason’s roommate may mistake his behavior as lazy. In this scenario, we have several relevant stimuli: the words “toilet seat,” “up,” “down,” and “please do not” being presented together as a complex conditional discrimination. It is possible that Jason is interacting with this conditional, positional discrimination successfully. It may also be the case that when Jason has been met with instructions like this one, saying “yes” and nodding terminates the aversive conditions and serves as a negative reinforcer without “understanding” what he is agreeing to do in the future. Individuals with disabilities often learn to feign comprehension to move things along and to contact reinforcement for being agreeable (Plante et al. 2002). Assessments which truly detail the degree to which the person speaks with meaning and listens with understanding can lead to better understandings of the person’s ability to self-advocate and can inform caution when making big decisions and when determining the source of misunderstandings.

Committed Action

Being a successful adult in most societies requires being able to complete complex activities extended over time. Many of the things worth doing in life are not terribly fun. It is often important to behave with respect to goals that appear far off and evaluate how our actions as they relate to their effects on other people (Di Maggio et al. 2020). Committed action skill sets focus on time management, self-awareness, environmental awareness, self-management, and evaluating your own activities in specific context. Behavior analysis has a long and diverse history working with people related to establishing and maintaining behaviors to completing meaningful activities (Slocum et al. 2014). Early demonstrations include using self-management systems in combination with goal-setting and prosocial daily conferences to increase the likelihood that juvenile offenders would take responsibility for their actions (Wolf et al. 1995). Other examples include creating the conditions for active

participation in treatment outcomes. Many of the skills developed in this area can then be used to transfer control from the behavior analyst to the person (Goldiamond 1976).

Adults with IDD often have several deficits in the area of being able to set goals, complete activities with delayed reinforcers, and evaluate their own actions (Lachapelle et al. 2005). We may work with a person who expresses that they want to have a meaningful romantic relationship. However, when they are asked how they spend their time, they identify that they do not create opportunities to meet other people. When asked about this several months later, nothing has changed—the person still presents several deficits related to setting a goal, identifying what is important, acquiring new skills, and altering their course of action depending on the results. A behavior analyst could create a plan that addresses the lack of opportunity for romantic partnerships, establishes teaching strategies for interacting with new people, and creates the conditions for this person to become a master at modern dating. This approach, however, is limited and may have addressed one core deficit area with the quality of this person’s life, but it has not prepared the person to be successful without a supervising professional creating the conditions for success. Building “committed action” skill sets would instead create the conditions for the person to be their own behavior analyst. Working with adults with IDDs requires surveying the various self-change skill sets of a person and assisting them in using these to achieve deeply meaningful outcomes. Behavior analysts would benefit from mastering procedures to assess committed action skills and using a person’s strengths to change other skills they themselves as meaningful.

Close Relationships/Community Contact

Humans are a highly social species. Quality of life, independence, and dignity are often highly associated with self-advocacy skills practiced among friends, family members, and partners as well as other community members. Social bonds are important, and skills that may facilitate the development of relationships should be targeted and given a high priority (Kavale and Forness 1996). We must not underestimate what human beings are capable of. Many adults with disabilities have not had the opportunity to participate in effective social skills and communication programs as children. Likewise, it is not uncommon for adults with disabilities to have been denied many culturally significant social experiences (e.g., team sports, road trips, roommates, parties, and so on) (Verdonschot et al. 2009). When that is the case, an individual’s first contact with quality behavior analytic support should mark a period of lasting and unambiguous growth in quality of social life and opportunity—because, as we have seen in this chapter, we have the behavioral technology to do so.

But therapeutic involvement in these areas of life can be challenging to navigate. When relationships involve a measure of risk, the perspective of the person being supported and their treatment providers can be at odds. Assessment of risk awareness and generalized skills for effective social maneuvers in unique situations is important, though it can be challenging. For example, perhaps a support provider

suggests that someone is capable of taking public transportation with the rationale that they have been regularly taking the bus to five to six different destinations. However, what if the person were to suddenly find themselves a block away from a familiar stop or an unfamiliar part of town,? Could they find their way home? What if they lose their transit pass? Effective action in such circumstances requires a much different skill repertoire than a simple routine bus trip and is often not considered until an emergency situation arises. This fear can often stop the team from allowing the person to experience it. Thorough assessment of these repertoires can prevent unnecessary risk while allowing contact with the world at large.

Navigating Dignity of Risk

When providing supports to a person with a disability in a home-based setting, what responsibilities do provider staff have in regard to ensuring the person's general wellness and safety? At first glance, this question may appear to be simple; make sure the person is safe and in a supportive environment. This is more complex when we acknowledge that adults have the same rights as any member of their society. This includes being able to spend their time how they want, taking appropriate risks in the context of what is legal, and making decisions about their own life. Adults with disabilities in most places in America have the legal right to engage in risky behavior. Commonly, this is referred to as "dignity of risk" (Perske 1974). Adults within a legal system often times are allowed the autonomy to make unhealthy decisions, such as drinking alcohol, smoking cigarettes, taking out loans that they can't repay, or engaging in risky sexual behavior.

The following case example will be used to illustrate the provision of supports related to the dignity of risk. Bill is a 20-year-old adult with an intellectual disability and has started smoking cigarettes in a state in which 18 is the legal age for tobacco use. Bill has some deficits in complex problem-solving, identifying medical concerns, and making healthy choices. He receives supports in a "24-hour home." When Bill goes to the corner market with staff, they have started to give him \$5 from his personal funds instead of the \$10 they used to give him. When they gave him \$10, he would buy a pack of cigarettes and a soda or a snack. The staff have only been giving him \$5 at a time from his personal money as this prevents him from buying cigarettes at the store. In most states, this would be identified as illegal and inappropriate restriction of the person's rights. Bill's ability to make decisions with regard to legal activities, even in the face of such things as stern recommendations from medical practitioners, is intact. We may face situations like this a lot when working with adults, and we may ask: "What are the responsibilities of staff to assist the person in this decision and mitigating the risk in the context of the services they are providing for that person?"

Given the scenario of Bill, it is our hope that providers of services in this area familiarize themselves with the views of person-centered planning (PCP) and dignity of risk. A behavior analyst familiar with complex verbal behavior from a relational frame theory perspective or from a verbal behavior perspective may identify some strategies regarding how to address the way that Bill interacts with his own

language related to smoking, his finances, what he wants out of his life, and where he is now. The behavior analyst has both supported and refuted the compatibility of the platform of PCP approaches and ABA (Holburn 2001). The current support of the PCP approach and the goals of ABA make sense as a platform that behavior analyst should embrace, identify functional components, and empower through well-designed scientific approaches. The authors support this approach not because of its ability to “play nice with others” but because the humanistic aspects of behavior analysis are readily suited for the challenge of empowerment through the planning process for complex repertoire development.

Dignity of risk has received marked attention over the past 20 years. Behaviorally oriented advocates have been making dignity of risk arguments as far back as 1990 with a seminal article by Bannerman and colleagues discussing the rights of people with disabilities in the context of habilitation. The balancing act of habilitation in the context of working with adults in their home environments requires that behavior analyst support people in creating repertoires that allow for meaningful choice-making (see Bannerman et al. 1990, for further discussion).

Creative direct-acting contingencies may be effective. We may, for example, provide relatively healthy alternative reinforcement schedules to satiate or promote avoidance of risky behavior (i.e., providing free access to alternatives such as “herbal” tobacco substitutions, providing enriched environments in private and appropriate spaces to encourage safe and nondisruptive sexual encounters, etc.). Practitioners must ultimately be able to offer behavior analytic approaches to language and cognition to provide a means of verbally altering the values of these risky behaviors. They must put people in verbal contact with the sometimes-devastating outcomes of needlessly risky behavior without deception or coercion.

Skills for the Twenty-First Century

The modern era has brought with it much convenience and innovation. Skills in this domain may remove some previous barriers such as long-distance communication, disorientation, difficulty communicating, or having meaningful social interactions (Dobransky and Hargittai 2016). However, with the advent of social media, email, and other ways of making contact with the world in the push of a button, the need for skills in recognition of scams and poor decision-making in the context of technology is increasing. Let’s take the example of Sue, a 33-year-old woman who has a support staff that assists her once per week. Sue has an iPhone. The support staff asks her what she has been doing for the past week, and when Sue is quiet or responds in vague answers, the staff requests to look at her data on her iPhone to identify her geolocation markers. Sue may be fluent in using an iPhone to call others, check messages, or even contact emergency services, but she may not have the skills to protect her privacy. Sue’s skill set with her phone may be helpful when safely navigating her community but must also be framed in the context of potential privacy intrusions. The twenty-first-century skills must be focused on using technology but also on empowering the person to be able to identify the risks associated with them.

Strategies for Teaching Skills

Task Analysis/Chaining

Many long-term support services readily embraced the technology of task analysis for teaching specific skills to people with disabilities. Many states in the USA require task analyses or components of a task analysis as part of their Medicaid waiver program for people with disabilities. Written task analyses may specify the target behaviors and the sequence in which they occur but may not be enough to produce strong treatment fidelity as a stand-alone strategy. Applied demonstrations of chaining have spanned the range of skill sets important to functioning such as aberrant behavior, functional living skills, and socialization (Lalli et al. 1995). While several comparison studies have found mixed results in the type of chaining procedures to use for specific target behaviors or context, general rules have been developed to maximize the chances of success (Slocum and Tiger 2011; Spooner 1984). General recommendations for chaining procedures are as follows:

1. Select the procedure most likely to lead to the relative outcome that is important to the learner.
2. Select procedures that allow for systematic fading to occur in the natural environment.
3. Allow for procedures that have the lowest potential for rights restrictions (limited physical involvement).
4. Have specified times to review the fidelity of the procedure.
5. If the person has the skills, create opportunities for social validity feedback on the procedure.

Task analysis should be specific to the types of supports that are relatively available to the targeted environment the person wants to live in. For example, a person who lives in a home with staff available 24 h per day may have the goal of living in their own home with staff only available once or twice per week. This person may be learning to administer their own medications. The first step in the task analysis may be something along the lines of “1. Staff presents the bottle of medication to the person.” However, this would not exist in their goal environment; the first step should reflect their goal to create the conditions for independence. Task analysis should also specify the outcome or the product for each step; this will allow the staff to identify the functional components of each step. Data collection should be flexible while still allowing for specific identification of the forms of errors. While task analysis/chaining may seem simple, it often requires careful consideration and regular review.

Prompting

There is probably not a more misunderstood and overutilized behavioral technology in the field of long-term residential supports for people with disabilities than prompting. Several concerns exist here on the lack of research oriented toward

understanding the context under which prompting is a valuable technology. Prompting can have several functions. It can create the conditions for skills to contact reinforcement, thus creating the conditions for skill sets to be developed. It can also create motivational conditions where the reinforcer is the termination of the prompt. From a human rights perspective, “nagging” an adult who has the right to terminate services at any time violates the autonomy of the person.

Prompting carries other risks as well; grossly misapplied, it can lead to minor forms of physical abuse, and in rare situations with physically frail learners, it may lead to physical harm that requires medical attention. In technical language, we can think of prompts as an additional discriminative stimulus for positive reinforcement for alternative response to the stimulus properties for the instructional target that increase the momentary probability of the response. Or put simply, prompts are additional information presented with or following instruction that makes it more likely the target behavior will contact reinforcement.

Prompting should be used to teach new skills, empower learners, and increase the success of the person. Once the basic conceptualization of prompts is taught, then staff are taught how to identify the types of prompts to use. It may be common industry knowledge at this time that most organizations teach one type of prompting hierarchy for all learners. However, a functional orientation to prompting creates the condition for the frontline staff to use mixed prompting methodologies, expertly switching from most-to-least and least-to-most with a few data-based decision-making rules (Nigro-Bruzzi and Sturmev 2010):

1. Each person requires unique prompting hierarchies.
2. Prompts are not repeated instructions.
3. Instructions and prompts are different.
4. Prompts lead the person to the correct answer.
5. Start with the prompt most likely to lead the person to success immediately after the instruction if the person has never demonstrated the skill before; fade prompts across opportunities.
6. Once a person can respond above 50% on a 3-second delay, switch to least-to-most prompting.

Prompting is an overutilized technology with adults with disabilities; however, it can lead to efficient learning outcomes when aligned with the values of the person.

Using Reinforcement

One of the hallmarks of ABA comes from the utilization of designing and implementing reinforcement contingencies. Using reinforcement versus understanding reinforcement as a “principle,” “process,” or “procedure” takes some special considerations. When working with adults with disabilities, complexities arise in understanding basic rights of people including ownership/property of the person, boundaries, and expectations on altering consequences for a specific culture (Bannerman et al. 1990). Let us examine an illustrative example: A parent of a 3-year-old, Samantha, buys a new toy

and tells her that if she meets her goals, she will be able to play with it. In another example regarding an adult, a group home manager uses Tom's personal funds to buy a soda and tells him that he can drink it if he stays calm and kind during a doctor's visit. These two events seem similar from a topographical perspective; however, the well-intentioned home manager is setting contingencies on how Tom will access his own property. Unless this right has been restricted through formal mechanisms, it would potentially be illegal. The context of working with adults alters what one can and cannot do in terms of setting reinforcement contingencies.

Offering reinforcement contingencies for staff members can be dangerous from an ethical, legal, and personal risk perspective. Staff should readily be trained on appropriate forms of verbal interactions that can be placed in reinforcement contingencies and on what potential reinforcers exist. Systematic design of reinforcement systems such as token economies or level systems can reduce the risk of individual decision-making from staff members. Such common phrases as "good job," "that's awesome," or "I really like the way you did 'x'" can come across as belittling or patronizing and may have functionally punitive effects for some individuals. This means that staff must be trained and supported in understanding how to identify idiosyncratic verbal interactions that may function as reinforcers, such as telling jokes, talking about socially appropriate shared interest, asking socially appropriate questions, etc. An important consideration when using more naturalistic reinforcers in these settings is maintaining stimulus control for the staff member and for the person receiving supports that the relationship is a professional one. Maintaining professional boundaries while providing individualized supports is a common supervision topic that should be revisited with staff on an ongoing basis. It is challenging to provide reinforcement that is typically of interest for an adult learner without crossing any of the formal boundaries that must be in place to maintain an effective relationship.

Further, questions exist on the importance of many of the aspects of reinforcement, such as the magnitude of social reinforcers, the frequency of reinforcement to corrective feedback/instructions, or even the immediacy of feedback for learners with complex verbal skills (Thomas 2019). Providing reinforcement has many questions that must be answered for each person in the context of the specific service relation that a behavior analyst has with a person with a disability. Practitioners would benefit from working with current and previous consumers to build social validity platforms as they continue to examine research questions in this domain. Identification of reinforcement contingencies for typically functioning adults in leisurely and work environments should also be used in this field to identify potential areas of improvement.

Antecedent Manipulations

In general, antecedent interventions can decrease the likelihood that errors occur, capitalize on previous history of the person, and decrease the likelihood of decelerative targets such as aggression, property disruption, or self-injurious behavior. Antecedent

interventions also typically have rather fast-acting effects if they are combined with a teaching procedure. Let's look, for example, at Sally Mae, an adult with a disability. Let us say that she has a long history of misplacing her wallet in the home; this then is followed by a prolonged search where she starts to become escalated and eventually engages in high-magnitude property disruption. Silva, a senior staff who works with Sally Mae, watches when she comes home each day and sees where the wallet is placed. Silva then takes the wallet and places it on Sally Mae's nightstand, so when Sally Mae goes to look, the first place she checks is her nightstand. It is there.

When we examine why this occurred, it is not a stretch to see that Silva finding and moving the wallet is under aversive control; an avoidance relation has developed given the potential for the property disruption he has historically experienced. Antecedent strategies, however, come with several long-term risks such as making institutional patterns of behavior. Decreases in Sally Mae's property disruption are a product of Silva's behavior, depriving the person of the opportunity to learn and creating the illusion of skill development. Further concerns with antecedent manipulations related to working with adults include ensuring that opportunities for choices are not limited or restricted by the antecedent change and that the antecedent changes are appropriate for the person's age. Sally Mae's wallet being touched by another person is a security risk for her. She has all of the prerequisite skills to place her wallet in a specific location and values her autonomy but is now dependent on another person for success. When using antecedent procedures, the following recommendations may be helpful:

1. Review antecedent changes to ensure that they are person centered and age appropriate and do not restrict choice for the person.
2. Design a fading plan with clear criteria to return to community-normative/previously familiar antecedent conditions.
3. Review data and adjust as appropriate.

A simple addition to Sally Mae's supports could change this problematic procedure and mitigate the risks mentioned above. For example, the behavior analyst may identify an antecedent change such as providing a basket on the kitchen table when she comes home. Over time, this standard spot may be faded to her nightstand. Here, what starts as an antecedent change moves to an independent repertoire. Behavior analysts working in the field should be familiar with identifying the times when antecedent changes have led to behavioral changes but have produced the risk factors identified above. Behavior analysts also should create instructional materials that produce skill sets for staff to identify these conditions and to request assistance in planning interventions to produce independence when antecedent changes are used.

Self-Management Strategies

When working with adult consumers, one of the primary goals for a population who has a long history of being oppressed and suppressed is to increase their autonomy, independent decision-making, and "control" over their immediate world. Many

behavior analysts working with children with limited skills may be unfamiliar with these types of broad behavioral goals and may find they are lacking the precision expected within a behavioral analysis (for a theoretical review of self-management, see Reinecke et al. 2018). Conventional descriptions of broad repertoires often have high social validity to multiple stakeholders. Social validity is an important consideration for behavioral interventions, and the varied repertoires supporting increased personal autonomy and self-management can be further pinpointed within a treatment plan.

From a behavior analytic perspective, self-management can be thought of as a repertoire that brings the person's historical and current responding into an operant that has evocative and reinforcing properties. From a procedural perspective, self-management has been discussed as being composed of goal-setting, values clarification, self-monitoring, self-data recording, and data-informed decision-making about one's own behavior (Busick and Neitzel 2009). Self-management has been investigated with typically functioning children, children with autism spectrum disorders, high school students with disabilities, adult college students, adolescents with mental health diagnosis, adults with mental health diagnosis, adults with substance use disorders, and typically functioning adults (Onselen 2019; Richardson et al. 2014; Sebag 2010).

There is a long-standing and robust literature based on teaching and using self-management strategies with people with disabilities. Much of the literature focuses on particular problems such as work production, stress reduction, or time management (Christian and Poling 1997). Procedures have included a range of elements from self-monitoring, self-observation, self-evaluation, self-recording, and self-reinforcement (Carr et al. 2014; Storey 2007). For example, Sebag offers an exploration into building self-management skill sets through a structured approach and coaching model with teachers, transforming the teacher from the decision-maker to the student. Sebag's Self-Advocacy Behavior Management Model may serve as a platform that can be adapted to adult learners in the context of community living.

When adapting self-management strategies for adults with *IDDs*, they should be specific to the person, recombine current successful skills, create for more informed decision-making, reduce staff supports, increase dignity of risk, and be monitored until those supports can be faded. Often self-management attempts have the risk of being used to identify skill deficits and why a person may need restrictions in place. The authors wish to highlight that learners should be supported and environments constructed to promote successfully contacting desired contingencies.

In summary when using self-management strategies, the behavior analyst must first assess the self-management skill sets, such as the following: "Can the person watch and report on their own behavior?" "Can they accurately record data?" "Does seeing graphical changes in their goals function as a reinforcer?" Each of these questions leads to further skills that can be targeted. Before a behavior analyst recommends self-management strategies, they should assess and build the skills that will lead to success for the learner. Self-management strategies can further be combined with other approaches such as antecedent changes, prompting, and using reinforcement.

What Should Students Be Doing When Looking for Opportunities?

Opportunities are abundant in working with adults with intellectual disabilities. Most professional roles in the area can be offered to people who have qualifying bachelor's degrees; these roles can offer abundant clinical experiences and general OBM experiences. In order to select high-quality experiences, potential behavior analyst should identify organizations that have a strong presence of behavior analyst in leadership roles; this can be identified by looking at the organizational structure. Further opportunities can include identifying key leaders in the practice domain through publications and a review of current literature:

1. Identify area of practice that you are interested in learning new skills.
2. Complete a literature review of the practice area including a review of the citations of this chapter.
3. Identify if authors are practicing in your geographic area and contact those authors.
4. Identify local organizations that work with adults with disabilities through a Google search.
5. Identify organizations that have behavior analytic language tied to their materials or that have behavior analyst in leadership positions by their credentials, bios, and other materials provided.
6. Contact organizations expressing wanting to learn behavior analysis with working with adult with disabilities in community-based settings.

What Should Supervisors Be Doing to Offer Meaningful Supervision?

Given the range of skills required for adults to be successful in community-based living, there is a need for behavior analysts in this area to learn how to program these skills, work with complex service teams, follow ethical and legal guidance, and master specific behavioral procedures. Supervisors have the complex task of adapting the BACB materials to the population, ensuring the development of materials for the oversight of legal practice, and creating a process that aids in assisting practitioners learning how to identify their own cultural biases for people with disabilities. In order to create meaningful supervision, supervisors should create a skill inventory for their supervisee that has each of the relevant practice domains, the legal knowledge needed, and the professional skills required. Several of these activities may not seem behavior analytic in nature such as reviewing the work force "Innovation and Opportunity Act" of 2018 although this can become an exercise in behavior analysis if the supervisee is taught how to take a document and transform it into a module of Personalized System of Instruction for entry-level staff. These exercises can allow the practice of behavior analytic skills, the development of specific legal knowledge, and creation of future materials that the supervisee can use when working with the population. Further, to increase the opportunities for development of skills, the supervisor should assist the person in identifying the people they work with based

on common factors the population in relation to the reasons they have support. This would mean balancing the people that a single supervisee works with to ensure that they experience the large breadth of diversity of the population. Categories could include medically fragile, primary focus on behaviors to decrease, transition aged individuals looking to fully participate in community, and older adults transitioning to end of life care. Here, the key is to create as many opportunities as possible for supervisees to learn new skills, identify aspects of the population they enjoy working with, and further diversify the specialty skills of each supervisee:

1. Have a skill inventory that includes specific legal directives, building complex instructional materials, teaching specific forms of complex human behavior, and working with diverse teams.
2. Review progress on skills in ways similar to reviewing specific BACB task list items.
3. Review caseloads based on subcategories on the population and create opportunities for supervisees to pinpoint areas of practice they want to develop further skills in.
4. Assess the skills in specific instructional domains of the supervisee and encourage them attempting similar skills when appropriate for experiential effects of interventions.
5. Provide regular best practice supervision such as using BST when possible.

“Path Two”: Behavior Analytic Leadership

The behavior analyst working within the field of IDD in residential settings must be fluent with common clinical strategies and be able to seamlessly work through other people. This means that a combination of consultation skill sets and organizational behavioral management skills typically leads to success in this domain. This section discusses a brief introduction to several of the key OBM areas that the authors find particularly helpful for practitioners in this area. The OBM literature related to service delivery for people with IDDs in community settings had a slow start with only 11 empirical peer-reviewed articles identified from 1983 to 1996 (Harchik and Campbell 1998). As the intersection of OBM and IDD services grew, the literature base has expanded, with 75 identified articles from 1990 to 2016 (Gravina et al. 2018). A review of the literature identifies that working in this service setting has some unique conditions. Common conditions may bring about difficulties in defining a unit of services, accessing funding streams, and managing the skills of professionals (for a more detailed analysis, see Leblanc et al. 2009). Although the conditions are complex, direct-support professionals (DSPs) are estimated to approximate 5 million people by 2020, making it one of the largest workforces in America (Paraprofessional Healthcare Institute 2014).

What follows is a brief review of several of the key OBM strategies that behavior analysts should be familiar with as they build skill sets in this practice area. The

identified strategies are systems design, feedback systems, staff training, and supervision. These strategies are by no means exhaustive; however, they represent a strong starting point. With creativity, familiarity of behavioral principals, and orientation to the larger OBM literature, this area offers room for behavior analysts to explore new areas and share the science of behavior analysis with a wide range of people.

Systems Design

Organizational psychology, business practices, management, and leadership are greatly accelerated when behavior analysis is used as part of the domain of practice. Part of working with adults with disabilities is recognizing that staff do not require formal education beyond a high school diploma to provide direct support and typically require a person with a bachelor's degree for every 30–45 people receiving supports. In this landscape, many behavior analysts will find themselves in leadership roles such as clinical directors, training managers, or chief executive officers. Often behavior analysts have well-developed skill sets related to the clinical population of expertise but may not have training and experience related to managing and leading an organization.

Systems design and analysis should identify the components of a complex set of contingencies across multiple user segments and provide a brief description of those contingencies; often this must include the elements of the system, the inputs/outputs, behaviors, materials, and products of the system (Diener et al. 2009). Systems design should map the individual contingencies, the relationship across contingencies, the specific variables that alter contingences, and elements such as policies, stakeholders, materials, and outputs of the system. Systems analyses should be reviewed at least once a quarter in residential services. Many data points in the analysis occur monthly (the billable period in these systems is typically 1 month) so quarterly reviews allow for the analysis of emerging trends. The results of a systems analysis can help identify areas for improvement based on the critical outcomes of the system. Typically, in community-based residential supports, this includes skill development of the person, financial stability, safety, staff turnover, staff satisfaction, and stakeholder satisfaction—although these areas can be expanded based on the specific goals of the organization. Analyses of these systems:

1. Must include materials, products, people, places, expectations, contingences, and relationship of contingencies.
2. Must be tied to the outcomes of the mission of the organization.
3. Must be reviewed at least once every 3–6 months.
4. Must be included to make decisions about supports, services, people, processes, and materials.

As an example of a systems analysis, we may look at a provider who supports 15 people, living in community settings, who need 5–20 h of support each per month. The analysis may start with outcomes. Our hypothetical company may specify that

the desired outcomes of support are “to increase independence through meaningful engagement with the community.” A review of the data may demonstrate that across all people supported, only 2 of 40 individual targets have achieved mastery of a community-based skill in the last year. We may also note that, on average, service contracts increased 1–2 h per month across consumers. This outcome may suggest we are headed in the opposite direction of the mission of the organization. Upon further examination, it may be revealed that the organization has been increasing overhead and case managers have been pushing to increase contracts rather than creating the conditions to decrease the need for hours by teaching the relevant skills. A simple intervention may be clarifying expectations, creating alternative revenue streams, and/or changing the contingencies for case managers. We may, for example, provide hourly pay plus additional money per plan mastered as demonstrated by competency checks by supervisors (further examples of system redesigns may be seen in Gravina et al. 2018). Skill sets in systems design and analysis can help the behavior analyst in identifying areas of improvement within a system that lead to the best outcome as fast as possible.

Staff Training

Staff training is often something that most behavior analysts learn early in their careers through their experiences teaching parents, providing direct service, and training registered behavior technicians (RBTs) how to implement supports. Specific procedures such as behavioral skills rehearsal may target topographies. Adapting them to the functional decision-making that is in the scope of the DSP may be difficult to interpret for behavior analyst not familiar with building robust operants that alter response forms (e.g., see Parsons et al. 2012). As discussed earlier, the field of residential supports often has high staff turnover, limited resources for the behavior analyst to provide direct staff training in the context, and limited reimbursement hours for formal classroom training for DSPs (Leblanc et al. 2009). Best practices such as competency-based instruction and behavioral skills rehearsal may require creative solutions to implement in the context of the specific service setting. These settings typically only facilitate large group instruction, onsite instruction in the context of providing services, or online instruction completed, while direct-support duties are safely peripheral. Behavior analysis has a long history in the world of instructional design; these approaches can be used to enhance the effectiveness and efficacy of training programs (Tiemann and Markle 1990).

It is important to identify the function of training to establish a repertoire of behavior that can be evoked reliably under specific conditions and maintains in natural conditions over a period of time. Training goals can start with specific behavior or can identify specific work products. When selecting training goals or outcomes, it is important to align them with the systems design, to ensure that all appropriate

segments are accounted for. Outcomes should be checked with all federal and state requirements, history of your organization and population, safety requirements, and any other sources relevant to your systems analysis. Missing an outcome can leave staff unprepared, put the person and others in danger, and create liability for the clinician or organization. The following are some general rules for skill development through training:

1. Design trainings to build fluency in component skills and recombine to composite skills.
2. Ensure staff training meets minimum legal requirements in the location of practice through a review of components and legal requirements.
3. Review the expectations, place expectations in context, develop hierarchy of expectations, and develop fluent recall of expectations.
4. Provide demonstrations of skills whenever available and have staff identify the critical features to fluency.
5. Provide low-risk practice opportunities with specific corrections, until corrections are no longer needed.
6. Have regular periods of review of core skills before errors in the performance occur.

Staff training in human services requires that core competences are established. Those core competencies may change as other features and expectations change. Have regular periods to review the adequacy of trainings based on the identified outcomes. Create opportunities to have training materials reviewed by other professionals and experts in the practice area. For low-frequency skills such as high-intensity de-escalation skills that a staff may only use once or twice per year, create activities that allow for practice on a monthly or bimonthly bases. Finally, it is important to allow the DSPs to provide feedback on trainings and be active members of trainings such as allowing competent performers to review procedures and give input on the relevant features of training.

Performance Management

Training is an initial aspect of building skills for staff members; the long-term goal of staff performance management is to sustain and integrate skills. Performance management systems should be designed to have reinforcement for critical outcomes, create the conditions for motivated employees, promote healthy workplace behaviors, and be an environment of continual growth. Given the resources of these services, coercive systems are common. Performance management can often focus on corrective feedback designed to suppress aberrant behavior. Examples of aberrant behavior include tardiness, errors in implementation, errors in data collection/record keeping, unethical interactions with consumers/coworkers/supervisors, and other targets counterproductive to critical outcomes. These coercive management

systems are used to ensure that appropriate people are working in these settings, but they should not be the primary contingences designed to influence employee behavior.

Behavior analytic alternatives create performance management systems that look at critical features of an employees' performance on a regular basis. When competency-based training procedures are used, the staff are likely to be successful from the time they start providing services. During the initial time a staff works, they should have frequent observations as discreetly as possible to identify their strengths and areas for improvement. Staff should have time allocated to reflect on their own performance, share the reflection, and create their own strategies for improvement. Strong performance management should reinforce prosocial skills related to the position, support those skills, and transfer those skills to others within the system.

In general, "feedback" has at times been used as a catch-all for addressing performance problems, in a similar way that "training" has been used to address problems that may not have to do with the functional components of staff's performance (Peterson 1982). Feedback can serve multiple functions. Under specific circumstances, it can operate as an SD, MO, reinforcer, or punisher. These functions may be understood in the context of rule-governed behavior or acquire their functional properties through relational networks as described by relational frame theory (Haas and Hayes 2006; Peterson 1982). Clear specification of the functional components in the system can allow for proper evaluation of the technology in the context of staff performance. Further identification of the contingencies, workplace expectations (rules), and feedback as interrelated variables can lead to an understanding of the conditions under which to use feedback and those where efforts may be futile (Haas and Hayes 2006). When using the term feedback in practice, the behavior analyst must be clear on the outcome of what they are trying to accomplish in order to evaluate if the strategy is working or not.

Feedback systems currently in behavior analytic literature in general do not have clear best practice guidelines; however, general recommendations do exist. It appears that feedback should be specific; targeted at behavior or outcomes of behavior; presented in neutral, respectful tone; not blended with both supportive and corrective forms; and followed up under a planned schedule of reinforcement (Parsons et al. 2012). The role of feedback however should be primarily focused on supporting the development of repertoires. Additional best practices for providing feedback are provided below:

1. Tie feedback to workplace expectations, job duties, and outcomes.
2. Provide feedback for behaviors and outcomes targeted for maintenance (or increases) and elimination (or reductions) separately.
3. Specify alternative actions for behaviors targeted for elimination (or reduction).
4. Provide personally meaningful reinforcers to employees upon their executing targeted alternative actions.
5. Evaluate the function of feedback for individual employees and the whole system.

6. Give staff the opportunity to provide feedback on the feedback system. This social validity data should be used to alter feedback systems as needed.

One measure to know if feedback is punitive or reinforcing is if the DSPs are recruiting your feedback independently. It is recommended that behavior analyst create the conditions for staff to request feedback for novel skills; however, that staff allows this to fade over a period of time. If signs of aversive control start to appear from feedback, create an open dialogue with staff to identify potential approaches to alter the function of feedback.

Creating Opportunities

There are many options for behavior analysts who are excited by the potential of working in a large industry which provides the opportunity to contact people with unique abilities, greatly expand and challenge their skill sets as a behavior analyst, and provide a much-needed service to a historically and currently underserved population. To start, it is recommended that practitioners looking to enter the field read the citations included in this chapter. Likewise, for those entering this area, finding a trusted mentor who works in the field is also well advised.

For students who are exploring behavior analysis, many management positions in the field only require a bachelor's degree and 1 year of work experience in the field. Most organizations are always hiring interested people. If attempting to begin work in this area, it is recommended that you create interview questions based on identifying an organization that has a familiar behavior analytic approach. Many of the above-listed sections may serve as guideposts. For example, we may ask how the organization approaches issues with regard to dignity of risk. We may ask about training procedures and policies regarding the management of staff. Further information may also be found by contacting national disability organizations, online training programs for direct-support professionals, and local disability advocacy law centers.

Adults with intellectual disabilities have had a long history of suppression in society; behavior analysis is in a unique position to continue to provide support to assisting people in living meaningful lives. Behavior analysts seeking experience in this area should expect to become experts in teaching skills through direct-support staff, who are diverse in their ranges of capabilities and experiences. It is an exciting area of practice that has many subspecialties including teaching functional communication, daily living skills, health/fitness skills, community safety skills, love and relationship skills, self-knowledge, decision-making skills, and self-advocacy, to name but a few. With the right organizational fit, the right funding supports, adequate training and experience, and a well-framed and executed vision, there are few areas in human services which allow one to affect the lives of so many people so profoundly.

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Part IV
Specialty Populations

Behavior Analysis in Acquired Brain Injury



Chris M. Schaub

Abstract According to the International Brain injury Association, brain injury is the leading cause of death and disability worldwide. In the USA alone, it is estimated that a brain injury occurs every 9 s, and more than 5.3 million individuals live with a brain injury-related disability. A brain injury may appear to be a singular event; however, it is a lifelong process that can be influenced by a complex array of variables at all phases of recovery and rehabilitation. Treatment occurs within a variety of settings and environments, and teams are typically comprised of professionals from the medical and rehabilitation fields, but behavior analysts are not routinely involved. Across the spectrum of injury severity and treatment settings, the science of behavior analysis can be applied toward examining and organizing the variables impacting behavior, which requires careful consideration of both the organism and the environment. To this end, this chapter is intended to serve as a valuable resource to those who currently work in the field of brain injury, as well as an introduction and overview for those who may seek to become involved, including professionals from outside the behavior analytic community who are interested in furthering their understanding of behavior in brain injury.

Keywords Brain injury · Neurobehavioral · Rehabilitation · Interdisciplinary · Behavior analysis

Introduction

“I was in the passenger seat when the vehicle slid off the road and rolled six times down an embankment”; “...our son was 2 when he suffered an anoxic brain injury from a near drowning”; “I was hit by a drunk driver”; “...throughout my life, multiple concussions have etched their marks on my skull”; “...guy ran a red light and hit us head on”; “...we got the call that no parent ever wants to receive.” These words come directly from the personal stories page of the Brain Injury Association

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of America website (BIAA 2019) and offer a touching and intimate portrayal of how brain injuries change lives at any moment. An accident at work, a car crash, a medical crisis, a fall, and many other events that result in brain injuries instantaneously affect the trajectory and direction of a life. In the USA, we are perhaps more familiar with brain injuries now than ever, as their incidence and impact are more widely reported and felt as a result of military conflicts and contact sports.

The goal of this chapter is to meet the information needs of behavior analysts who are seeking to, or currently work with individuals with brain injuries. For those not familiar with behavior analysis or other disciplines who address sequelae of brain injuries, this chapter provides a useful overview of the philosophy, principles, and procedures of behavior analysis applied to individuals with brain injury. This chapter will also outline when to consider referrals to board-certified behavior analysts.

The Basics

What is a brain injury? The *Essential Brain Injury Guide* (BIAA 2016) defines it as “an injury that results in a change in neuronal activity, which affects the physical integrity, the metabolic activity, or the functional ability of nerve cells in the brain” (p. 3). All brain injuries are broadly classified as acquired, with the additional specifier of “nontraumatic” if they result from neurological events (e.g., disease, acute toxicity) or “traumatic” if they are the result of physical trauma resulting in an open or closed head injury (BIAA 2016). Traumatic brain injuries involve two types of injuries: First, there are primary injuries from the initial physical impact, including cerebrovascular injuries (Kenney et al. 2016). Because the brain is cushioned in fluid, such injuries occur both at the site of the impact and the opposite site. Damage sustained by acceleration-deceleration forces is common as the brain strikes the front of the skull as the head moves forward (coup) and then the back of the skull as it goes backward (contrecoup). Thus, highly associated with these forces and in addition to circumscribed focal damage at the point of impact, traumatic brain injuries often involve wide-ranging shearing or tearing of brain tissue (diffuse axonal injury; BIAA 2016).

Finally, there are secondary injuries to the brain from swelling, bleeding, compression, and contusion. Of note, secondary injuries can emerge slowly, often during rehabilitation: Post-traumatic hydrocephalus or symptomatic ventricular dilation are conditions in which cerebral spinal fluid slowly accumulates and enlarges the ventricles of the brain, thereby creating pressure that results in neurological changes and disrupts rehabilitative efforts (Kammersgaard et al. 2013). Because individuals with traumatic brain injury are at high risk of further neurodegenerative processes or diseases (e.g., Alzheimer’s disease), it might be most useful to think of traumatic brain injury “as a [lifelong] process, not an event” (Masel and DeWitt 2010).

Depending on severity of injury, the following repertoires are disrupted: orientation (to self, purpose, time, and location); fine and gross motor skills; sensory func-

tioning including smelling (Han et al. 2018), seeing (Greenwald et al. 2012), and hearing and vestibular functioning (Gottshall 2011), the latter of which may place the person at high risk of falls and/or increased sensitivity to auditory and visual stimuli; basic attentional skills; communication skills (see section on communication and cognition); verbal skills such as comprehending, reasoning, planning, organizing; self-monitoring skills including switching courses of actions when barriers arise; and problem-solving skills (e.g., generating alternatives, implementing and evaluating them). Difficulties with learning are common, and often problems remembering are better characterized as difficulties in learning new information in the first place or acquisition. Because cognitive difficulties vary from person to person and also over the trajectory of acute care and recovery (see below), families and providers often do not know how to place demands that match the current strengths of the person. Additionally, providing the kind of assistance that does not foster premature dependence, yet also offers sufficient scaffolding that the client has an opportunity for mastery, is an art. In this space of reacquisition of skills across multiple domains – balancing the client’s safety with his or her decisional autonomy as well as skillful and artful scaffolding – lies the propensity for neurobehavioral problems. Withdrawing from social interactions, refusing assistance, escaping or avoiding demands, insisting on resuming prior activities without regard for safety, and engaging in self-protective behavior while confused are most common. Neurobehavioral challenges represent a lack of understanding of the variables affecting the client’s behavior, a lack of collaborative goal-setting (e.g., in a paternalistic structure), or a tug of war between clients, their families, and the rehabilitative structure (e.g., degree to which it accommodates longstanding patient preferences such as dietary choices, sleep and wake times, and personal care routines).

Prevalence, Etiology, and Categorization

According to the International Brain Injury Association (IBIA), brain injury is the leading cause of death and disability worldwide (IBIA 2019). In the USA, a brain injury occurs every 9 s, and more than 3.5 million children and adults sustain a brain injury each year (BIAA 2019). Of these, 2.2 million individuals are treated in emergency departments, 220,000 patients are hospitalized and discharged, and nearly 50,000 people do not survive their injuries (BIAA 2019), which represents more than 30% of all injury-related deaths in the USA each year (Brainline 2019). Overall, more than 5.3 million individuals live with a brain injury-related disability in the USA (BIAA 2019), and the cost of care and loss of productivity related to brain injury is estimated to be more than \$76 billion annually (BIAA 2016).

From 2006 to 2014 – as awareness and diagnosis of brain injuries was on the rise – the rates of TBI-related emergency department visits increased by 53%, while hospitalization rates decreased by 8% and death rates decreased by 6% (CDC 2019).

Rates of emergency department visits more than doubled from 2001 to 2012 for sports or recreation-based injuries of children aged 19 or younger (Brainline 2019).

Falls are the leading cause of brain injury (48%), and those under 17 and over 65 years of age are at high risk (CDC 2019). Being struck by or against an object and motor vehicle accidents each account for approximately 17% of all injuries, with the remaining percentage of injuries due to assault or unknown causes (CDC 2019). Of special concern is the increased risk of repetitive injury. An individual with a brain injury is three times more likely to sustain a second injury, and the risk of a third injury increases eightfold (BIAA 2016). Repetitive injuries without appropriate recovery time play a role in mild traumatic brain injuries and have been linked to a condition known as chronic traumatic encephalopathy (CTE; Stern et al. 2011), which has received significant attention related to contact sports (Asken et al. 2017).

Because of triage needs at the time of injury (Ghajar 2000), initial assessments categorize brain injury severity as mild, moderate, or severe and consider the duration of loss of consciousness (LOC) and the degree to which verbal and motor responses are present. Standard indicators for initial severity are the Glasgow Coma Scale (GCS) score, comprised of verbal and motor indicators on a scale of 1 (severe) to 15 (mild), and the Ranchos Los Amigos score, which assesses levels of awareness, cognition, behavior, and interaction with the environment on a scale of 1 (no response) to 8 (purposeful and appropriate). After the acute injury, duration of retrograde and of post-traumatic amnesia (PTA) also determines severity ratings (BIAA 2016), as do later neuropsychological assessments that characterize strengths and weaknesses across perceptual and cognitive domains (Mayo et al. 2019).

Survivorship with severe traumatic brain injury has increased. This improvement can be attributed to increased awareness and use of safety devices, as noted above, but also to changes in the timeliness of first response and needs assessment (e.g., instantaneous or automated crash responding via smartphones and OnStar), the type and level of available emergency prehospital trauma care (Williamson et al. 2011), and future development of novel assessment techniques (e.g., biomarkers) to forecast complications from brain injuries that might look mild on first glance (Dash et al. 2010; Zetterberg et al. 2013).

Following an injury, the type of care, services, and settings following brain injury spans a continuum, including emergency services, acute neurology inpatient stay, acute inpatient rehabilitation, subacute inpatient rehabilitation, outpatient and/or in-home rehabilitation, and residential services. Clinical practice guidelines for rehabilitative services are inconsistent (Jolliffe et al. 2018), and often clients who have socioeconomic resources (e.g., access to advocacy from family or friends, monetary stability including health insurance) fare better than those without. Prominent individuals with brain injury, such as Gabby Giffords, a US politician from Arizona who was shot in the head, are showcases for optimal service provision. While individual needs should constitute the primary consideration, variables such as the availability of specialized resources/settings in the area and funding affect services (Reynolds et al. 2001). The National Institute of Health (NIH) estimates the annual cost for services for recent brain injuries in the USA each year is \$9 to \$10 billion,

and the average lifetime cost of services for severe injuries ranges from \$600,000 to \$1.875 million (Johnstone et al. 2003).

Specific factors that affect individuals with brain injuries will be discussed in detail in subsequent sections. The direct impact on family and friends must be considered as the effects of an injury reverberate across social networks. Family members frequently present with understandable worry, increased apprehension, loss of reciprocity and social support, withdrawal, and other disruptions in activities after taking on care partner roles for individuals with brain injury (Kreutzer et al. 2009). Concerns about care partner functional status are particularly pronounced when neurobehavioral sequelae are present, such as refusal of assistance, social withdrawal, disengagement from meaningful activities, ongoing substance use, and/or motor deficits (Livingston et al. 2010).

Measurement of recovery from traumatic brain injury includes quality of life-related outcomes (such as returning to home, school, work, driving, parenting, independent living) and healthcare systems variables (e.g., rehospitalization, utilization of services). Johnstone et al. (2003) found that 42% of those employed at the time of injury were unemployed 1 year later and that their monthly income declined by over 50%, while Novack et al. (2010) found that only half of the individuals diagnosed with moderate to severe brain injury returned to driving. Within a military population, rates of rehospitalization were 41%, with 30% involving two or more readmissions (Tran et al. 2017). The impact on families and outcomes for the individual substantially underscores the importance of providing the best possible care throughout the rehabilitation and recovery process.

Brain injury rehabilitation professionals typically include physiatrists, physician assistants, advanced nurse practitioners, nurses, certified nursing assistants, occupational and physical therapists, recreation therapists, speech pathologists, neuro- and rehabilitation psychologists, and social workers. Often, neuro-ophthalmology and low vision specialists as well as pain specialists join the team. Specialty care, such as neurologists, urologists, psychiatrists, or pharmacists, may consult on cases if indicated. Behavior analysts must learn how to integrate into rehabilitative teams, as difficulties are multifactorial. Many factors must be considered when providing services for individuals with intensive and complex neurobehavioral needs. Behavior analysts can meaningfully contribute to the conceptualization and implementation of comprehensive, integrated, and individualized treatment programming for individuals with brain injuries through expertise, experience, and collaboration.

Organism-Environment-Behavior Relations

Among brain injury professionals, it is often said that if you meet one person with a brain injury, you have met one person with a brain injury. Brain injuries change the interaction of organism and environment in unique ways, and the science of behavior analysis is well equipped to organize and examine individual whole-organism-environment relations. Because brain injuries include many and often complex

interrelations of physiology, personal history, and current social or instrumental demands, the goal of systematically predicting and influencing behavior can be challenging.

Brain injury – whether from trauma or stroke – represents the partial failure of an organ that in turn affects many other physiological systems. Because processes in the brain affect many physical functions, damage to the brain poses a risk to the entire body. Individuals with brain injuries are thus at risk of serious complications, such as post-traumatic epilepsy, neuroendocrine dysfunction (which may mimic depression, lead to irritability, or further interfere with cognition) (Behan et al. 2008; Webb et al. 2014), associated diabetes insipidus, and abnormal bone formation (heterotopic ossification) but also chronic pain and sleep-wake disturbances (Ouellet et al. 2015). To program rehabilitative behavioral services, behavior analysts must understand the variables influencing the status of the organism, whether temporary or long term. While each person is affected in his or her own way and individualized assessments are key, knowledge of regions of the brain and their overall function is useful as a rough guide for assessment of strengths and weaknesses. What follows are brief descriptions of a sample of organismic variables to be considered, remembering that to the extent they are unaccounted for, efforts to predict and change behavior will be hindered.

Sleep: According to Rao et al. (2008), sleep disturbance following brain injury occurs at a rate of 30–70% and can further complicate recovery and rehabilitation due to fatigue and/or increased irritability and anxiety. Significantly changed sleep-wake patterns also may disrupt routines, both in rehabilitative settings and at home.

Pain: Pain is a significant variable that directly impacts the organism and is recognized as a common consequence of traumatic brain injuries (for a review, see Colloca et al. 2017). Recent research suggests that brain injuries may alter modulatory pain pathways from brain to spinal cord (Irvine et al. 2018; Colloca et al. 2017), resulting in pain other than headaches. In addition, pain may be related to orthopedic injuries (either at the time of trauma or later, e.g., from falls) (Mukherjee and Chakravarty 2010).

A related aspect of pain is spasticity: While its mechanisms are not fully understood, current evidence suggests that pathways from the brain to the spinal cord result in loss of inhibitory neural control (Bhimani and Anderson 2014). In other words, the muscle stretch reflex is overactive. To the person, muscles tighten unpredictably and are resistant to passive stretching. Continuous contractures may shorten the muscles and make movement even more difficult, placing the person at an even higher risk of falls.

Bladder and bowel functioning: Similarly, neurogenic bladder is also prevalent and may require timed voiding programs. Because pain is often treated with opioid analgesics for pain, the use of stool softeners or laxatives may prevent constipation or impaction as well as the development of a drug-induced ileus. Thus, bowel and bladder training programs as well as assistance with personal care may be implemented as indicated, to minimize disruption of other activities.

Delirium: As all individuals whose nervous system has been compromised, individuals with traumatic brain injury must be monitored for delirium (e.g., due to

unreported pain, infections such as urinary tract infections, poorly managed comorbidities such as diabetes, or other events), evidenced by rapid and significant changes in behavior, disorientation, and falls. For a comprehensive description of delirium and its preventions, see Inouye et al. 2014 and Ponsford et al. 2014.

Medication considerations: Given the types of features noted above, medication-based interventions are common in brain injury treatment. However, Diaz-Arristia et al. (2014) point out there are still significant gaps in pharmacotherapy knowledge, and strong evidence for efficacy and safety is lacking. This is of particular importance when addressing neurobehavioral sequelae and is in part why Acriniegas and Wertzel (2014) specifically mention applied behavior analysis as part of a multidisciplinary treatment approach to address neurobehavioral sequelae. As such, while conducting assessments and developing interventions to enhance and promote skills development, behavior analysts should be attuned to any changes made in medication, whether to address incontinence, sleep, pain, mood and behavior, etc. Cox and Virues-Ortega (2016) completed an extensive reanalysis of published studies wherein functional analyses were conducted in the presence and absence of medications and note that there are “relatively few functional analyses in the literature that have incorporated medication manipulations as a secondary independent variable” (p. 86). Whenever possible, data collection and graphs should reflect changes in medication(s) specific to target behaviors, and the behavior analyst should collaborate with medical professionals. This can significantly enhance treatment in brain injury as medication changes and/or other interventions can be systematically planned and evaluated in a single-subject manner toward a more precise understanding of medication effects on behavior. Of note, if behavior reduction is targeted, then meaningful and/or rehabilitative activities should be monitored at the same time: Often, the use of sedatives results in a general withdrawal from activities that might interfere with rehabilitation.

While behavior associated with brain injury can be understood through a contingency analysis including medical factors and pain, it is important to recognize that staff or family care partners may interpret a person’s behavior as unpredictable; therefore, behavioral education will assist in supporting the team (of which families and friends are a part) and individuals with brain injury. A fundamental underpinning of behavioral science, across assessment and intervention, is the precision of language. Given its use of technical terms (Hineline 1990), behavior analysis must be translated into vernacular prose for accessibility and collaboration with stakeholders and care partners.

Preference Assessments and Reinforcers

Behavior is a product of its history, which includes a history of contacting reinforcement that can be directly impacted by a brain injury. Establishing preferences in the context of brain injury will require ongoing collaboration and monitoring, and the behavior analyst must be sensitive to pre-injury histories as well as changes in pref-

erence during the course of rehabilitation and recovery. Behavior analysts have established rigorous and well-studied methods for conducting preference assessments with nonverbal individuals (e.g., Pace et al. 1985; Piazza et al. 1996; DeLeon and Iwata 1996), including comparisons of methods and outcomes (e.g., Fisher et al. 1992; Verriden and Roscoe 2016). This work can be extended to acquired brain injuries. Utilizing procedures described by Fisher et al. (1992), Cohen-Almeida et al. (2000) compared active selection of snacks with stated preferences of individuals with unimpaired verbal repertoires and found the highest and lowest preference items for four out of six participants matched, and the spoken assessment required less time. Heinicke et al. (2013) conducted preference assessments with individuals with brain injuries using verbal, pictorial, and tangible stimuli to address characteristics that might influence the assessment, e.g., “partially [unimpaired] verbal repertoires, history of literacy, varying levels of memory functioning, current discrimination skills” (p. 50). Prior to the preference assessment, they utilized the Assessment of Basic Learning Abilities (ABLA; Kerr et al. 1977) to assess participants’ discrimination repertoires and specifically identified Levels 3, 5, and 6 as measuring the skills necessary to accurately discriminate each modality used in the preference assessment. As noted previously, the course of care for brain injury often includes evaluations completed by other disciplines, which should be referenced as part of comprehensively assessing discrimination repertoires.

Broader extensions of preference assessments are required when working with individuals with brain injury as extensive pre-injury histories must be considered. Before their injury, individuals lived rich lives, involving family relations and roles, occupations, and other leisure activities or hobbies. They have a history of reciprocal social reinforcement (including related to roles and social status), sensitivity to tone and other social cues, and autonomous decision-making. For this reason, adults in post-acute rehabilitative settings tend to enjoy meaningful goals toward more independent basic activities of daily living, such as improved ambulatory status (e.g., sliding-board transfers, progressing from a wheelchair to a walker, ambulating without assistive devices), supervision status (e.g., transitioning from available in-room assistance or supervision at all times – e.g., in the case of delirium – to decreased or no supervision), slowly resuming instrumental activities of daily living (e.g., cooking, driving, etc.), and expanded access to program areas or the community. Collaborative goal-setting, involving the person with the brain injury and his or her family, can be guided by disability rating scales, such as the WHODAS (Üstün et al. 2010), and by general principles of SMART goal-setting (Conneeley 2004).

The behavior analyst will need to address how best to arrange access to or progressions into contingencies and reinforcement schedules, when the client’s immediate engagement may be effortful and painful and recovery is a temporally distant goal. The client’s discounting of valued yet delayed outcomes may require the arrangement of immediate contingencies to support initial steps, often using contrived reinforcers or counting on a client’s history of rule-following (even when he or she does not understand the current rationale). Other members of the multidisciplinary team will have input into predicting and planning where access may be most readily expanded and what might be the necessary repertoires that will ensure safety

and success, which can include collaboration with occupational therapists, recreation therapists, physical therapists, and other professionals. For example, it may be that an individual first receives supervision while participating in grocery shopping and then while preparing microwave meals three times per week for lunch only. In this example, access to shopping and cooking is thought to function as a reinforcer. Gradually, the client's autonomy may increase, contingent on demonstrating specific competencies or skill sets until supervision is faded out. Ideally, the reacquisition of instrumental activities of daily living (e.g., shopping, cooking, transportation, financial management, medication administration) will provide access to an independent living arrangement in the future (i.e., larger-later but uncertain outcome). This creates a robust menu of potent reinforcers, capable of producing and maintaining component repertoires with significant communication, planning, and support. As a member of a rehabilitation team in brain injury, the behavior analyst can enhance treatment planning efforts by assessing contingency conflicts and assisting in the careful arrangement of both smaller-sooner and larger-later reinforcers.

Functional Analysis and Assessment

Functional analysis procedures, such as those as described by Iwata et al. (1994), are a recommended technology within behavior analysis, but extensions of their application to individuals with brain injuries are an area for future development and discussion. According to a meta-analysis of applied behavior analysis research in brain injury conducted by Heinecke and Carr (2013), functional assessments were not commonly completed before the introduction of interventions to reduce behavior. Due to the challenges the behavior analyst may encounter when considering and conducting functional analyses in the brain injury population, a discussion of several variations of functional analysis follows to perhaps ameliorate this issue, and the behavior analyst should be prepared to interpret and address idiosyncratic findings.

Roscoe et al. (2009) evaluated "...the utility of a demand assessment procedure for identifying tasks for inclusion during the functional analysis demand condition..." (p. 819). Tasks were presented and results were categorized as higher or lower probability of adherence. Roscoe et al. (2009) note that this type of assessment "...may reduce the need for additional analyses" and/or "...may be useful when little or no responding is observed during an initial functional analysis..." (p. 824). Alternatively, Kodak et al. (2007) manipulated the type of attention delivered during a functional analysis, based on observing parents in the natural environment. Results indicated problem behavior was maintained by attention for all participants, but to different forms across participants. Focusing on manipulations of demand or attention may expedite the assessment process and help to address idiosyncratic features.

Thomason-Sassi et al. (2011) utilized response latency as a measure of response strength to identify function and describe a high degree of correspondence with

established methods of measurement in functional analyses. The condition is terminated following the first occurrence of the behavior, which could decrease the time required to conduct a functional analysis and/or improve safety. Several other studies extended the use of response latency to establish a response hierarchy for topographies of behavior within the same functional class that differed in frequency, intensity, or duration (Harding et al. 2001; Mace et al. 2011), which could be valuable in working with individuals with brain injury.

Bloom et al. (2011) conducted a trial-based functional analysis, which consisted of a control-test-control format, with each condition terminating after 2 min or following the first occurrence of problem behavior. In the control conditions, the putative EO was absent and there was no programmed consequence for problem behavior, and in test condition the EO was present and the programmed consequence followed the first occurrence of problem behavior, which also resulted in the termination of the condition but did not delay the onset of the next condition. This assisted in decreasing the time required for a functional analysis, without sacrificing validity, and time can be a significant factor given the resource challenges for brain injury noted earlier.

Communication and Cognition

It has been established that socially mediated problem behavior can often be effectively treated by addressing communication (Carr and Durand 1985), and the brain injury population is replete with an array of communication deficits that impact behavior. As a speaker, deficits can include dysarthria and apraxia that impact intelligibility or production of speech, respectively, or aphasia and agnosia that impact the ability to find words or accurately identify objects, respectively. Alternatively, or concurrently, as a listener, an individual with a brain injury may be unable to follow even simple commands or respond to questions in a consistent manner due to lack of comprehension. In the brain injury community, these are commonly referred to as expressive and receptive communication deficits, but Baker et al. (2008) note these labels create an unhelpful dichotomy, and that “rarely is the entire receptive or expressive repertoire affected...” (p. 150). Further, Sidman (1971) previously pointed out that “...CNS disease need not break down all relations in which a particular stimulus or response participates” (p. 415). Baker et al. (2008) posit that “the work of Sidman and colleagues and Haughton (1980), when combined with Skinner’s (1957) analysis of verbal behavior, provides a new taxonomy based on specific stimulus-response relations and operant function” (p. 154).

Based on these works, Cowley et al. (1992) used a match-to-sample procedure with three individuals with brain injury to establish conditional relations between dictated names and photos. Posttests showed that untrained conditional relations emerged. The picture exchange communication system (PECS) is another widely used behavior analytic intervention to address communication deficits (Bondy and Frost 1994; Charlop-Christy et al. 2002) and can be highly effective for individuals

with aphasia or severe dysarthria, particularly if the individual is capable of using assistive technology as part of the communication system. However, in any situation, especially in a brain injury context, the intervention must be preceded by an understanding of the individual's deficits, e.g., impaired visual or discriminative repertoires, which is typically derived from assessments conducted by other members of the interdisciplinary team, e.g., neuropsychology. Lastly, Weslowski et al. (2005) increased accurate naming with individuals with brain injury through repeated presentation of pictures and verbal prompts that were increasingly descriptive in at least to most hierarchy, which may be effective in addressing memory issues.

Deficits of awareness are a hallmark trait of moderate to severe brain injury (Prigatano and Schacter 1991) and have been the subject of various models for over three decades (e.g., Crosson et al. 1989; Toglia and Kirk 2000; Arnould et al. 2016). Impaired self-awareness, or anosognosia, generally denotes a reduced ability to appraise one's strengths and weaknesses and their implications for daily life activities and a discrepancy between self-report and ratings by clinicians or significant others (Sanne et al. 2017; Winkens et al. 2014). Related to the treatment of these deficits, Schrijnemaekers et al. (2014) systematically reviewed 417 studies and recommended that "...clinicians should specifically focus on awareness and test their efforts to improve awareness with single-case experimental designs" (p. 29). These suggestions from within in the brain injury community should be of particular interest to behavior analysts.

Thompson (2008) provides a useful definition, "...when we say a person is self-aware, we mean that he or she responds discriminatively to his or her own externally observable behavior or products of the behavior" (p. 139) and from a verbal behavior standpoint the "ability to tact variables that often exercise control over one's behavior is an important part of what we mean by being self-aware" (p. 140) (see also Bem 1972). Awareness deficits are correlated with poor outcomes (Hart et al. 2004), so the variables influencing the accuracy of tacts are of value for further study in brain injury.

Glenn (1998) used the term inadequate tacts and identified three types: poor observation, lying, and denial. Poor observation was described as a skill deficit wherein accurate tacting was not sufficiently established. In brain injury, observing and tacting repertoires, though established prior to the injury, can be influenced by organic impairments discussed previously. Glenn defines lying as a conflict between socially mediated consequences and notes the description of a behavior will be differentiated across listeners in a way that is sensitive to the corresponding contingencies. Finally, she suggests denial is in part influenced by the "punishment inherent in tacting a fearful event" (p. 52) and is therefore maintained by a different type of reinforcement. Drawing distinctions between these types of tacts and developing corresponding interventions may be useful and should be informed by assessments and evaluations from other disciplines, e.g., neuropsychology, a behavior analytic assessment of the individual's verbal behavior, and a careful examination of the contingencies acting upon the individual's tacting repertoires, e.g., coercion. More broadly, when working with individuals with brain injury, interventions must take

into account current thinking, communication, comprehending, remembering, reasoning, and problem-solving skills, as well as contingencies that exist in the environment.

Sensitivity to Contingencies of Reinforcement

Individuals with brain injury may not be able to describe contingencies, even when their behavior tracks them. Schlund and Pace (2000) used a computerized operant signal detection task without feedback to examine whether participants with brain injury could estimate how much money they had earned during each component of the task. Although variability among individual performances was high, patterns of responding tracked changing signal detection contingencies even when brain injury was present, but the self-reports tended not to match the actual performance, especially when reinforcers were contingent on not responding. While the authors suggested that these self-description deficits correlated with the outcome of neuropsychological tests measuring executive functioning, the sample size was too small to draw any conclusions.

Dixon et al. (2005) examined choice behavior of individuals with brain injury by utilizing a hypothetical monetary discounting task. Because individuals with brain injury produced atypical patterns of responding (e.g., choosing \$1000 with a delay over \$1000 available now), the task had to be changed to include everyday hypothetical amounts of money, ranging up to \$20. Only then did most individuals with brain injury generate the typical discounting curves, suggesting that the task might be appropriate for assessing impulsivity in brain injury. However, verbal comprehension, sustained attention, and simple arithmetic skills – all necessary repertoires for participation in discounting tasks – were not assessed.

Dixon et al. (2005) and Schlund and Pace (2000) highlight key neurobehavioral features in ABI and propose direction for continued research toward a better understanding of the variables that influence the often idiosyncratic response patterns of individuals with brain injury to operant contingencies. The study by Schlund and Pace (2000) also emphasizes the importance of interdisciplinary collaboration that is important to highlight.

In working to address these issues, as well as other complicating features in the brain injury population, the use of token economies should be considered which, for example, can assist in addressing issues with smaller-sooner and larger-later reinforcement contingencies. In an extensive review of basic and applied research in token economies, Hackenberg (2016) reminds us that "...token economies are among the oldest and most widely used procedures in applied behavior analysis" (p. 393). In this author's experience, they provide an expansive framework within which issues of immediacy can be addressed, reinforcers of various potencies can be made available at different schedules, and measures can be taken to increase the discriminability of contingencies. However, when working with adults with brain

injury, “tokens” must be considered and utilized in a manner that is age-appropriate and acceptable to the individual.

A study by Jowett-Hirst et al. (2016) compared individual versus group contingencies in a token economy, as well as differential reinforcement and response costs. Overall, their results suggest that differential reinforcement and response costs were equally effective, as were the individual and group contingencies, but there were important idiosyncratic differences in responding across participants. LePage et al. (2003) implemented a token economy using ink stampers to stamp sections of a paper carried by participants that served as “credits” exchangeable for items. They achieved a 33% reduction in assaults, but as importantly it was noted that the token economy provided the opportunity for other clinicians to incorporate additional treatment plan elements, which is a useful feature in an interdisciplinary setting. Lastly, Becraft and Rolider (2015) utilized edibles to examine the effects of MOs in a token economy. Their findings suggest the classes of stimuli utilized as backup reinforcers should be varied to mitigate the effects of MOs on generalized conditioned reinforcers, which in a brain injury setting could include a variety of other backup reinforcers, some of which have been noted previously. These studies represent several key features that are valuable considerations for the application of token economies when working with individuals with brain injury. Token economies often require coordination and arrangement of activities and significant training to ensure treatment integrity, and the behavior analyst should utilize established, evidence-based practices to train staff in their implementation (Parsons et al. 2012).

For individuals with brain injury, severity of impairment influences sensitivity to contingencies and efficacy of contingency-based programming (Wood and Adelman 2011). When issues arise regarding contingency-sensitivity and establishing stable rates of behavior, it has been this author’s experience that interventions based on rule-governed behavior (Skinner 1957) should be considered. Hayes et al. (1986) offer caution in the use of rules in applied work as they may interfere with contacting the direct contingencies in the environment that would otherwise exert control over behavior. Acknowledging this requires further examination; it is potentially for this very reason that rules may be effective for individuals with brain injury. That is, individuals with brain injury who demonstrate insensitivity to direct contingencies in the environment, whether due to variables such as awareness deficits or inadequate tacting repertoires, may benefit the provision of rules and reinforcement of rule-following behavior to produce desired behavior change.

In situations where brain injury sequelae are more severe, the capacity to learn may be profoundly impaired, and control of behavior through consequences is of limited efficacy. The emphasis in these situations must be on prediction, anchored by an analysis of data that is based on clearly defined behaviors and appropriate measurement and recording methods. Antecedent-based programming must be exhausted, including variables discussed previously that may be medical in nature, as well as assessing the extent to which environmental modifications can occur to influence the conditions under which behavior occurs. In the rehabilitation environment, these interventions can consist of enhancing stimulus control, arranging for

graded prompting procedures, providing frequent breaks, assigning preferred staff to complete high demand activities, arranging for medication administration at strategic intervals prior to evocative activities (e.g., physical therapy), and allowing for noncontingent escape or providing noncontingent attention.

Ethical Considerations

Working with brain injured individuals involves a variety of important ethical considerations. The first principle of the American Psychological Association is beneficence: Assessments and interventions must benefit the client in the long term. This echoes Skinner's (1976) fundamental distinction between helping others and helping them to help themselves. Rehabilitative professionals should strive to make their services superfluous, through the creation of prosthetic environments. According to Skinner, "one has most effectively helped others when one stops helping them altogether" (p. 7). To ensure successful transitions to least restrictive environments that balance autonomy and safety, care partners must be trained. This balance should be informed by assessments of the variables discussed previously and defined in a collaborative and transparent manner, with training and data collection to ensure that treatment integrity and progress are monitored and that target behaviors are evaluated and advanced when appropriate.

Moving from philosophical to practical considerations, all behavior analysts are bound by the *Professional and Ethical Compliance Code* established by the behavior analyst certification board (BACB 2019) and should be familiar with additional resources available that offer guidance, interpretation, and perspectives on ethical treatment and decision-making (e.g. Van Houten et al. 1988; Bannerman et al. 1990; BACB 2019). Beyond these, it is essential to take into account relevant federal, state, and local policies, regulations, or guidelines that define and/or identify limits for treatment interventions. Additionally, in working with adults with brain injury, it is necessary to be aware that brain injury does not deprive a person of personhood and associated rights. Capacity is domain-specific, and individualized assessment – typically by a neuropsychologist – will show whether a person needs assistance with financial or healthcare decisions, what the role of the designated power of attorney is, or whether a temporary guardianship might be necessary. Collaborating with local legal aid services will guarantee that human, civil, and disability rights are respected, that the client has proper legal advocacy, and that he or she does not incur adverse consequences (e.g., divorce without representation) as a function of the injury or a long-lasting rehabilitative process.

Behavior analysts should practice due diligence in seeking clarity, documenting, training, and data collecting in all situations, particularly those that entail multiple governing bodies (BACB 2019).

Credentialing

Working with unique populations requires a behavior analyst to be well versed in the philosophy, principles, and procedures of behavior analysis, but the term unique should also serve to occasion us to seek knowledge and experience that will enhance the consequences of our own behavior for the benefit of the behavior of those we serve. Specific to brain injury, there is no supplemental specialization or certification to obtain within behavior analysis, though this would be a potentially valuable addition to the existing offerings for BCBAs. However, within ABAI, a special interest group, the Rehabilitation and Independent Living (RAIL), has existed for many years and is currently comprised of behavior analysts working or seeking to work in brain injury.

In an effort to advance the level of care for the brain injured population, the BIAA created the Academy of Certified Brain Injury Specialists (ACBIS) (BIAA 2019). As designated by the BIAA (2019), ACBIS provides several certification options, including provisional certified brain injury specialist (PCBIS) for individuals who do not yet have the contact/experience hours for full certification but are enrolled in a graduate degree program within a field designated by the BIAA; certified brain injury specialist (CBIS), for individuals who possess a minimum of a high school diploma or equivalent and meet the contact/experience hours requirements; and lastly, a certified brain injury specialist trainer (CBIST) designation available for those who meet additional educational and experience requirements, demonstrate relevant professional and teaching skills, and provide additional documentation. CBIS and CBIST certificants must obtain 10 and 15 h, respectively, of continuing education credits to maintain their certifications.

Supervision

A BCBA providing supervision in a setting with individuals with brain injury should seek to provide supervisees with as comprehensive an experience as possible. This should minimally involve the opportunity to engage in behavior analytic work with a person with brain injury, within the scope of competence of the supervisor, and the opportunity to interact with different individuals with brain injury, perhaps at various stages of recovery or levels of injury severity, which will provide the supervisee with a well-rounded understanding of the scope and impact of brain injuries. Beyond this, interactions with various team members, including direct care staff and therapists, will add to the supervisee's understanding of how services for individuals with brain injury are coordinated from multiple perspectives, within one collaborative care plan. If possible, it may also be beneficial to introduce the supervisee to family members or friends of an individual with a brain injury and, if appropriate, for the

supervisor to facilitate a discussion with the family members about their loved one's care so the supervisee may observe the immediate impact of brain injury on family functioning. In some situations, if the supervisee has previous experience with a specific type of behavior or intervention in another population, it may be beneficial, if possible, to consider working with them to apply similar principles and procedures to a similar behavior with an individual with brain injury. This opportunity to generalize their own behavior across populations promotes a better understanding of the nuances of brain injury and how the relevant organic features influence behavior that is produced through interactions with the environment.

Conclusion

Brain injury is known to bifurcate lives – into the time before and the time after the injury. Outcomes have improved significantly, and we are able to further hone the services individuals and families are receiving. The goal of this chapter was to provide an introduction and overview of brain injury and behavior analytic principles and procedures to address the complex variables and behaviors that complicate the rehabilitation and recovery efforts of individuals with brain injury. As stated, it is also intended to serve as a motivating operation for behavior analysts to exert the full force of the four-term contingency and the experimental methodology toward providing the most effective treatment possible, as individual practitioners and as members of interdisciplinary teams.

Despite the attempted scope, several critical areas were unmentioned that among others include efforts to address staff training and using telemedicine to make expertise more widely available to this unique population. Also, the impact of substance use and other mental health issues that can contribute to or result from brain injury were not discussed. There are also intense debates being waged about the safety of contact sports that affect families, communities, and our culture at all levels of competition, every day. These forces will continue to produce advances in our capacity to analyze and assess the behavioral sequelae of brain injury.

In closing, Skinner (1989) reminds us that “the analysis of behavior need not wait until brain scientists have done their part. The behavioral facts will not be changed, and they suffice for both a science and a technology. Brain scientists may discover other kinds of variables affecting behavior, but they will turn to a behavior analysis for the account of those variables” (p. 18). Therefore, the work of the behavior analyst in brain injury remains rooted in the science upon which it was founded, with the goal of utilizing, advancing, and communicating its methods and practices.

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Behavioral Gerontology



Claudia Drossel, Jennifer Bruzek, and Rachel VanPutten

Abstract The field of behavioral gerontology is well-established and has produced a body of research and clinical literature. The following chapter introduces behavioral gerontology by outlining its history within behavioral analysis. It then describes the field's current status within behavior analysis and points to training benchmarks that were developed specifically for behavioral health assessments and interventions with adults 65 years and older. Considering training benchmarks and best practices, the goal of this chapter is to align the renewed interest in behavioral gerontology with developments that span well over half a century and to provide a roadmap to entering a mature field.

Keywords Older adults · Person-environment fit · Aging · Behavioral gerontology · Dementia · Geropsychology

Behavioral Gerontology

Behavioral gerontology is defined as the application of the science, practice, and philosophy of behavior analysis to problems encountered by adults in later life, which typically refers to ages 65 and older (Behavioral Gerontology Special Interest Group 2020). To introduce interested students or Board Certified Behavior Analysts® (BCBAs®) to this specialty, we will briefly review its history and its current scope, best practices, and evolving challenges and then outline how behavior analysts and aspiring psychologists could establish competencies in the area.

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A Brief History

Behavioral gerontology is one of the oldest specialties of behavior analysis and predates the founding of the Association of Behavior Analysis International (ABAI) in 1974 by more than a decade. The first wave of behavior analysts who left the laboratory, such as Azrin, Ayllon, Goldiamond, Lindsley, and Sidman, applied behavioral science to a wide range of presenting problems, from neurodevelopmental to persistent mental health disorders, in inpatient and outpatient settings (see also Holdsambeck and Pennypacker 2016). Already in 1964, Lindsley introduced the development of geriatric prosthetic environments. Inspiring the contemporary guideline that disability occurs to the extent that the environment withholds necessary supports, Lindsley criticized a focus on person variables (e.g., nutrition, vitamins, hormones) to maintain youth and instead strongly advocated for the design of social and physical environments that maintain ongoing and equitable access to activities and promote quality of life in advanced age (Lindsley 1964). Giving credit to Lindsley as the founder of “environmental psychology in later adulthood,” Lawton (1970) broadly disseminated Lindsley’s idea of behavioral design as “person-environment fit” and added nuance. Lawton argued that as repertoires narrow, demands exerted by the person’s physical and social environments increase and – as choices decrease – disproportionately affect behavior (1974). Thus, contrary to vernacular assumptions, Lawton underlined that, later in life, physical and social environments influence people’s well-being far more than when they are in young adulthood (and presumably can select ideal contexts). Through Lawton, assessment of person-environment fit became and continues to be a keystone in mainstream theory and practice with adults in late life.

Also in the 1970s, Goldiamond outlined the “constructional approach” that systematized behavioral functional assessment to maintain or improve current repertoires (1974). This approach is particularly relevant to the work with individuals who are developing inefficiencies or losing skills (e.g., mobility, vision, hearing). Rather than a focus on accommodation, Goldiamond’s constructional approach suggests the building of novel repertoires, in terms of replacement or compensatory strategies. The question, however, was whether the building of novel repertoires could be extended to late-life problems. Baltes, through her doctoral work at West Virginia University, provided the answer from the experimental behavior analytic perspective. Her work produced evidence that countered the pervasive myths of stagnation, rigidity, and “not being able to teach an old dog new tricks” and – using an operant framework – showed that repertoires could be built or reestablished in late life (Baltes and Barton 1979). Her ensuing research program, implemented collaboratively with her spouse, globally established a view of aging as a lifelong process that is actively shaped by social, cultural, and physical aspects of the person’s environment. Baltes and Baltes’ life work and intellectual products, such as the theory of selective optimization with compensation (Baltes and Baltes 1990), affected not only the field of aging but also rehabilitative service provision worldwide.

By the 1980s, core ideas of behavior analysis – prosthetic environments, constructional approaches, and operant procedures to enhance lifelong learning – seeded mainstream research programs (see, e.g., the website of the Baltes Foundation). Because the technical language of operant psychology relies on jargon that is not easily accessible, and science does not work in isolation but through participation with multiple scientific specialty communities, core ideas of behavior analysts were disseminated by relating them to and integrating them within existing theoretical frameworks. In this process, these core ideas became less recognizable to the behavior analytic community, and progress in gerontology became disconnected from its behavior analytic origins.

Another schism between experimental and clinical work inadvertently opened when the professional market broadened, with concerns about clinical competencies and quality control (see Chapter 2, scope of practice and standards of training across the clinical professions, for a parallel process in behavior analysis). Until the mid-1980s, experimental psychologists – including behavior analysts at the doctoral level – were eligible to apply for general psychology licensure in most states. As pointed out earlier, pioneers in behavior analysis worked across a wide range of clinical settings. The emergence of managed care and the evidence-based medicine movement generated increased opportunities for reimbursement and demand for assessment and interventions, with an expanded workforce and concurrent questions about empirical support for implemented practices. Barriers to behavior analysts' scientist-practitioner status arose when the Association of State and Provincial Psychology Boards and the respective state licensing bodies began to require demonstrations of competence through completion of restricted training sequences (e.g., structured predoctoral internship and postdoctoral supervised hours) and examinations (e.g., Examination for Professional Practice in Psychology, additional oral examinations depending on jurisdiction). For ongoing discussions of the demonstration of competence, see DeMers et al. (2008). Eligibility criteria for general clinical licensure tightened, thereby limiting behavior analysts' scope of practice and their participation in aging-related clinical research.

In 1982, the Behavioral Gerontology Special Interest Group was formed at ABAI. Subsequently, Burgio and Burgio (1986) redefined behavioral gerontology as “the study of how antecedent and consequent environmental events interact with the aging organism to produce behavior” (p. 321) and in line with the mission of the *Journal for Applied Behavior Analysis* put the focus on what they termed “geriatric behavior problems” (p. 321). This focus on behavior *problems* represented a narrowing of behavioral gerontology from its originally broad inception as behavioral design (i.e., behavioral functional assessment), maintaining or constructing repertoires and promoting quality of life (see also Skinner and Vaughn 1983/1997), to a more restricted scope of practice. Suddenly, “behavioral gerontology” appeared to be synonymous with assessments of and interventions for behavioral excesses and deficits related to cognitive decline. Burgio, one of the founders of the Behavioral Gerontology Special Interest Group of ABAI, eventually left the organization and applied behavior analysis broadly, including codesign and implementation of a federally funded study of a training curriculum for caregivers (REACH; Schulz et al.

2003) that also introduced basic behavior management skills (i.e., antecedent-behavior-consequent approaches to problem-solving). While behavioral gerontology remains “alive and well” (Burgio and Kowalkowski 2011), the nationwide trial lost its formal connection to behavior analysis, and behavior analysts today would be hard pressed to identify project REACH as a milestone for behavior analysis, putting it square into the mainstream of caregiver training.

Thus, behavior analysts have made significant contributions to conceptualizing aging as a lifelong process influenced by sociocultural factors, thinking of disability broadly as a problem of access and person-environment fit, and to assessing and intervening on behalf of individuals who have narrowing repertoires or who are losing entire skill sets. Discontinuities that emerged in training programs contributed to a fading of interest and eventual neglect of this formerly thriving area in behavior analysis (see also Gallagher and Keenan 2006).

Current Scope

When reimbursement systems emerged for behavior analytic supports for children and young adults with autism spectrum disorder (up to their mid-20s, typically), many behavior analysis graduate programs housed in special education promoted specialization in this area at the master’s and doctoral levels (e.g., through practicum placements). The special interest in behavioral gerontology limped along, best characterized by studies of interventions for behavioral excesses or deficits or skills training for service staff, implemented in institutional settings (see Trahan et al. 2011, for a review). The broad applicability of behavior analysis and its promise for research and practice with adults aged 65 years and older were lost. For example, recent literature (LeBlanc et al. 2012) introduces assessment and interventions for behavioral problems associated with neurocognitive disorders (commonly referred to as “dementias”) as an example for workforce expansion; yet, compared to behavioral gerontology’s initial aspirations in the 1960s and 1970s, to solve general problems related to aging, this focus represents a more restricted scope of practice. The focus on behavioral problems is enshrined in the fifth edition of the Behavior Analyst Certification Board task list (Behavior Analysis Certification Board 2017), such as sections F-7 and F-8 (“conduct a descriptive assessment or functional analysis of problem behavior”).

Today, as the workforce development market in the domain of autism spectrum disorder is approaching saturation, behavior analysts are again in search of areas to which to contribute. Research and practice in geriatrics/gerontology has advanced significantly within the last 40 years, however. The absence of behavior analysts from gerontology as well as training programs’ focus on problem behaviors specific to neurodevelopmental disabilities has placed behavior analysts at a significant disadvantage. Their unfamiliarity with the complex landscape of service delivery to older adults puts behavior analysts at risk of neglecting important characteristics of the context. In the remote past, behavioral gerontology has challenged the myths of

aging and helped to change research and practice fundamentally. To resume the role of a forerunner and reestablish itself as advancing state-of-the-art assessment and intervention services, behavior analysts' knowledge of aging and neurocognitive disorders first must catch up with current research and practice of behavioral health in late life. In other words, behavior analysis thrives in other domains and is in demand within geropsychology (Molinari and Edelstein 2011), yet its broad applicability of research methods and clinical practice to late life has not been fully realized.

To orient readers of this chapter to the population and the need for specialization in this content area, unique features of the work with adults in late life are briefly described below. Seminal and recommended readings related to these topics are listed at the end of this chapter.

General Considerations and Best Practices

Population Characteristics

“Adults in late life” constitute a heterogeneous population. Most individuals live at home, and engagement in employment, volunteer work, and caregiving is common (Gonzales et al. 2015; Hinterlong 2008). Because of the diversity of the “late-life” population, in age (65+ to 100+) and cohort experiences (e.g., Korean War, Civil Rights Movement, Vietnam War, digital revolution), disability status, socioeconomic status, immigration status, ethnicity or race, gender, and sexual orientation, providers must conduct thorough assessments and be aware of their biases toward older adults. To put clients' behavior in its context, providers must be curious about specific events that might have shaped a person's view of aging, trust of providers or systems, or other relevant events that may have affected collaborations with professionals or other supports. For example, some older adults have seen their parents receive substandard long-term services (Kane 2005); others associate admission to skilled nursing with rapid decline (Laffon de Mazières et al. 2017). Refusal to seek medical services, motivated by fear of “being put into a home,” might be a reasonable reaction considering the person's history or beliefs.

Stigma

Myths and pseudoscience predominate vernacular conceptions of aging. Ageism – or negative beliefs and attitudes about age, including “jokes,” disparaging remarks, and the perpetuation of a youth culture – is the most common and socially sanctioned form of discrimination. This is tragic, as all of us hope to belong to this class of aged individuals one day. Descriptions of “aging tsunamis” and other

comparisons of aging or the “aging population” to catastrophic events are common even in academic publications. Provider behavior is not exempt from participation in social practices that inadvertently punish or extinguish social approach behavior. Common are infantilization (comparing older adults to children) and elderspeak. Examples are the use of terms of endearment (“honey,” “sweetheart”) without a relationship or permission; changes in tone, pitch, and choice of words that imply feebleness – such as, “How was your din-din,” after supper; speaking loudly when talking to somebody older; or programming with child-appropriate materials (see also Salari 2006). Hall, a US poet laureate, astutely remarked that, “When kindness to the old is condescending, it is aware of itself as benignity while it asserts its power” (2014, p. 8). Condescension and benevolent coercion (“for your own good”) are ubiquitous sociocultural practices of which providers must be aware, lest they are at risk of participating.

Behavioral Health

Given the heterogeneity of the population, the health status of older adults varies greatly. Regarding physical status, limitations in mobility – via knee and hip problems – are most common, followed by sensory loss. Individuals who attribute their own problems to age are less likely to participate in preventive medical care or seek out interventions in a timely manner. For example, a person in midlife may attribute recurrent respiratory infections to “getting old” and fail to seek diagnosis of and interventions for a progressive respiratory disease, such as chronic obstructive pulmonary disease, that could have been remediated with pulmonary rehabilitative strategies early on. Thus, preconceptions and stigma associated with aging – mentioned above – correlate with increased morbidity and mortality (Allen 2015).

In general, behavioral health presentations vary with contexts, such as social living circumstances and economic resources, health status, immigration status, trauma histories, lifestyles, and broader sociocultural factors such as marginalization. With age, we tend to lose relatives, friends, partners, and sometimes our children, and we encounter acute or chronic medical problems of self or others. Diagnoses of depressive disorders, anxiety disorders, post-traumatic stress disorders, and substance use disorders are common (Andreas et al. 2017). Additionally, there are considerations at the end of life, such as access to hospice or palliative care, with which providers must be familiar. End-of-life presentations might include increased confusion and behavioral problems that are best addressed by reviewing whether goals of care plans are still appropriate or whether priorities have shifted (e.g., a person may refuse rehabilitative strategies and prefer to spend time with family members). Delirium, confusion, and restlessness are common at the end of life, and providers must be able to identify end-of-life presentations and the need for appropriate treatment planning that significantly differs from the usual behavioral management approaches (e.g., implementing advance care plans, focusing on palliation, saying goodbye, shifting time allocation).

Behavioral gerontology was originally conceptualized to study the effects of age-related events on behavior and work to improve the quality of life of older adults broadly. While behavioral health coaching in general is a suggested domain of growth in behavior analysis (Normand and Bober 2020), when considering adults aged 65 and older, behavior analysts are most likely to assess and intervene with a relatively small subset of the population by focusing on behavioral changes associated with major neurocognitive disorders (NCDs, formerly “dementias”).

Neurocognitive Disorders

The population of the USA and European countries is aging, yet NCDs have been *decreasing* in prevalence, potentially as a result of increased education and public health outreach to prevent or address cardiovascular conditions (for a critical review, see Wu et al. 2017). Domain-specific difficulties in thinking, remembering, problem-solving, or other skills – also termed “cognitive decline” – are not an inevitable part of aging but signs of diagnosable neurological diseases. Age can be a heuristic tool, but NCDs only correlate with age; age is not causative (Kelley et al. 2008; Nyberg et al. 2014). In gerontological practice, a provider might encounter a person with cognitive decline who might be in his 60s and the person’s care partner – a parent in their 90s. Notably, some types of neurocognitive disorders have an onset in middle adulthood.

As part of the preconceptions about aging, cognitive loss is poorly understood and highly stigmatized by the public (for an overview of the maltreatment of individuals with dementia until recent history, see Powell 2019). Like adults with neurodevelopmental disabilities, individuals with NCDs used to be institutionalized in psychiatric facilities. Today, most individuals with neurocognitive disorders live at home and receive assistance from family members and/or friends. This puts families and friends in the positions of direct service providers, for which they tend to be ill-prepared. Behavioral gerontologists – rather than educating professional staff – must equip family and friends with the tools to understand the person’s cognitive strengths and weaknesses, anticipate difficulties, and provide adequately prosthetic or therapeutic physical and psychosocial environments.

Informed Consent

Before behavior analysts provide individualized assessment and intervention services, they must obtain informed consent (“ethics code,” 3.03; Behavior Analysis Certification Board 2014). In their work with children, informed consent is provided by the child’s guardian – typically one or both parents. Contrary to popular myth, a diagnosis of a neurocognitive disorder does not mean that the person cannot consent to treatment. For this reason, when working with adults whose decision-making capacity might be in question, behavior analysts must know the guidelines

for assessing whether an adult can participate in the informed consent process (please refer to guidelines provided by the American Bar Association and American Psychological Association 2008). To obtain fluency in their respective state jurisdiction's laws governing surrogate consent, behavior analysts best consult with legal aid attorneys.

Consent procedures apply whether a person resides at home or is in an assisted living or a skilled nursing facility. If a person meets criteria for NCD and cannot give consent, assignment of global guardianship is often unnecessarily restrictive or harmful, resulting in a sweeping loss of personhood. Many individuals have designated a power of attorney for healthcare decisions, consisting of a family member or a friend who then can act on the person's behalf if permitted by state law. Assent procedures that confirm the person's willingness to participate in assessment and intervention, even if informed consent cannot be obtained, are highly recommended. Of note, to build a community service team, releases for the exchange of information are necessary; these are again obtained from the person with NCD if possible, otherwise from the surrogate decision-maker(s).

Diagnostic Process

Behavior analysts might best think of "neurocognitive disorders" as spectrum disorders. In contrast to autism spectrum disorders, where variations in genetic deletions have been too broad to identify specific subtypes, many neurological conditions that underlie difficulties remembering, thinking, or problem-solving have been identified (Gooch et al. 2017). Some are reversible or improvable (e.g., normal pressure hydrocephalus, some brain tumors); others are mild, do not disrupt activities of daily living, and can remain relatively stable throughout the remainder of the person's life (e.g., non-amnesic mild cognitive impairment). Politics related to research funding generated the "Alzheimerization" of NCD (Adelman 1995, 1998). Clinical presentations were lumped together although the conditions underlying the observed cognitive difficulties matter: Strokes, for example, are acutely acquired brain injuries. Similarly, hematomas are common after falls in late life, particularly when a person takes anticoagulants. Table 1 shows common neurological conditions, their physiological mechanism, and the expected illness trajectory (for an overview, see also Erkinen et al. 2018). A diagnosis of NCD based on these conditions requires a decline from baseline, progression, and disruption of activities of daily living, including social and occupational functioning.

Today, the most frequent diagnosis in the community is NCD not otherwise specified (> 90% of Medicare beneficiaries with a dementia claim), followed by Alzheimer's disease (>43%) (Goodman et al. 2017); note that multiple diagnoses are common. Ageism (i.e., default attribution of memory problems to age) often interferes with proper diagnosis and rule-outs. Consequently, behavior analysts must advocate for clients and organize systematic diagnostic services to rule out modifiable or reversible factors. While behavior analysts are problem-solvers for contextual factors that can improve functional status, the first step in

Table 1 Overview of selected progressive neurocognitive disorders

Pathophysiology	Clinical syndromes–neurocognitive disorder(s) due to:	Main clinical features
Spreading aggregation of amyloid- β and tau proteins, which contribute to amyloid plaques and neurofibrillary tangles	Alzheimer's disease	Insidious onset and progressive decline Loss of immediate and delayed stimulus control (olfaction, visuospatial skills, verbal skills)
Ischemia, hemorrhage, or hypoxia-ischemia (single or multiple infarcts, lacunar states in or across the brain)	Vascular dementia (O'Brien and Thomas 2015)	Acute onset and heterogeneous decline (e.g., continuous or stepwise) Loss and preservation of repertoires are highly variable
Spreading α -synuclein aggregation, initially entering the motor pathways of the brain via the olfactory and the enteric nervous system	Parkinson's disease (Reichmann et al. 2016)	Insidious onset and progressive decline Significant loss of motor skills, with resting tremor, rigidity, bradykinesia, gait disturbances, sleep disturbances, visual disturbances Decline that resembles NCD due to Lewy body disease
	Lewy body dementia (Walker et al. 2015)	Insidious onset and progressive decline Rapid eye movement (REM) sleep disorder as very early sign Subtle behavioral changes (e.g., withdrawal, apprehension) that predate decline by about a decade Visual disturbances with clear form and detail (typically children, animals, or small adults) Fluctuations in alertness and skills Parkinsonian symptoms Severe sensitivity to some psychotropic medications (e.g., antipsychotics)

(continued)

Table 1 (continued)

<p>Pathophysiology</p> <p>Spreading tau, TAR DNA-binding protein 43 or FET (also termed FUS) protein accumulation, with significant atrophy of the frontal and temporal lobes</p>	<p>Clinical syndromes–neurocognitive disorder(s) due to:</p> <p>Frontotemporal lobar degeneration (FTLD):</p> <p>Behavioral-variant frontotemporal dementia (bvFTD)</p> <p>Semantic dementia (SD)</p> <p>Progressive nonfluent aphasia (PPA)</p> <p>Progressive supranuclear palsy (PSP)</p> <p>Corticobasal degeneration (CBD)</p> <p>Motor neuron disease (MND; Burrell et al. 2016)</p>	<p>Main clinical features</p> <p>Age 40 or older at onset</p> <p>Insidious onset and progressive decline</p> <p>bvFTLD: profound disruption of operant behavior, described as personality changes, apathy, impulsivity, socially inappropriate behavior, and neglect of personal care</p> <p>Concurrent declines in reasoning, planning, flexible problem-solving</p> <p>SD: progressive waning of verbal skills while speech remains fluent and impoverished in content</p> <p>PPA: progressive verbal decline with motor difficulties, including significant difficulties with speech production</p> <p>PSP: includes a variety of different clinical presentations</p> <p>CBD: extrapyramidal rigidity, dystonia, apraxia, alien limb phenomenon, verbal decline, predominance of effects of immediate contingencies</p> <p>MND: predominant motor deficits, as measured with nerve conduction studies and electromyography; verbal decline; behavioral disturbances; difficulties organizing and problem-solving</p>
<p>Genes identified (chromosome 4p16.3 in the huntingtin gene) that affect huntingtin protein; neurodegeneration spreading from corticostriatal brain areas</p>	<p>Huntington’s disease</p>	<p>Rare, autosomal dominant inherited disease</p> <p>Mean age of onset 30–50 years (range, 2–85 years)</p> <p>Insidious and progressive decline across repertoires</p> <p>Significant loss of motor skills, with choreas and dystonias</p> <p>Subtle behavioral changes (e.g., withdrawal, apprehension) that predate decline</p>

problem-solving is to champion expert medical consultation to clarify the person's physiological context. Proper diagnosis is a keystone to intervention planning: Prosthetic environments are concerned with skill maintenance and access to preferred or meaningful activities with scaffolding and accommodations (e.g., in progressive neurodegenerative diseases such as Alzheimer's disease, progressive sensory loss such as macular degeneration); therapeutic/rehabilitative environments provide opportunities for the reacquisition of prior repertoires or learning of new skills beyond a potentially new baseline (e.g., after stroke) (Lindsley 1964). Note that stroke and traumatic brain injury – while they might lead to diagnoses of neurocognitive disorders – are not included in Table 1 above because of the significant therapeutic/rehabilitative potential of those neurological conditions. Generally, prosthetic environments expect a slow narrowing of skill sets given progressive decline and emphasize repeated assessments to increase scaffolding when needed. The goal is to slow the functional decline related to an incurable, progressive disease by addressing factors that hasten decline (see the following sections on chronic health conditions, medication effects, sensory loss, excess disability, and questionable practices related to service delivery). In contrast, therapeutic/rehabilitative environments (e.g., for stroke or traumatic brain injury) repeatedly monitor outcomes for progress. Here, the goal is to shape increased relative independence with at least some basic or instrumental activities of daily living over time. While goals often overlap – some repertoires may benefit from prosthetic, others from therapeutic approaches – individuals with NCD and their families should be aware of diagnosis and trajectories, so they can engage in appropriate planning and organization of services or advanced care planning.

Comorbid Medical Conditions

Past debates about the affiliative status of behavior analysis with other sciences, such as biology or neuroscience (for an example, see Reese 1996 and the related commentaries) foreshadowed the elimination of courses from the behavior analytic curriculum that, traditionally, would have been a core of experimental training (Edelstein 1982). Yet, health literacy – that is, basic knowledge of physiological processes and how they might affect behavior – is important when working with all neurological presentations. Behavioral gerontologists' work occurs at the intersection of behavioral and medical points of intervention.

To illustrate with an example, if an adult has diabetes, behavioral health providers collaborate with the medical service team (physicians, physical therapists, nutritionists) to implement a regimen of regular assessment (e.g., glucometer), medication (e.g., oral tablets or insulin injections), physical activity (e.g., walking), and eating (e.g., diabetic diet). Now let us assume the person has pronounced changes in mood and becomes more irritable. Because the medical system typically relies on self-report, two scenarios emerge. In the first, the person and their family complain to their physician about mood changes and irritability while denying any decrease in adherence to the diabetes regimen. Physicians do their diagnostic work and find an

acute infection that led to a spike in blood glucose values and associated irritability and mood changes. A prescription of antibiotics solves the problem. In the second scenario, the person is a poor historian, who does not self-report or whose reports are unreliable – this is the likely situation when somebody has a diagnosis of NCD. Even when a person continues to speak fluently, NCDs may produce deficits in self-reporting, particularly related to one's ability to report private events, pain, discomfort, or other variables affecting one's behavior. Without intervention by a behavioral gerontologist, families typically assume that any change in mood or behavior is a sign of further neurocognitive decline, as they equate verbal fluency with appropriate tacting of private events. In this scenario, the family notices increased irritability and mood changes and attributes them to the NCD – a case of diagnostic overshadowing.

Of concern is the behavior analytic assessment approach in this second scenario. If a behavioral gerontologist observes the person's behavior for several days, what started with a small infection may spread to other systems (i.e., many older adults die from sepsis). Yet, the physician cannot initiate assessment because the medical system relies on self-report, and neither the person nor the family reports a problem to the physician. The behavioral gerontologist, who spends more time with the person with NCD and their family, is more likely to notice changes in behavior immediately and discuss them with the family. During that discussion, a behavioral gerontologists' default assumption is that any behavioral changes (irritability, low mood) are not a direct result of the NCD, guarding against diagnostic overshadowing, but a function of some other undetected variable that disrupts the usual behavior. Behavioral gerontologists thus become the voice of the person with NCD, initiating and arranging necessary medical rule-outs with the family (thereby building the family's advocacy skills) and, if indicated, with the medical team. This medical rule-out may save a person's life, as people with NCD frequently have acute illnesses that remain undetected (Hodgson et al. 2011).

The example above is important as chronic health conditions (such as diabetes, hypertension, hyperlipidemia, and also chronic pain) correlate with cognitive status and with age; for a review of the relationship between increases in life expectancy and living with disability, see Chatterji et al. (2015). As discussed above, significant cognitive decline is not part of aging but an effect of one or more disease processes affecting the nervous system. Because of these processes, comorbidities are common, and the medical literature identifies syndromes (e.g., "obesity syndrome," "metabolic syndrome") to capture the multifaceted physiological compromise present. Put plainly, many individuals with NCDs have multiple chronic illnesses. As people lose the ability to manage their own health conditions and to report on private events (e.g., pain, dizziness, discomfort), they are at high risk of undetected medical events. These events commonly include urinary tract infections, dehydration, constipation, anemia, or toothaches. For this reason, before concluding that a behavioral problem is due to other behavior-environment interactions, medical events must be ruled out. Typically, medical events present with increased confusion, abrupt changes in functional status, and uncharacteristic behavior (refusing preferred activities, sleeping, crying, restless pacing, yelling, cursing, kicking, etc.).

Steps to ascertain client well-being reflect those of delirium protocols (for a review of delirium, see Oh et al. 2017). Behavior analysts thus must know how to conduct initial assessments that are integrative or at least collaborative with physicians, advanced practice nurses, and/or physician assistants, working side by side to systematically rule out the disruption of operant behavior by medical complications, including delirium. In addition to keeping up with the neuroscientific literature about NCD itself, behavior analysts working with populations with NCD must have a solid understanding of the intersection of medical conditions with behavioral presentations to serve the population without doing harm, e.g., by attributing behavioral changes to environmental factors and delaying medically necessary services or by failing to recognize end-of-life presentations (Sampson et al. 2018).

Medication Effects

Working with a population that has multiple comorbidities also requires an understanding of drug effects on behavior. Multiple comorbidities result in multiple prescriptions, and adults in late life who take multiple medications are at high risk of adverse medication effects or interactions. Both poorly managed health conditions and adverse medication effects – while usually reversible or manageable – can mimic cognitive decline and lead to disruptive behavior. Moreover, medications that are deemed anxiolytic or sedative in nature may have paradoxical effects that include akathisia (i.e., “pins and needles,” restless pacing) or other adverse effects, such as an increased risk of falls or further disengagement from activities due to increased confusion. Geriatric pharmacy is a recognized specialty; in 2019, there were more than 4500 geriatric pharmacists in the USA. Referral to or systematic collaboration with geriatric pharmacists, who are specialized in pinpointing medications that are inappropriate for older adults (American Geriatrics Society Beers Criteria® Update Expert Panel 2019), must be within the behavior analysts’ repertoire. For a general outline as to how to coordinate behavioral with pharmacological interventions and adverse event monitoring, see Kalachnik et al. (1998).

Sensory Loss

One of the most frequent disabilities in late life is sensory loss, particularly vision and hearing (Yamada et al. 2014). If such sensory loss is uncorrected, it may exacerbate a person’s functional status. Thus, behavior analysts must assess the person’s history and check whether prescriptions for glasses or hearing aids were issued. Persons with NCD often refuse complex aids (e.g., digital hearing aids, trifocal glasses) and tend to benefit from devices that enhance one-on-one communication (e.g., portable amplifiers such as PockeTalkers, monovision glasses). Part of the initial assessment must be a systematic investigation of the factors that facilitate participation in social interactions.

Excess Disability

Many individuals with NCD live in conditions that accelerate decline (“excess disability”; Kahn 1965): They may not receive indicated medical and dental services, regular medication reviews for potential adverse effects/interactions and avoidance of polypharmacy, correction of sensory loss, attention to proper hydration and nutrition, bowel and bladder health routines that prevent constipation or urge incontinence, and monitoring for delirium or abrupt decline in functioning. When a person’s functional status is worse than would be predicted based upon NCD alone, behavior analytic services must investigate and address sources of excess disability, including unmet social needs.

Because of stigma and a fundamental misunderstanding of NCD, many families and providers draw parallels between impairment in verbal skills and a loss of self. From a behavior analytic perspective, “self” is a locus – a place at which contingencies interact in a unique fashion (Hineline 1992). For continuity of “self,” ongoing contingencies that support behavior patterns, choices, or preferences identified with that person are necessary, while self-description is not. Self-descriptive skills might wane, and a person might not give verbal reports about the “self” anymore, but a gentle and dignified prosthetic environment honors and continues contingencies that support behavior patterns continuous with the person’s history. When families or providers conclude that history is irrelevant because the person’s self-descriptive skills are insufficient, discontinuities in social and environmental supports often lead to increased confusion and behavioral disruptions. Well-intentioned prescriptions of so-called “dementia-friendly” activities, such as coloring or modified Bingo, may have detrimental effects if such activities are inconsistent with the person’s history or rely on declining repertoires. In contrast, high-quality services regard the person’s behavior in the context of decades of lived values and personal preferences.

Mealtimes provide another good example: Family mealtimes are social determinants of well-being. They may serve as opportunities for conversations and for cues that provide continuity with the person’s past. Yet, weight loss and malnutrition are common when NCDs are present (Chatterji et al. 2015). Behavior analytic services should consider meal routines, including NCD-related barriers to engagement (e.g., sensory loss including smell and taste, loss of fine motor skills) and sociocultural factors, such as preferences based on specific food groups (e.g., vegetarians, pescatarians), ethnic traditions, or religious prescriptions. In a seminal study, Keller et al. (2007) observed families and their solutions to mealtime problems, thereby providing a starting point for systematic assessment and intervention.

The focus on individual preferences and values and engagement in activities that are continuous with the person’s history provides the general rules for identifying support needs. Given that the physical life space of individuals with NCD shrinks as concerns about disorientation and safety mount, regular physical activity, access to the outside (e.g., walking, gardening, watching birds or other wildlife, going to lunch with family or friends), and meaningful social programming are vital

elements of service provision. Many existing programs (e.g., Gitlin et al. 2008) give examples for selecting and scaffolding physical and other meaningful activities.

Questionable Practices

As noted, excess disability is common. In contrast to individuals with physical impairments alone, individuals with NCD are not able to reliably voice their needs or direct their own medical or social-behavioral health services. Absence of any of these services represents systemic difficulties that might lead to behavioral disturbances. Thus, if behavior analysts work in settings that do not provide the standard of services for individuals with neurocognitive disorders, these behavior analysts are at risk of participating in questionable practices or perpetuating problematic systems of care (Goldiamond 1974).

Questionable practices may be characterized as requests for behavioral reductions (i.e., interventions for perceived excesses), when these “excesses” were part of the person’s typical routine for the past decades (e.g., going for a walk, golfing, showering after exercise, purchasing a gift for mother’s day, having a glass of wine with dinner) but now seem out of context because the person has been diagnosed with an NCD (e.g., resides in a locked unit; has a predetermined shower time; parents are deceased; assisted living facility does not serve alcohol). As outlined by Fisher et al. (2007), a person’s behavior must be interpreted in context, considering both the person’s habits and routines and the current setting. Many complaints about “behaviors” are problems of stimulus control: They identify that longstanding patterns are now occurring in novel (and potentially inappropriate) contexts. Proper design of physical or social environments rather than behavioral reduction is the issue. Solutions honor the person’s rights and lifelong preferences.

Questionable practices also concern behavioral deficits, particularly refusals: Attributing refusal (e.g., related to foods, medications, or other activities) to NCD may ignore that such refusal may be reflective of longstanding values and preferences. Discussions related to covert medication administration as a management strategy reflect the ethical issues to be weighed when overriding a person’s refusal and implementing involuntary services. Because of the complexity of these issues, guidelines direct practitioners to prompt individuals with NCD and their families to engage in collaborative advance planning while the person with NCD has capacity to do so.

Finally, some residential facilities (e.g., assisted living, rehabilitative settings) may take a “hospitalist” stance, with the assumption that consent to services provided in the facility is covered by the residential contract. These contracts are often room-and-board or housing agreements, and they do not include the provision of health services. As noted earlier, behavior analysts must obtain informed consent, and that mandate persists even when the facility has hired behavior analysts to provide assessment and intervention services to residents. To prepare for discussions and consultations and to prevent uncritical acceptance of poor practices, behavior analysts should familiarize themselves with the topic of nonconsensual service provision to individuals with NCD.

Settings

Regardless of whether a diagnosis of NCD is present, in the USA, most older adults live in their own home, with family or friends. Yet, behavior analysts have been most active in skilled nursing and residential service settings. Regulations for different settings vary widely (Carder 2017), and many do not offer the person-environment fit that would be required for scaffolding behavior. Indeed, behavioral problems (such as withdrawal from activities) can be endemic to some settings (Kane and Cutler 2015). For this reason, scientist-practitioners who publish in behavior analytic journal (e.g., *Journal of Applied Behavior Analysis*) should know the regulatory details and service contracts of the settings and specify the type of state licensure acquired by the research setting. Failure to do so obfuscates the vast differences among states' regulatory approaches, the types of facilities available, training mandates, staffing ratios, and professions (e.g., untrained hourly workers versus certified nursing assistants). Because the physical and social characteristics of settings play a great role in the quality of life of older adults with or without NCD, behavior analysts also must know when a systems approach is indicated. In these cases, individualized assessment and intervention are futile because behavioral plans will not be supported by features of the system (e.g., lack of staff training, insufficient staffing ratios). Organizational behavior management is needed to address systemic shortcomings that produce excess disability (Carney and Norris 2017; Sinclair et al. 2018).

Behavioral Gerontologists' Roles

It is somewhat ironic that, while behavioral gerontology initially identified a broad role for behavior analysts in studying and intervening upon aspects of aging regardless of health status, currently behavior analysts tend to work solely in the area of progressive NCDs. Behavior analysis also is found most frequently in skilled nursing or residential settings.

Working within families presents unique challenges to behavioral gerontologists. The preceding sections emphasized behavioral gerontologists' role as advocates for persons with NCD by arranging for indicated medical rule-outs, preventing inadvertent misattribution of behavioral problems to NCDs, and carefully weighing ethical issues that might arise when balancing a person's autonomy with safety. A thorough knowledge and applied understanding of the philosophy of behavior analysis is necessary for proper advocacy. When proper services have been ascertained, covering the domains previously discussed – from medical to psychosocial – the true work begins. This work is dyadic and interactional. It acknowledges that many of the behavioral challenges of NCD arise within the family system.

People diagnosed with major NCD maintain interpersonal repertoires, even when verbal skills decline. In contrast to young children with autism spectrum

disorders, individuals with NCD have lived diverse and rich lives, socially connected through subtle and nuanced relationships with reciprocity and mutual respect. They have cherished education, occupations and vocations, hobbies, and travel. As repertoires fade away and reinforcer losses outweigh access, withdrawal and reluctance to engage are the most common behavioral sequelae of NCD. To family members' chagrin, the person's self-description often lags or does not match the declining skills and narrowing repertoires. Families teeter between over- and underestimation: They are prone to overestimating the person's skills, risking safety (e.g., driving), and setting occasions for creative escape or avoidance behavior when tasks are insurmountable (e.g., fixing a plumbing leak, cooking a family dinner). On the other hand, they also underestimate the person's skills, erring on the side of safety but generating premature dependence. Both under- and overestimation tend to create conflict. Underestimation creates conflict because the person with NCD might rebel against and resist benevolent coercion (i.e., restrictions placed on behavior "for your own good"). Overestimation generates unrealistic task demands. Related escape and avoidance behaviors most often take the form of provocations that lead to verbal disputes that preserve the self-respect or dignity of the person with NCD at the cost of the relationship ("you always have been a selfish child," and the daughter drops the task demand and enters into a verbal argument with the person with NCD). Conflict arises most often in situations in which assistance is needed but not provided, provided but not needed, or provided only upon lecturing the person with NCD on the deficits that make the assistance necessary, even though that lecture does not assist the person with NCD to navigate similar situations in the future.

A good example for relationship-burdening events are those that family members interpret psychiatrically (e.g., "hoarding"), when these behaviors are signs of increased confusion about receptacles and disposals, or about what items are important to keep (i.e., lack of stimulus control). In these situations, assistance is needed, but not provided because of misattribution to person characteristics. Often, worn laundry, used napkins or soiled dishes/cutlery, doffed continence items, and leftover food appear in unusual places. Standoffs with the person with NCD are most likely when care partners' chiding, asking "W" questions (e.g., why? when? where?), and other forms of coercion ("if you don't ... then ...") constitute the initial behavioral management attempts. After a series of disputes, "where is ..." and "give me ..." can take on aversive functions and become ominous verbal threats, leading over time to more self-protective behavior and less collaboration by the person with NCD. It is thus not unusual for providers to enter the home only after historically good relationships have become acrimonious or difficult.

Patterson's coercive family process model (1982, 2016) is instructive for behavioral gerontologists working with families, as it outlines how dyadic interactions may inadvertently escalate through the coaction of positive and negative reinforcement. Familiarity with other applications of the model (e.g., integrative behavioral couple therapy) is recommended, to prepare for inter-partner conflicts that are exacerbated by the onset of NCD. Effective behavioral skills training for families constitutes:

1. Education about the particular type of NCD that the person has.
2. Application of the NCD to the person, to guide assessment strategies.
3. Rule-out of other factors as described earlier.
4. Individualized assessment to pinpoint particular strengths and weaknesses as well as their interface with family dynamics.
5. Design of an intervention in collaboration following Goldiamond's (1974) constructional approach: treatment planning with the family and considering the values and preferences of the person with NCD; if NCD is mild, the person with NCD should be involved in the process.
6. Family training to implement the intervention.
7. Monitoring of implementation and troubleshooting when indicated.
8. Concurrent evaluation throughout 3–7.

Stable baselines and systematic replications (e.g., using multiple baseline designs across targets, clients, or facilities), including inadvertent returns to baseline (e.g., when families or staff do not implement the procedures), serve to provide empirical support for the treatment methods (for a review of single-subject design, see Hayes et al. 1999; Kazdin 2011; Sidman 1960/1988).

Throughout the process briefly outlined above, behavioral gerontologists work in close collaboration with family members and other providers. Both assessment and intervention plans are collaborative. This bears emphasizing as family care partners in the USA receive very little preparation for and instrumental support while assisting their spouses, parents, siblings, or adult children at home. Women provide most home-based services, and the homecare landscape is diverse: Family care partners may be part of the “sandwich generation” – in midlife, raising children while assisting a parent or a spouse with NCD. Alternatively, “old-old” mothers in their 80s or 90s may provide instrumental and emotional assistance to “young-old” adult children in their 60s or 70s (Abramson 2015). The heterogeneity, already mentioned but also evidenced in the home situations, requires consideration as practical barriers to implementation of treatment plans may differ widely. Additionally, relationships are often longstanding – at least half a century long – and thus behavioral history and the related momentum must be considered. When working with families in which assistance is provided in the home, behavior analysts must expect barriers to the implementation of treatment plans; indeed, it would be highly unusual if no such barriers emerged. Beyond treatment planning for the person with NCD, behavioral gerontologists require a large and flexible professional repertoire to engage with families and clearly acknowledge their concerns about implementation and failures to implement. Through indirect and direct instruction, behavioral gerontologists teach families about rule-governance and other barriers to effective action while addressing them consistently. Available practice guidelines for working with adults in late life, detailed below, thus emphasize a repertoire that includes strategies for proactive problem-solving within family systems.

Available Practice Guidelines

Described earlier, behavioral gerontology always has held promise but, due to structural issues such as reimbursement, has not seen the dawn of systemic service integration. In the meantime, other behavioral health providers (i.e., psychologists) are striving for parity with medical professions within existing regulatory and reimbursement systems, e.g., geriatrics and geriatric pharmacy. Postdoctoral board certification is now available for psychologists working with adults in later life, and psychology has adopted a skills competency model for training. Current benchmarks for the work with adults in late life, known as the Pikes Peak training model, are described by Knight and colleagues (Knight et al. 2009). While not all domains of practice are relevant to behavior analysts (e.g., behavior analysts might not engage in comprehensive assessments using nomothetic measures), review or completion of the self-assessment tool developed within the model is recommended, to identify training needs (Council of Professional Geropsychology Training Programs Task Force on Geropsychology Competency Assessment 2010; Karel et al. 2010, 2012). The goal is to apply the knowledge and skills identified in the BACB fifth edition task list to a specialty population, with concurrent consideration of the ethics code. The importance of these benchmarks cannot be overstated: If behavior analysts set out to work with older adults generally, or adults with behavioral excesses or deficits related to cognitive decline, the complexity of the presentations is high and behavior analysts who are insufficiently trained will be at risk of participating in questionable practices or perpetuating problematic systems of care. Engaging in assessment and treatment planning without acquiring the prerequisite skill set is reckless.

Practical and Ethical Considerations

The current BACB task list is applicable to behavior analytic work with a wide range of populations and treatment targets. However, review of the Pikes Peak training model shows that difficulties applying the BACB task list to behavioral gerontology could arise in the following domains:

Knowledge

As outlined in the ethics code, behavior analysts must acquire the knowledge necessary for research and practice with novel populations. Behavioral gerontology curricula should include training in lifespan development, particularly later life, cohort effects (e.g., baby boomers), health psychology, and the intersection of physiology – as part of the context – and behavior. To acquire this knowledge, behavioral gerontologists in training must be prepared to read outside of the area of behavior

analysis and understand scientific methods from multiple perspectives. Behavioral gerontology training programs should emphasize the degree to which behavioral thinking has permeated geriatrics and rehabilitative medicine in general, pointing out parallels and alliances. This will allow behavior analysis to benefit from existing knowledge within gerontology and to develop relevant constructional solutions without reinventing the wheel.

Advocacy

Training programs in behavioral gerontology must consider vernacular notions of aging and prepare trainees to examine their own beliefs and attributions. Whether a behavior analyst engages in research or clinical work, care must be taken to advocate properly and refrain from perpetuating preconceptions. Such advocacy can only occur if behavior analysts are familiar with the vast literature on aging. Aside from general issues in aging, individuals with NCD constitute a small subset of older adults for whom further specialized knowledge and skills apply. As a vulnerable population, they are at risk of neglect (e.g., unmet needs), abuse (emotional, physical, sexual), exploitation (e.g., financial), and abandonment. If behavior analysts intend to work with individuals with NCD, they also should familiarize themselves with the guidelines issued by the American Psychological Association (2012) for the evaluation of NCDs and age-related cognitive change and with available materials related to elder abuse and mandated reporting.

Target Behaviors

Behavioral gerontology relies on a constructional approach. Ideally, behavior analysts in behavioral gerontology work to prevent behavioral and emotional changes, assessing both strengths and weaknesses and attuning families to difficulties that might be subtle yet impactful on interactions. Such comprehensive assessment is within the purview of the BACB fifth edition task list but is not specified by it, given the disproportionate focus on “problem behaviors” already mentioned earlier. This imperative to rely on a constructional approach can be subsumed under “recommend intervention goals and strategies based on such factors as client preferences, supporting environments, risks, constraints, and social validity” (H-3).

Skill Sets

Training curricula and the BACB fifth edition task list should emphasize the application of behavior analytic science and philosophy to everyday interpersonal/social situations of older adults, bringing science and philosophy not only to behavioral *problems* but also to prevention and improvement of quality of life. Behavior analysts, such as M. Baltes, who left experimental labs to pilot applications of behavior

analysis in a variety of settings, first observed how principles might play out in the new settings. Today, the broad rule-governed dissemination of techniques – taught as shortcuts to promote workforce development in neurodevelopmental disabilities – may lead to a brute-force application of rules rather than a skillful and artful application of behavioral principles. In other words, there is the danger that behavior analysts may adhere to procedures and techniques without adequately tracking the contingencies operating within the new population or setting. An example is the use functional analytic techniques that explore a limited range of antecedent and consequential variable (i.e., demand, alone, play, attention, tangible), initially designed for individuals without verbal repertoires and with severely self-injurious behavior. Behavioral gerontology training programs must support behavior analysts in stepping back from formulaic approaches to the content of function-based assessments. They promote fluency in behavioral principles for ideographic assessment and problem-solving, to innovate and evaluate both conceptualizations and applied solutions.

Teams

The BACB fifth edition task list implicitly assumes a consultation model (e.g., “Review records and available data [...] at the outset of the case” – F-1) rather than an integrative team approach to healthcare. A part of the preparation for work in behavioral gerontology is a focus on systems of care and distinguishing the typically fragmented systems from cohesive, team-based approaches to medical and behavioral health (see Kelly and Coons 2012 and Strosahl 1996, for the difference between consultation models and integrative services). Team approaches could be covered by “collaborate with others who support and/or provide services to clients” (H-9); however, service integration is not mentioned explicitly, and relevant skill sets are not targeted in the task list. Geropsychology, in the meantime, is working toward integrative services and navigation hubs, mirroring developments in other specialty areas (e.g., pediatric feeding disorders; see Chapter 8 in this volume).

Regulatory or Licensing Frameworks

If interested in broadening one’s practice to adults in late life, or adults with NCD, BCBAs must refer to the respective laws regulating their licensure at the state level, as some states limit the scope of practice of licensed BCBAs to neurodevelopmental disorders (e.g., autism spectrum disorder or intellectual disabilities). Please refer to Chapter 2, [Scope of practice and standards of training](#), for further information on licensures.

Under current reimbursement structures, psychiatrists, psychologists, and clinical social workers are most likely to provide behavioral health services across the lifespan, including to adults in later life. Regarding older adults, in addition to

specialty practices, the Centers for Medicare and Medicaid Services (CMS) authorized reimbursement for behavioral health services integrated within or coordinated with primary care practices in January of 2017. Through this payment structure, behavioral health specialists (broadly defined, but mostly social workers or psychologists with specialty training in behavioral health) have a mechanism to offer services to individuals in the context of primary care, particularly regular assessment, brief intervention, and case management delivered in collaboration with medical practitioners (e.g., physicians, nurse practitioners, physician's assistants, psychiatrists). This model is also available as home-based primary care, for individuals who are home-bound (Eric De Jonge et al. 2014), and continues to be developed to better address the needs of individuals with complex conditions at the intersection of medical and behavioral health (Press et al. 2017).

Individuals with progressive NCD, by definition, have difficulties acquiring novel repertoires. They benefit from tailored skills-building within the family to access socially and physically prosthetic environments, yet the common procedural technology codes embedded within the CMS regulatory framework do not adequately reflect these skills-building services delivered by behavioral gerontologists. For example, neither ideographic assessment of dyadic functioning in the home nor family care partner training in behavioral management techniques would meet procedural definitions for reimbursable behavioral health services within the primary care framework. As the advocacy for caregiver assessment and referral as part of routine medical practice becomes stronger in the medical community (e.g., Swartz and Collins 2019), the added value of behavioral gerontology to optimize community living of individuals with NCD could lead to reimbursement options.

Supervision

Because most of the practical experience within behavior analysis occurs outside of behavioral gerontology, behavior analysts interested in behavioral gerontology should expect to contract for supervision as a form of post-credential professional development. Thus, board-certified behavior analysts at the master's or doctoral level should seek out supervision from behavioral geropsychologists, with state-of-the-art training (currently, within the Pikes Peak model) and behavior analysis. Because of the gap created by the absence of behavior analysts in the field, such supervision would allow behavior analysts to catch up to current benchmarks in the provision of care and then to develop and evaluate novel clinical behavior analytic solutions. Behavioral geropsychologists in most states will be familiar with post-masters and postdoctoral supervision in their specialty area, and they can contract for that supervision.

Conclusion

Stigma related to aging, systemic difficulties with long-term service provision, and lack of behavioral skills training within families and providers continue to mark behavioral gerontology as an area of great public health need. In other words, the field needs behavior analysts. Behavioral gerontology has a long history within behavior analysis, whose philosophy and science initially significantly affected healthcare providers' approaches to aging and disability worldwide. Yet, for the last decades, behavioral gerontology has marched on without large support from or dissemination by behavior analysts. Given advances in the study of aging, neurophysiological, and social processes, behavior analysts who would like to enter behavioral gerontology today require specialty training. The translation of principles hinges on an understanding of the population. Post-certification training will enable behavior analysts to reenter the landscape of research and clinical service provision and continue their contribution to our understanding of aging and neurocognitive disorders.

Self-Assessment

Pikes Peak Geropsychology Knowledge and Skill Assessment Tool: <https://copgtp.org/wp-content/uploads/2016/01/Pikes-Peak-Evaluation-Tool-1.4.pdf>

Additional Related Readings

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Specialty Training for Behavior Analysts to Work in Substance Abuse Treatment



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Abstract Employment opportunities for substance abuse counselors are expected to grow by 23% over the next decade, making this an opportune field for Board Certified Behavior Analysts (BCBAs), particularly those at the master's level. Although certification in behavior analysis is not currently needed for employment in substance abuse treatment, research has shown that interventions based on behavior analysis are among the most effective in changing behaviors of individuals with substance use problems. Despite these findings, credentialing requirements for substance abuse counselors do not follow a behavioral model, and few training opportunities exist to prepare BCBAs to work in specialty substance abuse treatment. This chapter outlines recommended additions to the BACB fifth edition task list that would be required to meet Advanced Substance Abuse Counselor credentialing standards. They are translated to behavioral concepts where possible, and the additional training necessary for a master's level BCBA to provide treatment effectively is identified. These additions include training in the concepts and principles of pharmacology, behavior pharmacology, and behavioral economics. Training is also suggested in methods for measuring substance use and other related behaviors, in the application of individual analysis designs in this area, and in randomized clinical trial designs. Training in methods of functional assessment, in empirically established behavior change procedures (e.g., abstinence-based reinforcement, acceptance and commitment therapy, community reinforcement approaches), and in medication-assisted treatments is also recommended. Finally, ethical issues, regulatory frameworks, and supervision issues are discussed. Hopefully, as behavior analytic treatments become more widely implemented, training programs will consider incorporating these recommendations.

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Historically, substance use disorders (SUDs) were largely conceptualized as manifestations of underlying psychopathology or moral weakness. Today, SUDs are defined as persistent use of substances despite impairment or other negative consequences (American Psychiatric Association 2013). This definition was likely influenced by decades of research showing that human and nonhuman drug self-administration of every drug class is influenced by antecedent, consequent, and past history variables in the same way as other operant behaviors (Griffiths et al. 1980).

The *Diagnostic and Statistical Manual of Mental Disorders (DSM-5;* American Psychiatric Association 2013) categorizes SUDs by drug classes, including (1) alcohol; (2) caffeine; (3) cannabis; (4) opioids; (5) sedative, hypnotic, or anxiolytics; (6) stimulants (amphetamine, methamphetamine, cocaine); (7) phencyclidine and other hallucinogens; (8) inhalants; (9) tobacco; and (10) other (unknown substances). SUD prevalence varies by user age and availability of substances. Legal substances such as tobacco and alcohol account for most adult SUDs, followed by marijuana (Center for Behavioral Health 2018), but prevalence of substance use can change over time. For example, among high school seniors in 1998, cigarette and binge alcohol use (i.e., ≥ 5 drinks in a row during the past 2 weeks) were most common, but by 2018, marijuana use was most prominent followed by binge alcohol use (Johnston et al. 2019). As any SUD can be encountered in any setting, and use of multiple substances is common, it is important that behavior analysts (BAs) working in this field have knowledge of pharmacological properties and drug-behavior actions concerning a wide range of drug classes. Although the behavioral principles used to treat different SUDs are similar, BAs must consider drug-specific factors such as pharmacokinetics, biomarkers, and long-term physiological consequences of use.

Potential Job Opportunities

Employment opportunities for substance abuse counselors are projected to grow 23% from 2016 to 2026 (Bureau of Labor Statistics 2019). At present, there is little demand specifically for BCBAs in this position, but opportunities may increase in the future as applied behavior analysis (ABA) procedures are among the most effective interventions for changing substance use and related behaviors when compared to other treatments. To date, most of the research establishing ABA treatments has involved large studies. As such, data documenting the effects of individualized ABA treatments for SUDs are not as readily available, when compared to areas where ABA is better established.

The relatively early stage of development of ABA treatments brings challenges and opportunities. One challenge is that there are very few clinical settings that approach SUD treatment from an ABA perspective. Those that do usually are research clinics affiliated with an academic institution, and they typically conduct large clinical trials, not providing individualized treatment or using single-subject designs. Even within this setting, the BCBA credential currently does not necessarily make a job applicant more competitive. As such, starting salaries for BCBAs in SUD treatment may be lower compared to areas where ABA is better established. However, there are many opportunities for work in a wide variety of settings. The most common settings are residential or outpatient specialty substance use disorder treatment programs. BCBAs may be able to advance fairly quickly in these treatment settings as therapist and supervisor turnover is high in many of them (Bureau of Labor Statistics 2019). Positions in primary care clinics are increasing (National Association of Community Health Centers 2018), particularly in federally qualified healthcare centers where primary care behavioral health counselors are part of the medical treatment team. For the most part, these positions require more general training in mental health issues, but specialization in SUDs would be helpful in primary care settings where drug use is prominent. Employee assistance programs and hospitals are also potential settings for BAs to work. The Veteran's Administration Hospital System in particular is the first to widely use abstinence-based reinforcement procedures to treat SUDs. Government positions (e.g., Department of Transportation) employ SUD professionals to evaluate and make recommendations for personnel who have violated drug or alcohol regulations. Finally, licensed BAs may be able to establish their own clinic or private practice. Although a BCBA credential may not improve competitiveness for a position, ABA training provides excellent preparation to understand SUD problems and to formulate and execute effective treatment plans.

Appropriate Training and Skills

The skills and training that are likely to be recommended by behavior analysts to prepare students for treating individuals with SUDs differ considerably from the training and skills required by most states. Furthermore, requirements differ considerably from state to state. For example, some states allow individuals with no post-secondary education or formal professional training to practice independently after minimal education in SUDs and many hours of supervised practice. Academic qualifications can come from a variety of fields, including counseling, psychology, social work, and others. In ABA, there is a single certification board that provides a clearly specified task list covering foundational knowledge and basic and practice-oriented skills. In SUD treatment, there are no widely agreed upon best practices and many different credentialing organizations. Task lists were reviewed and found to vary greatly, but most are derived from a list of 12 core functions of SUD counselors established over 40 years ago (Brigham et al. 2011). The recommended

additions to the Behavior Analyst Certification Board (BACB) fifth edition task list that appear below were informed by the International Certification and Reciprocity Consortium (IC&RC) Advanced Alcohol and Drug Counselor task list,¹ which is the most frequently accepted certification (NASADAD 2012), with a detailed task list for master's level counselors; however, they are also informed by our own training and experience. Table 1 lists content-specific tasks arranged by categories consistent with the BACB fifth edition task list.

Section 1: Foundations

B. Concepts and Principles

Genetic and Neurobiological Factors in SUD In addition to understanding environmental factors influencing substance use, BAs need to understand the genetic and neurobiological factors that interact with environment, particularly those contributing to the development of SUDs. This is important because SUDs are still often seen as moral failings (Lewis 2017). Adequate training in the assumptions underlying the science and philosophy of behavior analysis should prevent BAs from accepting this view. However, understanding (a) genetic and neurodevelopmental factors that increase susceptibility to the onset of SUDs during adolescence and (b) changes in brain function associated with frequent substance use and extended abstinence can be useful in decreasing the stigma and interpersonal conflict associated with moralistic beliefs about SUDs.

Psychoactive Drugs and Drug Classes BAs also need to be familiar with the classes of psychoactive drugs and the most commonly abused substances within each class. They need to learn the generic, trade, and street names of these substances and how their use and withdrawal affect behavior. Generic names are most frequently used in research, whereas trade and street names are needed when communicating in community treatment settings.

Basic Pharmacology Concepts An understanding of basic pharmacological principles is also needed, especially where drug administration and disposition have clinical implications. For example, abused drugs are most often administered through oral (e.g., alcohol), inhalation or nebulization (e.g., tobacco, marijuana), nasal (e.g., cocaine), or intravenous injection routes (e.g., opioids). The concepts of dose-response curves (i.e., response under different amounts of drug), exposure (i.e., time-dependent blood or plasma concentration and effects), and drug half-life (i.e., the time required for the amount of drug in the body to be reduced by one-half) are also important. Dose-response curves clarify the need to attend to dose amounts

¹For the complete IC&RC task list, see https://internationalcredentialing.org/resources/Candidate%20Guides/AADC_Candidate_Guide.pdf or https://internationalcredentialing.org/resources/Candidate%20Guides/ADC_Candidate_Guide.pdf.

Table 1 Content-specific skills and competencies

Section 1: Foundations	
	B. Concepts and Principles
SB – 1	Describe the etiology of substance use disorders
SB – 2	Identify the major neurobiological pathways involved in addictive disorders
SB – 3	Identify classes of abused drugs; provide examples of drugs in each class, and identify the signs and symptoms of use and withdrawal for each
SB – 4	Describe routes of administration and how they influence absorption and time course of drugs
SB – 5	Explain the importance of dose-response curves and exposure in research on drug effects
SB – 6	Define the term half-life and describe how this relates to the time course of drugs
SB – 7	Define tolerance and conditioned tolerance and identify their implications for overdose risk
SB – 8	Define delay discounting and its role in substance use disorders
SB – 9	Identify medical complications of drug use
SB – 10	Describe methods for managing intoxication, withdrawal, and overdose
	C. Measurement, Data Display, and Interpretation
SC – 1	Describe and implement biological methods for monitoring use of tobacco, alcohol, and other drugs, and identify timeframes for detection and the clinical implications of them
SC – 2	Describe how technological methods of measurement can address measurement limitations
SC – 3	Describe commonly used self-report measures and discuss their utility and limitations
SC – 4	Describe the limitations and risks in using collateral reports
	D. Experimental Design
SD – 1	Identify the defining features of randomized clinical trials
SD – 2	Read published clinical trials and discuss the implications of the statistical analyses
SD – 3	Read published behavioral pharmacology studies and describe the implications of their findings
Section 2: Applications	
	F. Behavior Assessment
SF – 1	Describe methods for conducting functional analyses of drug use behavior
SF – 2	Describe and use <i>DSM-5</i> and ASAM criteria for SUD assessment and treatment placement
SF – 3	Describe and apply several commonly used SUD screening and assessment measures
SF – 4	Describe and utilize methods for identifying co-occurring mental and other health disorders
SF – 5	Screen for and describe signs of abuse, neglect, domestic violence, and other trauma
	G. Behavior Change Procedures
SG – 1	Develop and use abstinence-based reinforcement procedures
SG – 2	Identify methods to shape smoking cessation and describe limitations of use with other SUDs
SG – 3	Develop and use relapse prevention training
SG – 4	Use acceptance and commitment therapy to treat SUDs

(continued)

Table 1 (continued)

SG – 5	Develop and use family-based behavior therapy to treat SUDs
SG – 6	Describe and practice crisis and trauma intervention strategies, de-escalation techniques
SG – 7	Identify and use technological advances in delivering behaviorally based services
SG – 8	Develop and use behavior maintenance plans including the community reinforcement approach
SG – 9	Identify and use methods for engaging and reengaging individuals with SUD in treatment
SG – 10	Adapt and use ABA strategies for group treatment formats
SG – 11	Identify currently available medication-assisted treatments, specifying the SUDs each treats

when interpreting behavior pharmacological research. Many studies use measures based on exposure, or concentration-derived parameters, such as AUC (area under the curve) and C_{\max} (peak level of the curve). Drug half-life provides information about how long a drug can be detected through biological tests. Understanding drug tolerance (diminished response to a drug after repeated administrations) and different types of behavioral tolerance is also valuable (cf. Branch 2001). For example, as tolerance develops, people with SUD will self-administer increasing amounts of the drug. When self-administration occurs in the same or similar environments, unconditioned stimuli in the environment become associated (conditioned stimuli, CS) with the unconditioned drug response (UR; Siegel 1976). The environment itself then elicits physiological preparation, i.e., a conditioned response (CR) that ameliorates or works against the drug effects. This preparatory response may be experienced as “cravings.” If the same amount of drug is then used in a new setting, in the absence of the CS, the conditioned response (CR) is absent and the individual is at greater risk of a drug overdose.

Behavioral Economics Behavioral economics uses constructs from economics to inform drug-behavior relationships, including choice. Key concepts include demand, reinforcer competition, open versus closed economies, and delay discounting (Francisco et al. 2009; Hursh 1980). Delay discounting has been particularly useful as a behavioral model of impulsivity that has been empirically demonstrated using operant laboratory and applied choice paradigms, mathematically describing how reinforcers decrease in effectiveness, or “value,” when delayed. It helps clarify why individuals will continue to use drugs despite serious but delayed negative consequences. There is substantial evidence supporting delay discounting as a trans-disease process underlying health problems involving choices between immediate, smaller, more likely, and unhealthy reinforcers versus larger, delayed, less certain, and healthier ones (Bickel et al. 2012). Individuals living with substance use disorders have higher rates of delay discounting (Amlung et al. 2017), and chronic use of substances increases discounting (Dallery and Locey 2005). Behavioral strategies have been shown to change discounting (Bickel et al. 2019). Behavioral economic demand has also been found to be a clinically useful measure of drug value

(Strickland et al. 2019). The study of behavioral economics is a growing and promising area of research that has implications for effective treatment and is recommended for inclusion as content-specific training for BAs working with SUDs.

Physiological Consequences of Drug Use Alcohol-related deaths and overdoses totaled 78,039 in 2017 and other drug-related deaths totaled 117,728, with 74,922 due to overdose (CDC 2018). Cigarette smoking kills more than 480,000 Americans per year nationally (DHHS 2014). Other medical conditions associated with drug use include pancreatic and liver disorders, cardiovascular problems, renal and metabolic disorders, respiratory disorders, tuberculosis, hepatitis, and HIV. Intramuscular and subcutaneous injections have been associated with recurrent abscesses, and intravenous injection can produce tracking, which refers to scarring or dark pigmentation around injection sites and along veins. It can lead to damage to the veins, lesions, and bruising. An extensive knowledge of these complications and their treatment is not necessary, but BAs working with SUDs should be aware of potential complications and be able to identify signs and symptoms of them. They should also be familiar with the methods for managing intoxication, withdrawal, and reversing opioid overdose.

Other Considerations Although not recommended as part of an ABA training curriculum, BAs seeking certification to treat SUDs should be aware that some certifications require familiarity with non-behavior-analytic theories, terminology, and principles concerning human behavior. For example, the IC&RC task list includes mentalistic concepts such as transference and countertransference. Exposure to the guidelines of functional analytic psychotherapy can help BAs understand that these concepts can be approached and managed with strategies consistent with a behavioral approach (Kohlenberg and Tsai 1996). Another inductively derived, non-behavior analytic theory that is specified on the IC&RC task list is the theory of stages of change (Prochaska and DiClemente 1983). This has been linked to specific verbal strategies for motivating SUD patients to change their behavior, known as motivational interviewing (e.g., Miller and Rollnick 2013; Rollnick et al. 1992).

C. Measurement, Data Display, and Interpretation

Biological Testing Direct and frequent measurement is the foundation of behavior analysis; however, drug use is rarely observed directly by SUD treatment providers. Instead, biomarkers of substance use are used to assess abstinence behavior. Drug testing may be conducted on a variety of biological specimens including saliva, blood, breath, hair, and urine. Several factors are considered when selecting type of specimen collection: a) invasiveness or ease of collection, b) frequency required to detect use of particular substance(s), c) reliability of the test, and d) immediacy of receiving results (e.g., to reduce delays to reinforcement when using abstinence-based reinforcement treatments). Blood and hair samples are rarely used for drug testing in SUD treatment because they are difficult or inconvenient to collect frequently over long periods; and less invasive, more immediate and reliable methods

are available. Urine drug tests are most frequently used to measure illicit drug use as they can provide results for multiple substances in minutes and have acceptable reliability and sensitivity. However, urine samples must be collected under direct observation to ensure that the sample is recent and unadulterated and comes from the patient. They also can be temperature tested and checked for adulterants (substances added to the sample to obscure or alter test results). Saliva testing is less invasive, but drug metabolites are detectable in saliva for a briefer time, so sampling needs to be taken quite frequently to verify abstinence. In contrast, thrice-weekly urine drug testing will adequately detect most illicit substances of abuse. Breath carbon monoxide (CO) and urine cotinine are among the most popular measures for monitoring cigarette smoking (Benowitz et al. 2019). Breath CO can be measured noninvasively using a carbon monoxide breath sensor and with minimal instruction; however, its half-life is relatively short, so it must be measured several times daily in order to verify smoking abstinence. Fortunately, technologies have been developed to allow frequent remote monitoring through computers or mobile devices. It is important that BAs gain knowledge and experience with these different testing methods so that they can select appropriate and reliable measures, determine testing frequency, and evaluate new testing methods as they become available.

Self and Collateral Reports BAs should also become familiar with self-report measures that are frequently used in SUD treatment (see Behavior Assessment below) and be trained how to find information regarding the reliability and validity of these measures and to use them cautiously and in combination with other objective measures. Also, collateral reports can be useful in verifying self-reports, but they must be used cautiously as many individuals with SUDs have strained relationships with others. Level of conflict and history of physical violence must be considered before involving collaterals this way.

D. Experimental Design

Both large- and small-N research designs have been used to evaluate ABA treatments for SUD, but most studies have used randomized controlled trial (RCT) designs, which are the gold standard for public health-related treatment outcome studies. Individual analysis designs are less frequently used. Thus, in addition to receiving training on single-case designs, which BAs need to evaluate the effects of their treatments on individual patients, they will need training on the strategy and execution of RCT designs as well. Specifically, they will need to know how to read and interpret commonly used statistical tests in order to stay informed of new research. Because individual analysis designs encourage exploration of variability in individual responses (Dallery and Raiff 2014; Sidman 1960, pp. 145–146), BAs' use of them to evaluate their treatments could in turn contribute greatly to our understanding of SUDs.

While receiving training in behavior pharmacology concepts, BAs will also be exposed to within-subject designs that are used when manipulating drug dose or

exposure. Between- and within-subject designs also are often combined. An introduction to these designs and some instruction on how to read and interpret results from these studies will also be necessary.

Section 2: Applications

F. Behavior Assessment

Many assessment procedures for SUDs are similar to those outlined in the BACB task list, including reviewing available records and data at the outset of the case, determining the need (and level) of services, and conducting assessments of relevant skill strengths and deficits. There are several well-known and widely used tools for conducting these assessments, although their utility for planning behavior analytic services is limited. A list and brief description of some of the most common screening and global assessment measures are available through the National Institute on Alcohol Abuse and Alcoholism (NIAAA)² and the National Institute on Drug Abuse (NIDA).³ BAs working with SUDs should be aware of these different measures and get experience using them, including the Structured Clinical Interview for the DSM (SCID) Substance Use Disorders section, which is the assessment tool associated with the *Diagnostic and Statistical Manual 5 (DSM-5)*. Although the SCID provides a traditional classification of substance use problems that sheds little light on potential functional relationships, it is included on the IC&RC task list and is widely used to justify treatment reimbursement and to describe severity of the disorder. The American Society of Addiction Medicine (ASAM) placement criteria are used in over 30 states (Kolsky 2006) to determine the level of treatment needed (medically managed intensive inpatient to outpatient care) and also is an IC&RC requirement.⁴ IC&RC additionally requires use of readiness to change measures (e.g., Readiness to Change Questionnaire, Stages of Change Readiness and Treatment Eagerness Scale) and screening for signs of “process addictions” (i.e., excessive and deleterious eating, sexual behavior, shopping, gambling, Internet use, etc.), interpartner violence, neglect, trauma, and co-occurring mental health disorders. Many states use their own developed or revised measures of unknown reliability and validity, so extensive training on every assessment tool on the NIAAA and NIDA lists may not be the best use of training time; however, those specified above should be included along with education providing a basic understanding of reliability and validity and their importance in evaluating the utility of interview and survey measures.

² <https://pubs.niaaa.nih.gov/publications/assessingalcohol/quickref.htm>

³ <https://www.drugabuse.gov/nidamed-medical-health-professionals/screening-tools-resources/chart-screening-tools>

⁴ Information regarding IC&RC requirements, guidelines, and recommendations can be found at <https://internationalcredentialing.org/earningacredial>.

Practice guidelines regarding socially significant behavior change goals include reducing or eliminating substance abuse, improving functioning in multiple areas, and preventing or reducing the frequency and severity of relapse (Kleber et al. 2010). Yet, there is little agreement about specific goals. For example, the goals of traditional SUD treatment may include decreased denial, endorsement of 12-step beliefs, and participation in self-help groups. ABA treatments of SUD would be unlikely to list these goals. Behavioral treatments typically focus on reducing reinforcement for substance use and enhancing it for substance abstinence. Behavioral treatments tend to be clearer about the need to prioritize target behaviors. For example, meta-analyses have shown that targeting reduction in the use of one drug produces better effects than targeting all substances simultaneously (Griffith et al. 2000).

Functional behavior assessments are not typically conducted in traditional SUD treatment and have received little attention even in behavior analytic research of SUD treatments. They are usually included in clinical treatment manuals for behavioral interventions where they typically use an interview format, have the individual identify a specific recent episode of substance use (or other target behavior), and then consider the external antecedents (e.g., people, location), internal antecedents (i.e., thoughts and feelings), immediate consequences, and longer-term consequences of the behavior. This information is then used to develop hypotheses regarding the functions of the substance use and derive treatments based on them. Mobile technology (e.g., daily diaries/ecological momentary assessments) can also be used to get a better sense of the functions of SUD. For smoking cessation, a questionnaire has been developed to identify major functions of smoking including automatic positive or negative reinforcement (e.g., sensory reinforcers from smoking, relief from withdrawal), social positive and negative reinforcement (e.g., mingling with other smokers, getting a break from work), and antecedent respondent processes (e.g., drinking coffee/alcohol). The measure is still early in development, but thus far there is support for its validity, as well as preliminary results suggesting individual differences in smoking functions (Burrows et al. 2020). Experimental functional analyses that demonstrate control over behavior do not currently exist in SUD treatment. BAs should be aware of the need to develop methods for functional analyses and apply new methods as they emerge.

G. Behavior Change Procedures

Although behavior change procedures are similar across fields of expertise, BAs working with SUDs should be exposed to several well-known behaviorally based interventions and receive supervised experience with some of them. Although supervision would ideally come from a supervision-qualified BCBA, at present very few BCBAs have expertise in SUDs. In the absence of these individuals, quality supervision is most likely to come from behavior analytically trained individuals specializing in SUD. In the meantime, a clinical practice supervision structure to onboard BCBAs into this area needs to be developed. Several empirically supported interventions for SUDs are listed below.

Abstinence-Based Reinforcement Procedures Abstinence-based reinforcement procedures are among the most effective interventions for SUDs (Dutra et al. 2008). These interventions usually provide positive reinforcement contingent upon biologically verified substance abstinence. Early studies used reinforcing or punishing consequences, increasing or decreasing methadone doses and/or allowing clinic privileges (Stitzer et al. 1986). Token economy systems have been used that award point vouchers on a schedule that increases the point amount to differentially reinforce sustained abstinence and add a response cost by lowering the amount contingent upon a drug-positive urinalysis result (Higgins et al. 1994). Other variations have used a probabilistic reinforcement schedule where individuals draw slips from a bowl that earns prizes of varying sizes (Petry and Martin 2002) or apply interdependent group contingencies alone (Kirby et al. 2009) or in combination with individual contingencies (Dallery et al. 2015). These interventions have been used to address illicit drug use, smoking cessation (Dallery et al. 2017), and excessive alcohol use (Koffarnus et al. 2018).

Shaping Shaping has been used in SUD treatments to build alternate behaviors, such as patients' completion of treatment plan tasks (Iguchi et al. 1997), and to decrease substance use by reinforcing provision of biospecimens with successively lower levels of drug metabolite (Preston et al. 2001). However, shaping is rarely used in illicit drug abuse treatment, likely because most urinalysis tests provide a qualitative (drug negative or positive) result rather than a continuous measure that could be targeted for gradual reductions and reinforcement of successive approximations. Shaping has been more successfully used in smoking cessation, where breath carbon monoxide is easily measured and provides a quantitative result that decreases as cigarette smoking reduces (Dallery et al. 2017).

Relapse Prevention Relapse prevention (RP) involves identifying people, locations, and other external and internal stimuli that have been associated with drug use and the reinforcing effects therein. These are treated as antecedents that set the occasion for drug craving and drug use. Once antecedent situations are identified, the patient is trained in alternate responses, such as avoidance, escape, drug refusal, and relaxation skills. The goal of RP is to expect lapses to drug use, to prevent them, or, when that fails, to minimize the duration of the lapse. RP also provides information regarding temporary stimulus control (e.g., craving lasts only a few minutes) and includes differential reinforcement of novel verbal rules regarding lapse and relapse (i.e., verbal behavior-based interventions related to substance use narratives). Although RP uses some concepts that are inconsistent with an ABA approach, most of the strategies can be understood behaviorally, and there is empirical support for the approach (Hendershot et al. 2011).

Acceptance and Commitment Therapy Acceptance and commitment therapy (ACT) is a contextual approach based on an experimental analysis of human language known as relational frame theory (RFT). ACT assumes that substance use is controlled by rule-governed behavior, specifically rules that are ineffective and problematic in the long term in the context in which they are being applied. ACT

aims to diminish the influence of the rules by teaching patients to focus on longer-term outcomes (e.g., family relationships, health) even when private events (e.g., thoughts, cravings) compete with them. Consistent with a behavior analytic approach, rules and other private events are considered to be under the control of the same variables as observable behaviors and not the cause of behavior, thus undermining reason-giving about substance use. ACT has been adopted as a standard treatment protocol in a wide range of settings by many provider types, including BCBAs. It has been rigorously studied across many disorders. A meta-analysis found a small to medium effect favoring ACT for smoking and other drug abstinence at follow-up when compared to cognitive behavior therapy and other non-behavioral treatments (Lee et al. 2015). There is also preliminary support for ACT compared to no intervention or minimally effective interventions for alcohol use disorders (Byrne et al. 2019).

Family Behavior Therapy Family behavior therapy trains family members to set goals and use behavioral principles to attain them (Azrin et al. 2005; Donohue et al. 2009). Family-based services are used irregularly in treatment programs, though strongly recommended for adolescents. There are several well-known family-based adolescent interventions, some of which are not derived directly from behavior analysis but are clearly contextual (e.g., multidimensional family therapy and multisystemic family therapy; Liddle et al. 2011; Henggeler and Sheidow 2011).

Crisis and Trauma Interventions Although there are no empirically supported crisis interventions (Spencer et al. 2018), knowledge and use of de-escalation strategies are included on the IC&RC task list. BAs need to be aware of widely accepted non-behavioral approaches but also know behavior analytic strategies (e.g., identify early behaviors in chain to escalation and interrupt, differentially reinforce de-escalation). For trauma, which is also on the IC&RC task list, prolonged exposure is one of the best-known and efficacious behaviorally based treatments. It involves repeated exposure to stimuli that evoke a trauma response, thereby decreasing sensitivity to the stimuli (Watkins et al. 2018). However, BAs should also be aware of popular integrated treatments for SUD and trauma (e.g., seeking safety) and the research regarding their efficacy (e.g., Hien et al. 2010).

Technological Advances in Delivering Behaviorally Based Services With the rapid expansion of technology in the health sector, there are opportunities for mobile intervention applications (apps) based on ABA principles and targeted toward individuals with SUDs. One of the first empirically supported mobile applications, Addiction-Comprehensive Health Enhancement Support System (A-CHES), offered users a variety of services (Gustafson et al. 2014). It used geolocation to send alerts to app users when they were in high-risk locations for substance use, essentially interrupting a chain of behavior leading to use. A-CHES was later combined with another mobile app (Therapeutic Education System) to become Seva, which includes skill-building and self-management. Other apps have incorporated remote monitoring methods that allow abstinence-based reinforcement for smoking and alcohol cessation (Hertzberg et al. 2013; Koffarnus et al. 2018). An empirically

supported web-based treatment, CBT4CBT (Carroll et al. 2009), uses cognitive behavior therapy, providing videos and exercises to teach skills that aid users in developing new behaviors to interrupt drug craving (part of a behavioral chain) and to keep track of abstinence goals (using feedback and positive reinforcement).

Behavior Maintenance Strategies Although the need to maintain long-term changes in substance use is acknowledged, little research focused on the development of maintenance strategies until recently. The IC&RC task list requires counselors to be familiar with current continuing care and recovery strategies (e.g., continuous recovery monitoring and peer recovery specialists), although most of these are not derived from principles of ABA. Indeed most ABA studies in SUDs have not systematically planned or examined strategies of behavior maintenance. When long-term maintenance of abstinence has been directly addressed, the primary strategy has been to establish natural maintaining contingencies. The community reinforcement approach (CRA) is one such approach that has empirical support in treating alcohol use disorder. CRA aims to reduce rates of substance use by increasing the rate of reinforcement contingent on abstinence while decreasing reinforcement derived from use (Miller et al. 1999). It enriches abstinence reinforcement through social and nonsocial sources, for example, by helping the patient find rewarding work and arranging for significant others to reinforce abstinence. The intervention includes functional assessments of substance use, contingency contracting, differential reinforcement of alternative behaviors, and disruption of behavioral chains. Another strategy is the “therapeutic workplace” (Silverman et al. 2012). This offers enduring reinforcement by providing access to a workplace where the patient receives pay contingent on proof of abstinence and other transferable workplace skills. In addition to its direct reinforcement of abstinence, the approach may also help impact comorbid rates of poverty, providing access to alternative social contexts in which substance use may not be as readily reinforced.

Methods for Engaging Individuals with SUD in Treatment Anosognosia, or impaired awareness of illness, has been widely discussed in traditional SUD treatment. Usually referred to as “denial,” it is considered a characteristic of the disorder. In the past, treatments of SUDs called for “confronting” the patient to break through “denial,” although research has shown that this approach decreases patient compliance (Patterson and Forgatch 1985). BAs need to be taught that resistance to treatment is not a character flaw and instead trained to recognize environmental factors that may contribute to patients’ failure to see their use as a problem and their resistance to getting treatment. For example, individuals often have friends who engage in similar levels of substance use and loved ones who protect them from the negative consequences of their use. These two factors may combine with others so that the behavioral excesses and negative consequences are less apparent to the individual, especially in the context of the reinforcing effects from using substances. BAs need specific strategies to help engage individuals in treatment, such as motivational interviewing (Miller and Rollnick 2013; Rollnick et al. 1992), a widely known empirically supported approach. Experience with this strategy and its associated interventions (motivational enhancement therapy, brief interventions) may help

BAs avoid approaches that increase patient noncompliance. Another useful empirically supported intervention is community reinforcement and family training (CRAFT). CRAFT trains concerned significant others of out-of-treatment individuals to provide appropriate consequences for drug use and abstinence and in effective strategies for suggesting treatment entry. CRAFT produces better treatment entry relative to traditional approaches (Kirby et al. 2017). Finally, BAs should be trained in effective methods to locate patients who drop out of treatment, so these strategies can also be used for reengagement.

Group Treatment Formats Most treatment in alcohol and drug treatment programs is provided in group formats, which are more economical than individual treatments. As such, the IC&RC list includes tasks on group treatment and dynamics. Although these concepts have not been added to the content-specific task list in Table 1, BAs should receive supervision in practice methods for adapting ABA interventions to these formats.

Medication-Assisted Treatments Pharmacological interventions are widely used for smoking cessation, and clinical practice guidelines for smoking cessation suggest that medication-assisted therapies (e.g., varenicline and nicotine replacement therapy, NRT) should be considered (Kleber et al. 2010). These medications are available in several formulations including transdermal patch, gum, nasal spray, oral inhaler, and tablet. They have modest smoking cessation success relative to placebo controls, but long-term abstinence rates are low (Etter and Stapleton 2006), and NRT was not found to improve outcomes when added to an existing contingency management intervention (Tidey et al. 2002). Because smoking relapse is high no matter which intervention is used, novel behavioral interventions need to continue to be explored for not only initiating but also maintaining smoking abstinence.

Although there are pharmacotherapies to address other drugs of abuse, they are less widely used. For example, the American Psychiatric Association practice guidelines (Kleber et al. 2010) recommend the use of acamprosate, disulfiram, naltrexone, and topiramate to treat alcohol use disorders. These medications may be available in settings that employ psychiatrists, but most treatment programs do not use them. Similarly, there are empirically supported medications for the treatment of opioid use disorders that have been underused (Volkow et al. 2014). Methadone, buprenorphine, and naltrexone are typically administered orally, but the Food and Drug Administration recently approved an injectable that releases a steady dose of buprenorphine for 1 month. Naltrexone is also available as once-a-month injections for treatment of opioid and/or alcohol disorders. These treatments are quite effective at reducing opioid use, but behavioral interventions targeting treatment attendance, medication compliance, or abstinence from non-opioid drugs (among individuals using multiple substances) can significantly improve outcomes beyond medication alone. BAs working with SUDs should be aware of currently approved pharmacotherapies, their eligibility and ineligibility criteria, their efficacy, and their side effects. They should also understand their basic pharmacological properties so they can understand their mechanisms of action, appropriately advocate for their use,

and design behavioral programs that will address problems with treatment compliance or concurrent use of other drugs.

Other Considerations BAs who receive specialized training on the above behavior change procedures also need to be aware of special populations that may require additional training and/or supervision. Although the behavior change strategies are basically the same, treating populations such as adolescents, pregnant women, and chronic pain patients will require special considerations. Treating dually diagnosed patients or operating as a behavior health counselor (BHC) in a primary care setting requires expertise not only in SUDs but also other behavioral health problems.

H. Selecting and Implementing Interventions

There are no new tasks to add regarding the selection and implementation of interventions, but there are a few special considerations in SUD treatment. First, when considering unwanted effects of interventions, BAs should be aware of problems that may not occur when treating other behavioral disorders. For example, before decreasing benzodiazepine or alcohol use, BAs need to consider withdrawal effects including delirium, hallucinations, and seizures and know when it is necessary to collaborate with physicians before beginning treatments. Depending on the setting, severity and type of SUD, unwanted effects during abstinence-based reinforcement may include theft of reinforcers from the clinic or from patients. Extinction or response cost seldom presents an increased risk of violence and treatment dropout, but safety of staff and patients may need to be considered. Also, BAs should be aware that others may suspect frequent negative side effects of behavioral interventions that rarely occur, such as increased use of substances that are not targeted during abstinence-based reinforcement interventions (Kadden et al. 2009). Violence between group members may be a concern if group contingencies are used. Concerns may need to be addressed by monitoring the relevant behavior and comparing baseline and treatment rates.

A second consideration comes when building collaborations with other SUD professionals. At present, BAs treating SUDs are likely to be surrounded by non-behavioral colleagues. Collaboration with some colleagues may be easy, but others may have approaches or strongly held beliefs that have no empirical basis. BAs must be prepared to manage their interactions with these colleagues and shape their cooperation or plan treatments that do not require it. Also, they will need to find professional communities that will reinforce their behavioral repertoire if it is not reinforced in their workplace.

Finally, BAs should be aware that data collection in most treatment settings is currently minimal or nonexistent. Biological verification of drug use usually does not occur frequently enough to support most behavioral programs, and often results are not readily or immediately available to counselors. Data-based decisions about the effectiveness of interventions and the need for treatment revision or ongoing services are rare in SUD treatment. BAs must be prepared for these challenges and

understand the unique opportunities that they have to introduce behavior analysis into SUD treatment.

Other Task List Items

The IC&RC task list includes items that describe traditional counseling skills, such as empathy, respect, cultural humility, and educating patients and others about SUDs. These skills are generally addressed within the behavior change strategies mentioned above (e.g., motivational interviewing) or in the ethical guidelines for BAs. Also, the IC&RC task list includes other items (e.g., educational theories, prevention), and some certifications require attendance at 12-step groups. As such, BAs seeking certification or licensure or providing SUD-specific training should review state-specific requirements.

Ethical Considerations

The Professional and Ethical Compliance Code for Behavior Analysts is generally consistent with those of the American Psychological Association and of drug and alcohol counselor certifications. However, there are ethical issues that BAs should consider when working in the SUD field. Where possible, the section or subsection code for the relevant BACB ethical guideline is referenced.

Employer Policies May Conflict with BACB Ethical Guidelines Some BCBA ethical guidelines may be difficult to uphold when working in settings with few BAs. For example, many SUD treatment programs do not adhere to the use of scientifically supported treatments nor have resources required for behavioral interventions (1.01). When applying for positions, it is important for BAs to ask about policies regarding scientifically based treatments and available resources to determine if there is sufficient flexibility and support to implement behavioral interventions. They should ask questions about the range of services currently provided in the treatment setting and whether they would be required to provide any non-behavior analytic services (8.01b). As medical issues often arise in SUD treatment, BAs need to know about access to medical consultants (3.02). They also need to ask about caseloads, as they may be expected to take a volume of supervisory activity that is not commensurate with their ability to be effective (5.02). Finally, they should be aware that SUD treatment programs have been known to discharge patients for making threats, noncompliance with program rules, and even for missing treatment sessions or continuing to use drugs. Knowing whether a potential employer would interrupt service to patients for these reasons and facilitate transfer of care elsewhere (2.15) should be considered before accepting a position with them.

Confidentiality Respecting patient confidentiality is important in most of the areas that BAs practice, but because some drug use is illegal and stigmatized, confidentiality takes on special significance in this area. Stringent federal law and regulations (42 CFR Part 2) exist protecting confidentiality of information about patients receiving SUD treatment. Treatment providers cannot speak to family members about the patient's condition without explicit permission from the patient. Treatment programs are careful about agreeing to pass on apparently innocuous messages that may imply that a person is receiving services from them as family members (or others posing as family members) may be seeking evidence of the person's SUD. Federal confidentiality rules also apply when treating minors. Although the law allows treatment providers to communicate with parents if the minor consents, it is not always requested or provided. As such, adolescent treatment often occurs without discussing any aspect of the adolescent's treatment with parents, even when the parents are paying for the services. Counselors need to be familiar with these federal and state laws and communicate them to patients. Mobile interventions also introduce new concerns regarding privacy and security due to risks associated with data breaches and hacking, and this has been identified as a primary barrier to the use of mobile health interventions (Ramsey et al. 2016).

Consent Although parental consent is required in other service areas when providing treatment to adolescents, it is not always required when treating adolescents for substance use problems. More than half of the states, by law, allow adolescents under 18 years of age to consent to SUD treatment without parental consent. BAs also need to be aware of state laws regarding minor consent.

Other Ethical Concerns Often in substance abuse treatment, BAs need to address the ethical concerns that others have regarding their interventions. For example, positive reinforcement procedures are not only thought to be coercive, but they are believed to increase relapse to substance use. BAs need to be aware of research showing that patients do not feel coerced and are not more likely to relapse even when provided large monetary payments (Festinger et al. 2005). Also, as many SUD treatment providers are recovering individuals, the IC&RC task list includes items related to identifying, addressing, and advocating for impaired professionals.

Licensing and Regulatory Frameworks

SUD treatment arose from the lay therapy movement of the early 1900s (White 1999), and by the 1950s, paraprofessionals with no formal training in the helping professions were firmly embedded in SUD treatment (Libretto et al. 2004). This resulted in a lag in regulating SUD counselors. In 2006, only about half of US states required licensure or credentialing of SUD counselors, while 88% had requirements for mental health professionals (Kerwin et al. 2006), in part because states faced the unique problem of establishing regulations without excluding many existing

counselors (Hagedorn et al. 2012). However, the field appears to be catching up to the mental health profession, as in 2012, 72% of the states required all addiction counselors to be licensed or certified, although only one state required a master's degree (CASA Columbia National Advisory Commission on Addiction Treatment 2012).

An ABA master's degree that also meets the educational requirements for licensing as a master's level psychologist would prepare students for employment in the widest variety of settings; however, most states have a separate licensure or credentialing track for addiction counselors where SUD-specific coursework and supervised practice are needed (Morgen et al. 2014). In many states, certification is sufficient to allow independent practice. In five states, there is a specific substance abuse treatment agency responsible for licensing or certifying individuals providing SUD treatment. In 25 states, this responsibility is delegated to licensing agencies that oversee a range of occupations, and 20 states work with a nongovernmental agency to license or certify individual counselors. These agencies are aligned with national credentialing bodies – either the IC&RC, the Association for Addiction Professionals, or both. Reviews of these requirements were published in 2005 and 2012 (Substance Abuse and Mental Health Services Administration, SAMHSA, 2005; NASADAD 2012). Ultimately, the only way to be sure of meeting the licensure or certification requirements for treating SUDs is to check current regulations in the state(s) where one wishes to practice. These regulations are available at <https://www.addiction-counselors.com/>.

Supervision

Providing best practice guidelines for SUD clinical supervisors presents the same challenges as for SUD counselors. Again, the IC&RC Clinical Supervisor task list was used as a guide. Two of the five task list domains (i.e., professional and ethics standards, treatment knowledge) repeat content covered in the advanced counselor task list, focusing on the supervisor's role in ensuring supervisees are competent in these areas, and suggesting greater competence, leadership, and knowledge (e.g., of laws and regulations) is required. The other three domains (counselor development, program development and quality assurance, assessing counselor competencies and performance) are mostly covered on the BACB task list regarding personnel supervision and management, but like the advanced counselor task list, the supervisor task list includes items that describe traditional counseling concepts, such as being supportive of supervisees, building a safe environment, providing education, monitoring burnout, and encouraging self-care. A task in program development and quality assurance that is unique is "recognizing and understanding the limitations of evidence-based practice." This includes knowledge and application of fidelity/adaptation reviews and assessing community needs and cultural norms. For some traditionally trained supervisors, this may suggest that empirically supported treatments are optional, stressing the need for BCBA's qualified for supervision specific to substance abuse treatment.

Conclusion

Abuse of alcohol, tobacco, and other drugs has been estimated to cost the USA over \$740 billion annually (NIDA 2017). Nearly 20 million Americans met the criteria for either dependence or abuse of alcohol or illicit drugs in 2017 (SAMHSA 2018), and 74,822 died from a drug overdose (CDC 2018). These numbers have increased significantly in recent years (SAMSHA 2018; Hedegaard et al. 2018). Considering that SUDs negatively impact not only the person with the SUD but also their loved ones, the opportunity in this field to save lives and reduce suffering is substantial.

Although BCBA certification is not sought or even recognized by most employers, interventions based on the principles of behavior analysis are among the most effective in initiating and sustaining substance abstinence. The need to have skilled behavior analysts implementing these interventions is recognized, especially in the case of abstinence-based reinforcement procedures. Hopefully, as these procedures become more widely implemented, more will realize the need to have well-trained and experienced individuals designing and supervising ABA treatments. Until then, a considerable amount of work is needed for BCBAs to be recognized as the appropriately trained and credentialed individuals to provide these services.

Nonetheless, the field of substance abuse treatment holds many opportunities for BAs. Not only is the number of positions in SUD treatment expanding, but the practice of ABA in the treatment of SUDs is in many ways still in its infancy. Further work is needed to improve our treatment of SUDs, including developing better methods for functional behavioral assessment and analysis. The treatment of patients using individual analysis designs that allow adjustments in treatment in response to patient behavior offers many opportunities for progress. These designs allow us to learn more about the factors producing variability in treatment response and in turn improve our treatments in ways that have not been possible with clinical trial research to date. Strategies for maintaining substance abstinence and desirable alternate behaviors over the long term are still developing. Thus, although there have been decades of research on ABA treatments for SUDs, the practice of ABA in clinical service settings is in some ways a new frontier offering new rewards and opportunities for exciting new discoveries.

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Behavior Analysis of Couples: Intimacy as a Vehicle for Change



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Abstract Despite the demonstrated negative impact of relational distress on individual and family functioning, behavioral training programs seldom offer students specialized instruction in couple therapy. In this chapter, we provide a brief overview of an acceptance-based behavioral approach to couple therapy. First, we discuss the conceptual underpinnings of this approach. We provide behavioral conceptualizations of both acceptance and intimacy and discuss their role in facilitating therapeutic change. Next, we explore three therapeutic tools for achieving acceptance and intimacy: uncovering soft emotions, identifying patterns, and clarifying understandable reasons. We then address several therapeutic considerations particular to couple work. Finally, we explore ethical, training, and licensing requirements relevant to work with couples.

Keywords Couples · Behavior therapy · Acceptance · Intimacy · Relationships

Background

The Importance of Treating Couples

Over half of American adults are either married or cohabitating (Pew Research Center 2016), and the vast majority of adults will spend a portion of their adulthood in committed or long-term relationships (U.S. Census Bureau 2018). About 20% of married couples are distressed at any given time (Stephenson et al. 2016). While divorce rates among younger people have begun to decline in recent years, a substantial proportion of all committed partnerships end in separation, and divorce rates continue to rise among older couples (Kennedy and Ruggles 2014). Relationship health is associated not only with greater overall psychological well-being (Kamp Dush and Amato 2005; Kim and McKenry 2002) but also with better physical health (Braithwaite et al. 2010; Choi et al. 2016) and improved child out-

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comes (Brown 2010). Thus, addressing relationship health has repercussions that extend to individuals, their families, and society more broadly.

Despite the clear evidence that relationship health is integral to overall well-being, and despite the pervasiveness of relational distress among American adults, couples' therapy is often treated as an auxiliary branch of psychological training. This stands in contrast to the need for quality couple therapy described above, and therapy training programs would do well to make couple therapy a standard part of their training modules. Fortunately, practitioners interested in applying a behavioral approach to working with couples may draw from a strong behavioral lineage which is well-supported by empirical research.

From Traditional Behavioral Marital Therapy to an Integrated, Acceptance-Based Approach

Traditional behavioral couple therapy (TBCT; Jacobson and Margolin 1979) applies a relatively straightforward, behaviorally oriented approach to treating relational distress. TBCT, put simply, focuses on identifying and changing couples' problem behaviors (Christensen et al. 2004). Drawing from social learning and behavior exchange theories (Baucom and Epstein 1990), TBCT utilizes a deficit model grounded in cross-sectional research distinguishing distressed from non-distressed couples (Cordova 2002). Within this approach, the therapist works to identify relationship skills deficits, to train partners in-session to behave differently toward one another, and to improve problem-solving and communication skills (Baucom et al. 1998).

A promising initial outcome literature suggested that TBCT was an effective means of treating relational distress (Baucom et al. 1998), and variations of TBCT – including the approaches described below – remain the gold standard for couple therapy (Cordova et al. 2014). However, subsequent longitudinal research indicated that longer-term outcomes were not as robust as hoped (Christensen et al. 2004) and that more severely distressed couples did not benefit from TBCT (Cordova 2002; Jacobson and Addis 1993). These data suggest that a uniquely skills-based approach is not effective in the long term, possibly because skills deficits mask other context-driven factors: When embroiled in an argument, partners' intense emotional response impedes their use of their otherwise effective communication and problem-solving strategies (Cordova 2002). In an effort to apply behavioral principles to couple therapy in a manner that would benefit more couples over a longer period of time, Jacobson and Christensen (1998) developed integrative behavioral couple therapy (IBCT), an acceptance-based behavioral approach which utilizes a balance of acceptance and change techniques to promote relational well-being.

This move away from a targeted, circumscribed focus on overt behavior in favor of a more emotion- and process-focused approach may surprise the behaviorally oriented therapist. However, strong behavioral principals undergird the application

of this approach to the treatment of couples, and the behavioral facilitation of *intimacy* and *acceptance* lies at the heart of this approach.

IBCT: An Overview

IBCT is predicated on the assumption that no couple is entirely compatible in all areas and that variations in personality and learning history inevitably result in some degree of irreconcilable differences between partners (Christensen et al. 2004). In other words, couples entering therapy may face challenges which are not responsive to overt behavior change attempts, often because their presenting concerns are symptoms, rather than causes, of a deeper underlying conflict. When this is the case, direct efforts to change partners' behavior will not only fail but may also increase their resistance to the therapy itself (Jacobson and Christensen 1998). In such instances, a purely skills-based, TBCT approach will likely fail to address the broader contextual factors influencing the behavior patterns in the relationship. In contrast, an acceptance-based approach, which targets partners' emotional responses to behavior, can transform challenges into opportunities to create intimacy (Jacobson and Christensen 1998).

IBCT embraces a balance of acceptance and behavior change, helping the couple to soften around those dynamics less amenable to change and to make behavioral shifts where possible. The IBCT therapist utilizes skills training, where appropriate, as one of many tools within a broader approach. Introducing acceptance into therapy provides clinicians with an additional set of therapeutic tools from which to draw when working with even the most entrenched couples (Cordova 2001). It is our experience that, while couples often arrive in therapy requesting a set of skills or tools to use, they report benefiting most from the emotional closeness and renewed connection generated through intimacy and acceptance work. Empirical evidence lends support to this clinical observation (e.g., Hawrilenko et al. 2015).

Intimacy, Change, and Acceptance in IBCT

Acceptance as a Behavior

Colloquially, acceptance is often viewed as an emotional state. In the context of IBCT, however, acceptance is both an affective stance *and* a behavior. Cordova (2001) has provided a behavioral definition of acceptance as “a change in the behavior evoked by a stimulus from that functioning to avoid, escape, or destroy to behavior functioning to maintain or pursue contact” (p. 215). In other words, acceptance is behavior which results in continued or deepened engagement with a normally unpleasant – and therefore avoided – event. In the context of couples, this might

look like a decision to stay in a room and continue an uncomfortable discussion rather than changing the subject, the willingness to listen to your partner tell you what to do *one more time*, or a choice to listen to a partner's frustration without retaliating defensively.

Helping couples to generate the willingness to initiate and engage in more acceptance behaviors requires that the therapist adopt a *contextual approach to behavior change*, in which natural contingencies within the relationship shape couples' behavior. According to this approach, therapeutic change occurs through in vivo experiences of emotional acceptance and empathic responding in the therapy room, which generalize to the couple's daily, lived experience. Couples' behavior is shaped by the consequences which naturally follow behavior within a certain environment (Jacobson and Christensen 1998), such as one partner's smile in response to a compliment or another partner's snappish response to a perceived criticism. Thus, in order for behavior change to occur, the context in which the behavior occurs – the emotional fabric of the relationship – must first shift. The IBCT therapist often does not seek to provide overt suggestions for behavior change or obvious reward and punishment for partner's adherence to this change. Rather, the therapist helps partners to alter their understanding of and approach to their emotional responses within the relationship, thus altering the context in which their behavior occurs.

Intimacy work provides a medium for this change, and restoring intimacy between partners can form the heart of a behavioral approach to couple therapy. Intimacy is fundamental to relationship satisfaction (Van den Broucke et al. 1995), and the processes governing intimacy are closely tied to acceptance. When intimacy is nurtured, partners are more willing to engage openly and honestly with one another and to form congruent interpretations of and responses to stimuli within the relationship. Thus, a more intimate partnership is one in which the *context* of the relationship is one conducive to supportive growth (Cordova 2014).

Intimacy Theory: Intimacy Sets the Stage for Acceptance

Intimacy has been conceptualized as a behavioral process by which vulnerable behaviors normally met with punishment are instead reinforced (Cordova and Scott 2001). As a result, these behaviors increase in frequency, facilitating a feeling of closeness and safety within a relationship. This is an ongoing process dependent upon mutual disclosure and reinforcement (Cordova et al. 2005a).

The intimacy process begins with partners' first vulnerable disclosures, and it continues to deepen within a reinforcing environment. Each individual brings their own unique learning history to a relationship, and this history of reward and punishment informs their willingness to engage in vulnerable behavior with a partner (Cordova and Scott 2001). For example, Chris' learning history may have taught her that disclosing sadness will be severely punished by others. When her new partner, Alex, instead responds with compassion and caring to her first expression of sad-

ness, Chris' vulnerable behavior is reinforced. This experience of caring and safety when revealing her true and unvarnished self to Alex acts as a reward and facilitates Chris' future, deeper disclosure. In other words, Alex's behavior reinforces Chris' emotionally vulnerable behavior. Further, it increases the probability that Chris will, in turn, create a similar environment of safety and love for Alex. In this way, intimacy creates the relational context of trust, safety, and closeness most conducive to relationship growth, satisfaction, and acceptance.

However, as the frequency of intimate disclosure within a relationship increases, the risk of punishment – either intentional or accidental – increases concurrently (Cordova et al. 2005a). For example, on a particularly stressful day, Alex may snap at Chris when she expresses sadness. This behavior functions as punishment, acting as a suppressive event on Chris' vulnerable behavior. If the proportion of these suppressive events is greater than that of reinforcing events, overall intimacy will suffer and relationship satisfaction will deteriorate (Cordova 2002). Indeed, an overall ratio of five reinforcing events for every one punishing event experienced in a relationship has been established as the threshold for marital satisfaction (Gottman 1993). Thus, over time, the overall context of the relationship may shift from one conducive to mutual reinforcement, trust, and acceptance to one more likely to promote conflict and distance.

The behavioral couple therapist seeks to reset this balance: to increase the probability that vulnerable behavior will (re)emerge and that this behavior will be met within the relationship in a reinforcing way. The therapist's primary tools for fostering this contextual shift are uncovering *soft emotions*, recognizing and labeling *patterns*, and identifying *understandable reasons* within the relationship. While we will discuss these tools separately, they are interrelated. Working with one will facilitate and reinforce work on another.

Fostering Intimacy in Therapy

Soft Emotions

Couples often present for therapy reporting feelings of anger, contempt, frustration, and exasperation. Such emotions, which we call *hard emotions*, and the behaviors that accompany them create a relational context which evokes withdrawal, defensiveness, and rigidity. Couples' behavior in the therapy room may convey these hard emotions overtly, via raised voices, insults, accusations, or name-calling. Alternately, couples' behavior may communicate their emotions more subtly: through silence, by placing physical distance between one another, or through lack of eye contact. Far from creating a context conducive to intimacy, hard emotions can occur with an intensity that is often referred to as emotional flooding. In these circumstances, there may be expressions of intense emotions that are under relatively narrow (typically aversive) stimulus control which hampers the partners' abilities to draw upon otherwise effective communication or problem-solving skills.

Hard emotions present a tough, unrelenting, and antagonistic veneer that often covers feelings like sadness, worry, loneliness, or love. These more vulnerable emotions, or *soft emotions*, can be frightening to couples – they reveal a more sensitive side open to hurt and rejection. It feels safer to take a combative stance than to reveal one's fear or loneliness. However, while hard emotions close the door to intimacy, soft emotions create a context which elicits and reinforces openness, receptivity, and connection. When couples are able to access and display their softer emotions, they are better able to both initiate and reinforce displays of intimacy.

It is the job of the therapist to listen for the soft emotion behind the hard one – to hear the hurt behind the anger, the loneliness behind the hostility, and the loving concern behind the frustration. In other words, it is the job of the therapist to transform moments of hardening and antagonism into opportunities for intimate connection. By listening carefully for the emotional content behind partners' words and behavior, or by directly asking about soft emotions when necessary, the therapist can draw soft emotions into the therapy room by reflecting and emphasizing emotional content of couples' disclosures. In more behavioral terms, the therapist is looking for opportunities to establish formative augmentals (i.e., creating a reinforcing stimulus where none existed before) or, more frequently, to identify and highlight motivational augmentals (i.e., capitalize on the couple's established history of effective verbal responding to one another).

For example, Jamie may exclaim in therapy, "I just get so pissed off when Carlos comes home and goes straight to the TV. What, I'm just supposed to sit at home waiting for him? He can't take two seconds to say 'Hi, babe, how was your day?'" He's so self-centered." Rather than reflecting Jamie's anger and frustration, the therapist might say, "So Jamie, when Carlos is late and doesn't greet you when he comes home, you feel really sad and disappointed – and maybe even a little lonely. You miss him when he's gone, and you really look forward to that connection at the end of each day." In this way, the therapist is emphasizing the vulnerable emotion underlying Jamie's anger and resentment, creating a context for affirmation and connection.

When the therapist accurately identifies and reflects the soft emotion underlying a harder one, the context in the room immediately shifts away from hostility and toward intimacy. A reflection of hard emotions might elicit angry defensiveness from Carlos: "Well, if you didn't immediately jump on my back when I got home maybe I'd *want* to come home earlier and hang out." Shifting focus to soft emotions, however, increases the probability that Carlos will respond with compassion and understanding and the potential that he will recognize his own softer emotions: "Oh...I didn't realize you felt that way. I miss you, too, during the day – I just feel really overwhelmed when I get home and sometimes I don't know how to handle it."

As couples practice identifying and disclosing the soft emotions in therapy, they are better able to create this same context outside of therapy. They learn that their vulnerable disclosures are generally met with reinforcement, either directly through their partners' words or indirectly through the feelings of relief, warmth, and connection that follow a shift toward soft emotions. Thus, the behavior practiced in therapy generalizes as the overall emotional context of the relationship begins to evolve.

Identifying Patterns

Often, the seemingly disparate conflicts which emerge across various domains of couples' lives – finances, parenting, sex, household tasks, communication – are in fact informed by and representative of a single overarching pattern. In behavioral terms, the pattern serves as a *response class* or a set of related behaviors which may look different on the surface but which have essentially the same effect across situations (Jacobson and Christensen 1998). Problematic behaviors can therefore be thought of as symptoms of an underlying problem: partners' efforts to change the pattern by changing one another and the emotional context this creates within the relationship.

Patterns usually develop early in a relationship as a result of differences between each individual's personalities and behavioral repertoires. In fact, upon reflection, many partners report that the thing that now most irritates them about their partner was the quality they found most attractive at the beginning of their relationship. Patterns only create conflict when couples deem these naturally occurring differences to be uniquely problematic. In this context, couples often engage in rigid behaviors aimed at changing one another, creating a context of emotional distance and reactivity which decreases intimacy and sustains relationship challenges (Jacobson and Christensen 1998).

For example, Stacey's spontaneity, positive outlook, and high energy captivated Amari when they first met, especially in contrast to Amari's quieter, more measured approach to life. Stacey, in turn, loved the feeling of calm and stability he felt around Amari. Over time, however, and especially as their mutual responsibilities increased with children and a shared household, Amari began to view Stacey's spontaneous behavior as careless and frustrating. Amari began to feel like the only responsible adult in the family and that Stacey was unreliable and did not take Amari's concerns seriously. Stacey, on the other hand, thought that Amari worried too much, wasn't enjoying life, and was constantly nitpicking. They bickered and criticized one another frequently, and each felt they could no longer be authentic and vulnerable with the other. Both thought that, if their partner were willing to change their behavior, the relationship would be fine. We might label this pattern "conventionality/unconventionality" – one partner prefers a lifestyle which is predictable, stable, and dependable, while the other prefers a more spontaneous, carefree lifestyle (Jacobson and Christensen 1998).

Partners not only become entrenched in these patterns but are also frequently blind to them. Caught up in the minutia of day-to-day life, it is hard to recognize the link between arguments about the dishes and arguments about parenting philosophy or who should walk the dog. Nevertheless, a functional analysis of partners' behavior will reveal a common thread. While the content of various arguments might vary considerably, the behavior each partner displays within those arguments remains relatively constant and serves a similar *function* across situations.

Thus, another role of the therapist is to listen for the function of the behaviors couples describe or display in therapy. How do couples' words or actions reveal

efforts to change one another? Are there categories of behaviors, statements, or accusations that evoke a similar response across situations? How are partners responding to one another in the therapy room? Following the example of Stacey and Amari, the therapist may observe that – regardless of the topic of conversation – Amari lashes out any time Stacey implies that Amari is worrying too much or when Stacey forgets to follow through with a task he agreed to take on. Similarly, whether the discussion surrounds parenting, plans for the weekend, or housework, Stacey may shut down, turn away, or laugh derisively when he perceives that Amari is attempting to place unreasonable limits on his time or behavior. Each of these behaviors, aimed at criticizing or changing the other, serves to increase the emotional distance between the partners. Each partner feels limited in expressing their authentic self to the other, and each engages in counterproductive efforts to change the other.

Identifying and labeling a couple's pattern serves several purposes. First, simply discussing the pattern and its origins can create a vehicle for intimacy (Cordova 2014). Asking partners to tell their story reminds them of the characteristics they initially found attractive in one another, challenging their judgment of these characteristics as uniquely negative. It begins the process of creating new associations with these traits and the behaviors associated with them, helping to reframe areas of conflict as more complex than simply "you need to change because you are flawed."

Second, unpacking a couple's pattern helps to identify historical and current antecedents of the couple's behavior. It also clarifies how these processes perpetuate conflict through each partner's responses to relevant stimuli. In other words, identification and examination of a couple's pattern contributes directly to the functional analysis of the couple's behavior. This functional analysis aids both case conceptualization and the intervention itself, helping the therapist to accurately assess the couple's behavioral functioning and identify opportunities for effective intervention.

Finally, identifying and labeling a pattern also helps couples to externalize, or gain distance from, the problem (Jacobson and Christensen 1998). Couples caught in destructive behavior patterns feel personally attacked by their partner's efforts to change them. When the pattern rears its head, couples often become emotionally flooded and default to habitual behaviors which increase conflict and decrease intimacy (Cordova 2002). By identifying and labeling the pattern, the therapist places it outside the couple, almost as a third entity in their relationship. Partners are then better able to see the pattern as though through the eyes of an observer. This observer stance helps couples to see the function of their behavior within the context of the relationship *and* helps them to begin decoupling their emotional responses from the content of an argument. Further, it helps partners to actually unite around the problem and view it as something which they can address together (Jacobson and Christensen 1998).

As the couple becomes better practiced at recognizing the presence of the pattern themselves (without the therapist's help) and uniting around it, they begin to shift the context of disagreements from one of polarization to one conducive to reciprocity and closeness. Indeed, helping partners to reframe their narrative from one of hardening and blame to one of collaboration and empathy constitutes a primary

therapeutic tool. Within this new, altered context, partners are more likely to initiate displays of vulnerability. They are also less likely to criticize, blame, or try to change one another – behaviors which all punish vulnerability and reinforce distance.

Understandable Reasons

Clarifying the *understandable reasons* driving partners' behavior is another way in which therapists can transform conflict into opportunities to foster intimacy (Cordova 2014). When couples are in the throes of an argument, it can feel nearly impossible to understand the other person's perspective, let alone to cultivate empathy for their experience. The therapist, as a neutral observer, can more easily imagine or inquire about why partners do what they do – where did this person learn this behavior? What are the thoughts, emotions, or beliefs driving their actions? Ascertaining the understandable “why” behind behavior may involve harking back to an individual's childhood experience, to the beginning of the relationship, or to the couple's pattern. Is there something specific in this person's social learning history that makes them particularly reactive, unwilling to compromise, or sensitive to criticism? Is there an aspect of the couple's pattern that really draws out this behavior?

Perhaps the greatest value in clarifying and highlighting understandable reasons is that they help to build empathy and compassion. These experiences, in turn, promote greater intimacy and acceptance between partners, even in problem areas (Cordova 2014). When each partner can empathically understand how the other came to play a role in their shared problem as a direct result of, for example, difficult childhood experiences and softer emotions, they are more willing to treat one another with gentleness and care. In this way, the context surrounding the couple's difficult pattern begins to shift from one exclusively eliciting conflict, avoidance, and blame to one which *also* elicits vulnerability and closeness.

Continuing with the example of Amari and Stacey, Amari's adherence to a schedule, lack of flexibility, and criticism of Stacey seemed excessively rigid even to the therapist. The slightest deviation in plan, or Stacey's failure to follow through on even the smallest task, resulted in a disproportionate display of distress, often culminating in name-calling and shouting. This seeming mismatch between the antecedent (deviation in plan) and response (name-calling and shouting) was a clue to the therapist that she needed to further investigate the reasons behind Amari's behavior.

Exploration of Amari's background revealed a difficult, chaotic childhood. Amari's single mother worked multiple jobs to keep the family afloat. They often had to move to new cities or apartments based on the cost of rent and on Amari's mother's employment status; sometimes these moves would occur twice per month. Just when Amari started to get used to a new environment, the landscape shifted and Amari had to start over again. While the family sometimes lived in nice, well-cared

for buildings, they also spent time in less comfortable places where Amari heard and saw frightening things. Amari's busy mother was usually not around to explain or distract from these experiences.

As the therapist inquired more pointedly about Amari's lived experience, Amari shared the following: In addition to feeling frustrated and off-balance with each move or unexpected turn of events, Amari grew up feeling deeply fearful of change or uncertainty. Further, Amari felt profoundly alone and uncared for. These last emotions were especially upsetting to Amari – acutely aware of his mother's hard work and untenable position, he felt guilty and ashamed that he ever doubted her love.

In response to this unpredictable environment, Amari developed an effective coping repertoire which helped to minimize uncertainty and the distress that followed it. By predicting, planning, and controlling as much as possible, Amari was able to avoid the cocktail of emotion brought on by uncertainty. Of course, Amari brought this strategy into the relationship with Stacey. When Stacey changed plans abruptly, Amari often felt thrust back into that childhood emotional experience. Amari felt the rug pulled out and described feeling the same clawing combination of fear, loneliness, and guilt that he felt as a child.

While Stacey knew something of Amari's childhood, she had never heard Amari disclose these specific feelings. Further, neither of them had seen the connection between Amari's strong emotional responses in their day-to-day life and Amari's deep beliefs about uncertainty and love. For the first time, Stacey was able to better understand why Amari reacted so strongly and to empathize with the emotional experience driving his behavior. Further, Amari began to recognize fear, uncertainty, loneliness, and guilt as emotional clues that something more might be at play than simply Stacey's behavior. Thus, uncovering the understandable reason driving Amari's behavior transformed an area of conflict into an opportunity for intimacy.

Putting It All Together

The techniques described above are rarely used in isolation, and use of one alone is rarely sufficient to cultivate significant improvement in most couples. When utilized together and over time, however, these tools can alter the functional context in which couples operate and steer them toward enhanced intimacy and acceptance. By correctly identifying and labeling a couple's pattern, consistently drawing out soft emotions, and helping each partner grasp the understandable reasons driving their own and their partner's behavior, the therapist begins to shift the contingencies driving partners' behavior within their relationship.

Special Considerations in Working with Couples

Many of the skills therapists utilize in individual therapy are also helpful in couple work. For example, individual-level functional analysis, deep listening, paraphrasing, and reframing are all skills which transfer well to work with couples. However, the successful treatment of couples requires a special skill set in addition to those described above. While a full overview of these skills is beyond the purview of this chapter, we will highlight several important therapeutic and ethical considerations. For a more comprehensive discussion of the basics of working with couples, see Cordova 2014, Chap. 2.

Balancing Regard for Both Partners

While a therapist may certainly strive to balance empathy and consideration for both partners in a dyad, most therapists will occasionally find themselves aligning more naturally with one partner or the other. However, it is essential for a couple therapist to maintain a positive working relationship with both partners and to be viewed mutually as a balanced and understanding entity (Cordova 2014). If a couple perceives the therapist to be taking the part of one partner against the other, therapy will not progress. In such a case, the therapist might feel caught in the same frustrating pattern as the partners.

Therapists can employ the same strategies they use to help couples empathize with one another to strengthen their own empathy toward partners. Identifying understandable reasons, as well as searching for soft emotions below off-putting behavior, can be particularly helpful. Therapists are also urged to seek appropriate consultation or supervision when they find themselves stuck or when one partner evokes a particularly strong reaction. Most important is the therapist's ability and willingness to recognize when they are becoming more aligned with one partner than the other and to take steps to address this immediately.

Managing Conflict

Another skill particular to couple therapists is the ability to manage conflict effectively and to maintain a therapeutic environment even in the presence of heated argument and confrontation (Jacobson and Christensen 1998). The presence of an angry, dysregulated couple can feel destabilizing and frightening, especially to a therapist new to couple work. To the extent that the therapist can remain attuned to and respectful of their own emotional response and continue to observe the function of partners' behavior, they will learn to cope effectively with couples' arguments. It is helpful to intervene early by recognizing a couple's triggers, preventing partners

from interrupting each other, and maintaining a firm, warm demeanor (Cordova 2014). Early intervention will prevent complete emotional flooding and help to transform disagreement into an opportunity for growth.

Ethical Considerations Specific to Couple Therapy

Professional organizations, such as the American Psychological Association (APA) and the Behavior Analyst Certification Board (BACB), maintain ethics codes to which they hold their members accountable. A full review of these procedures is beyond the scope of this chapter. However, we provide a brief overview of some key areas of overlap and contrast between these two codes.

Both the BACB and the APA ethics codes prohibit therapists' multiple relationships with clients (i.e., when a therapist maintains an additional relationship to a client above and beyond their role as a therapist, such as a friendship or professional relationship). These issues can become particularly complex in the context of couple therapy. It is not uncommon, for example, for an individual client to ask her therapist to begin treating herself and her partner as a couple or for partners to ask their couple therapist to treat them each individually. While this approach may seem practically appealing, it is strongly discouraged. Working with clients in more than one capacity, such as individual and couple therapist, runs the risk of creating multiple relationships. It clouds the therapist's objectivity and impedes their ability to effectively treat all parties. The APA ethics code (but not the BACB ethics code) directly addresses this issue in the context of couple and family therapy, stating that the therapist must explicitly clarify their role with each partner or family member (American Psychological Association 2017). The BACB ethics code (Behavior Analyst Certification Board 2014) does, however, state that a BACB therapist must similarly clarify their role vis-à-vis all individuals referred by or to any third party (e.g., referring bodies, including couple or family therapists).

The BACB ethics code (but not the APA ethics code) includes explicit guidelines for conducting ethical behavior analytic assessment, as well as guidelines for proceeding with a behavioral treatment plan with clients' full informed consent. These are general guidelines not specific to couples. Behavior analysts interested in adapting these guidelines more specifically to couple therapy are encouraged to seek training or supervision from a licensed couple therapist, as we discuss in more detail in the following section.

Finally, there is a high likelihood that couples seeking therapy may argue frequently, and it is always possible that arguments might become physical. Especially when children are present in a couple's home, it is particularly important for couple therapists to be aware of federal and state laws governing mandated reporting. Both the BACB and the APA ethics codes stipulate that therapists should clearly communicate these laws to couples as part of the informed consent process. Therapists should also be familiar with the appropriate authorities and resources to contact

when child endangerment is suspected, as well as local resources for victims of domestic violence including shelters, hotlines, and victim resources centers.

Training and Licensing Procedures for Working with Couples

There are both master's and doctoral-level training programs that prepare students to work with couples. Master's level programs which prepare students for clinical practice include master's degrees in social work, counseling, and mental health. The only master's level program which specifically prepares students for careers as couple therapists is a master's degree in marital and family therapy, which would prepare students to become a licensed marital and family therapist (LMFT). Master's programs typically require 2 years of study not including supervised post-master's licensing hour requirements, which vary by state.

Doctoral programs which prepare students for clinical practice include a Doctor of Philosophy in Psychology (PhD in Clinical Psychology), a Doctorate of Psychology (PsyD), and a Doctorate of Philosophy in Counseling Psychology (PhD in Counseling Psychology). While some doctoral programs do offer high-quality training in the delivery of couple therapy, most programs require that interested students independently seek this training through clinical placements in the community. Doctoral programs require a longer time commitment than master's programs (typically 5–7 years not including supervised postdoctoral licensing hour requirements, which vary by state) and include an emphasis on conducting research.

Given the important differences between individual and couple therapy, we strongly recommend that any student interested in working with couples look closely at the programs to which they are applying to assure that specific training in couple interventions is offered. If the program itself does not offer training in couple therapy, interested students or professionals have several options. First, as stated previously, students may seek clinical placements which offer training in couple therapy. Community mental health centers and Veterans Affairs Hospitals often offer such experiences. Second, individuals may attend workshops or clinical training programs which offer training in couple therapy provided by experts in the field. Such training could occur either while a student is enrolled in a training program or post-licensure, as a form of continuing education. We recommend that individuals look to established professional organizations, such as the Association for Behavioral and Cognitive Therapies or the American Psychological Association, for training opportunities. Third, students or young professionals may seek ongoing supervision from practicing couple therapists until they become competent in identifying, assessing, and addressing issues specific to couple therapy.

Practitioners working with couples must be licensed in the state within which they practice, which requires passing a licensing exam (often a jurisprudence exam testing knowledge of applicable state laws). Most states do not require a special license to work with couples above and beyond the general license required to practice. However, given the special considerations we have outlined above, practitioners

wishing to practice couple therapy *should* seek specialized training in this domain. Indeed, both the APA's and the BACB's ethics code emphasize the necessity of conducting therapy only within the boundaries of competence in order to maintain an ethical clinical practice. Finally, regardless of degree type, all practitioners must pursue regular continuing education in order to maintain licensure.

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Part V
Non-clinical Settings

Behavior Analysis in Business



Byron Wine and Eli T. Newcomb

Abstract This chapter describes the area of behavior analysis that focuses on improving human performance in business settings: organizational behavior management. Organizational behavior management (OBM) is a large area of practice with several subspecialties (e.g., safety and systems) and a variety of different employment opportunities. While few behavior analysts will own or consult in businesses, most will likely supervise employees at some point in their career – this makes OBM one of the more important disciplines within behavior analysis. In addition to defining the field broadly, this chapter will present different areas of interest to individuals new to OBM including unique ethical issues and how to enter this diverse field.

Keywords OBM · Business practice · Behavior analysis

Overview and Introduction

Applications of behavior analysis to business abound. Utilization of behaviorally derived tactics in business is somewhat heterogeneous, as there are countless sectors and settings, socially important business behaviors and activities, and various points of input in terms of influencing human behavior (e.g., company leadership, employees, customers, third parties such as subcontractors, and the public at large and who may interact with facets of the company). While not an exhaustive inventory, the following research-based and descriptive accounts exemplify the range of settings where behavior analysis is found in business: restaurants and grocery stores (Downing Jr et al. 2018; Clayton et al. 2014), trades such as welding (Blasingame et al. 2014), construction companies (Lee et al. 2014), sales and telemarketing (Copeland et al. 2018; Tilka and Johnson 2018), customer service departments

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(Slowiak 2014), retail distribution centers (Goomas et al. 2011), the insurance industry (Frederiksen et al. 1985), telecommunications (Rodriguez 2011), myriad human service sectors (see Gravina et al. 2018), and many more.

Examples of behavior analytic tactics used in business have also spanned small businesses, mid-sized companies, and larger corporations (e.g., Gaetani et al. 1983; Godat and Brigham 1999; Rodriguez 2011). Applications may include the use of external consultation versus in-house behavior analysts, wide-ranging goals (e.g., improving employee health or safety, increasing profits through systems analyses or process redesign, decreasing turnover, managing performance, etc.), and to assist in building a new company, reshape a mediocre organization, or to help save a failing business.

The subspecialty within applied behavior analysis (ABA), organizational behavior management (OBM), focuses on using procedures based on principles of behavior to influence the actions of the individual and groups of individuals within an organization, to achieve one or multiple important goals. While an in-depth overview and discussion on OBM and the work of OBM professionals is beyond the scope of this chapter, it should be pointed out that OBM professionals *are* behavior analysts and represent a sizeable portion of the workforce we will discuss – those who use their training and expertise to influence company practices, employee behavior, and business success.

As behavior analysis becomes increasingly relevant and sought after in business settings, it is important to further our understanding of what skills and competencies are needed to be effective – as either a consultant or company-employed behavior analyst – and how to build and obtain such acumen. Applications of behavior analysis to business have unique ethical challenges and considerations, and we will elaborate on those, as well as on approaches to solving prospective ethical problems across a variety of business environments. We will also briefly discuss the topics of credentialing and regulation of behavior analysis in business and how one may develop the skillset necessary to work in this area. In short, this chapter aims to equip the reader with a general understanding of how behavior analysis intersects with business and how one might go about pursuing training and skill-building in this area and review some of the most key, intertwined behavior analysis-business considerations.

Best Practices, Skills, and Competencies

As a field, OBM has several practice areas. However, most published research demonstrates behavior change in a single or small number of employees in an organizational context. This type of investigation is likely to be easily recognizable to behavior analysts as it involves the operational definition of targets, developing reliable measurement strategies, conducting assessment, intervening, and monitoring the targets to assess success – all things behavior analysts regularly do within a clinical context. Some practitioners use the term performance management (PM) to describe the practice just detailed.

Behavior analysts will likely be familiar with the general process found in PM, and thus it is often a matter of familiarizing and practicing under competent supervision as the specific measures, assessments, and interventions (both antecedents and consequences) are similar to clinical practice but modified to work with the population – usually neurotypical adults. For example, the assessment of choice for many PM practitioners is the Performance Diagnostic Checklist (PDC). The PDC allows PM practitioners to conduct a structured informant interview with employees and management to inform the selection of interventions. In clinical practice, most behavior analysts would follow an indirect assessment with a direct assessment to verify the results. However, due to the intrusiveness and difficulty in arranging for direct assessments in work settings, these procedures in PM are rare, albeit not unheard of (Therrien et al. 2005).

A typical PM intervention involves identifying a small number of target variables the employees can control that have a financial or other significant impact on the organization. OBM specialists then operationally define these targets, measure, and graph them. The methods used to measure are likely to be the most interesting change for most practitioners as performance matrices or other tools are implemented. Practitioners then conduct assessments to select interventions from among one or more of four categories: training, antecedents, work design (also referred to as *processes*; this might be conceptualized as the job tasks being effectively arranged by the organizations), and consequences. Practitioners then select one or more interventions, measure the results of the intervention, and measure the impact the change in employee behavior has on the business (i.e., did we make more money, save waste, improve outcomes, etc.). Practitioners will find the basic PM procedures vital to practice as they train and manage small groups of employees. We recommend starting with a seminal text in this area: Daniels and Bailey (2014).

Once the basics of performance management have been mastered, additional topics may be of interest. Behavior-based safety (BBS) is a unique application of behavior analytic techniques designed to increase safety-related behavior, thereby reducing employee injuries over time. There are several examples of the effectiveness of these techniques in the empirical literature (e.g., Fox et al. 1987; Sulzer-Azaroff et al. 1990). Safety relates not only to obvious dangers (e.g., wearing hard hats to protect against falling debris) but to everyday behavior that could cumulatively result in injury (e.g., poor posture while typing at a clerical job). The issue of safety is relevant to all areas of ABA practice, but the specific procedures often implemented in BBS, while not overly complex, address unique challenges. Unsafe behavior typically is maintained by immediate reinforcers, and aversive consequences for the behavior occur on very lean schedules. Furthermore, safe behavior is often cumbersome and insufficiently supported to compete with unsafe behaviors. BBS can be an especially difficult area for new practitioners. For example, in safety there are regulatory issues, occasional resistance to BBS from unions (Agnew 2016), and the overarching consideration of employee health and welfare to consider. Any practitioner wishing to work in this area would likely need to find a mentor and work closely with her over a long period of time to avoid the many potentially pitfalls in this area.

Many practitioners of OBM often consider businesses from a systems perspective and often call what they do behavioral systems analysis (BSA). That is, a business has many overlapping systems or processes by which inputs (e.g., raw materials) are turned into consumable goods. In this model, PM, or performer-level interventions, are only one method to intervene in an organization. Employees or consultants could also intervene and the process or organizational levels. These techniques are only taught in a handful of ABA universities (at the time of this writing and often constitute higher-level (i.e., doctoral) study). Those with a degree in behavior analysis and coursework in PM techniques may find it helpful to explore outlets such as industrial-organizational psychology as well as other Lean or Lean Six Sigma programs as the training options within behavior analysis are so limited. Systems analysis is appropriate for behavior analysts who find themselves in leadership roles or are pursuing careers in external consulting. Interested readers who want a detailed introduction may wish to start with Rummeler and Brache (2013).

Performance management, safety applications, and systems work represent the most common practice areas in OBM. There are other areas that professed OBM specialists may work in (e.g., training or instructional design or the analysis of consumer behavior). Self-study along with continuing education and mentorship is likely sufficient for performance management, but the more advanced subspecialty would likely require somewhat lengthy direct mentorship to gain the skills needed.

As a conclusion to this section, we should note what OBM is not. OBM is not human resources, entrepreneurship, or finance. OBM practitioners specialize in employee behavior and how work is completed in organizations. Occasionally, OBM is conflated with topics that are covered in business schools or human resources programs. While there is obvious overlap in these areas, it must be noted that while the principles of OBM is essential to operating a business, it is not sufficient.

Ethical Considerations

OBM practitioners come from many training backgrounds, and as this is an unlicensed profession, they are not held to a specific set of ethical standards. Since most OBM practitioners are trained in within behavior analysis programs, it is intuitive that we look at the ethics code from the organization that certifies behavior analysts. The Professional and Ethical Compliance Code for Behavior Analysts (https://www.bacb.com/wp-content/uploads/BACB-Compliance-Code-english_190318.pdf) aims to cover all areas of ABA practice; however, the content is more clearly targeted toward traditional ABA clinical settings. For example, sections describing mandates to recommend a medical consultation if they suspect biological variables may be impacting behavior are simply not relevant in an organizational setting. That being said, the code does have some elements that may be useful, and individuals who possess certification from the BACB® are beholden to abide by the ethical code.

The ethics code of the American Psychological Association (APA) characterizes broad guiding principles that can be useful as well as specific guidance on reconciling conflicts between individuals and organizations (American Psychological Association 2016). The code is not enforceable per se but, rather, is designed to guide psychologists to reach the best decision in a given circumstance. As the APA contains many divisions that include multiple practice areas, the code is written broadly and is used by practice areas close in scope to OBM (e.g., I/O psychology).

The International Society for Performance Improvement (ISPI) also has an ethical code. ISPI is a behaviorally friendly organization of professionals dedicated to improving performance and making the work environment a better place, and as such they overlap with OBM. Like the APA, the code is not enforceable but exists to provide guidance when confronted with a variety of situations.

The ISPS ethical code contains six guiding principles (https://www.ispi.org/ISPI/Credentials/ISPI_Code_of_Ethics.aspx). ISPI members are encouraged to add value to organizations in their actions. Members are also encouraged to use validated principles when recommending organizational change procedures. Members are also advised to work collaboratively with others, continuously improve their own skills, uphold integrity, and maintain confidentiality of employers. The description of the code elements was designed to be flexible enough to allow practitioners to use a variety of intervention strategies, to influence a wide variety of outcomes, across numerous industries.

Taken together unless an OBM practitioner is certified as a behavior analyst, she is not beholden to a specific, enforceable code of conduct. However, there are many guiding principles that cut across all of the aforementioned codes (e.g., confidentiality practices). A widely applicable code with general recommendations is likely the best avenue for OBM practitioners who, unlike some other more clinically oriented specialties, may find themselves confronted with relatively novel settings and challenges in every consultation.

Credentialing and Regulations

At the current time, there is no specific licensure or certification required to work in OBM. Since many OBM specialists come from behavior analysis programs, they may elect to become BCBAs and will then be beholden to the BACB® regulations. However, a fair number of OBM practitioners do not elect to become certified as behavior analysts, likely because the certification does not provide any particular advantage in business settings.

Many OBM specialists market themselves as experts in “behavior science” or “behavior change” or as “behavior engineers” or some other derivation that identifies that their training is grounded in behavior analysis. They may even elect not to use the term behavior analyst for fear of sounding too clinical in business-oriented settings. The word *behavior* itself has varying connotations dependent to the envi-

ronment in which it is used. One thing future OBM specialists will have to attend to is the ongoing spread of licensure in behavior analysis. At the time of writing, 30 states license behavior analysts, and likely more are to follow. Since practice and title restrictions are unique to each state, OBM specialists will have to attend closely to the rules where they practice and ensure they are not practicing without a license or using a restricted professional title.

Training and Supervision

There does not exist sufficient data to determine how OBM specialists are trained. What follows is an account of how the authors have seen most OBM specialists receive training. Most, but not all, OBM practitioners are from a behavior analysis graduate programs. As such, most OBM practitioners hold master's degrees, while a few have received PhDs – the latter group tends to originate from one of a handful of programs that offer doctoral-level training in OBM.

Curricula in the OBM-focused programs tends to vary from one institution to another. One key differentiator seems to be systems analysis. OBM programs often provide one or more courses in behavioral systems analysis – systems is not included in the task list and is not used in clinical services, so these are not often found in clinically oriented programs. Other advanced coursework include practicum-style experience, instructional design, and behavior-based safety coursework. Occasionally electives through business colleges allow OBM students to take coursework that, while not OBM in nature, is certainly complimentary to a career in business (e.g., accounting, finance, and entrepreneurship).

Those coming from traditional ABA university programs may receive some amount of training in supervision and personnel management. We suspect this will increase as the fifth edition of the BACB task list is faded in as it includes a section called "Personnel Supervision and Management." The management section of the task list, from our perspective, is largely a mandate to train all behavior analysts in the basics of PM. Although the task list does not use language specifically found in many common PM procedures, the mandates are the same. For example, the mandates to establish clear performance criteria, use competency-based training, and implement feedback are all core strategies found in the PM literature. Likely, this exposure, followed by the natural contingencies arising from managing groups, will lead to increased interest in OBM over time. This group will still likely have very little in the way of formal practice in OBM (most programs are tailored to prepare students for careers in clinical fields, and so hire faculty primarily with that experience) or a complete skill set developed from the additional coursework found in one of the few programs that specialize in OBM and will likely require a mentor postgraduation.

This is not to say that it is impossible to receive significant training in OBM should experienced OBM faculty have appointments at clinically oriented programs. It is possible for these faculty to use established recommendations and best

practices for behavior analysts at large (e.g., Sellers et al. 2016b) and guidance on how to incorporate practice area-neutral considerations into behavior analytic training and supervision of aspiring OBM professionals (Luke et al. 2018). As an example of a skill that has found its way to all graduate programs consider, behavioral skills training (BST) (Miltenberger 2003). BST is a well-established, dominant approach to building new competencies and is ubiquitously incorporated into training regardless of subspecialty. Behavioral skills training combines the elements of instruction, modeling, practice/rehearsal, and feedback and is well-known for its effectiveness and range of areas in which it has been shown to be effective (e.g., Sawyer et al. 2015; Rosales et al. 2009). The OBMNetwork maintains a list of graduate programs on its website: www.obmnetwork.com. This list includes both the limited number of full OBM programs and clinical programs with OBM specialists on faculty.

A third group of OBM practitioners have significant training in I/O or business and add in the behavioral perspective later. A final, and growing, group of OBM practitioners develop an interest after receiving a clinical education. These individuals often seek BACB continuing education (as they mostly hold the BCBA) in the area of OBM and engage in independent study. This group would also require significant time under the mentorship of established OBM professionals after they have completed their educational experience.

As mentioned earlier, OBM has a wide variety of applications and skills that are simply not in repertoire in many ABA programs. With the noted exception of a few programs, advanced systems analysis is simply not taught. This is problematic in that not only are these skills required for effective practice but that many in business will be familiar with tools such as process maps, and lacking this information would be tantamount to admitting ignorance of an area one claims to be an expert in to an employer. One last problem is that while there are a number of tools and perspectives, the advanced skills required to practice OBM have not been codified – resulting in practitioners engaging in similar, but still unique, perspectives on practice and the methods by which to achieve results. For example, in her book, Malott (2003) describes five levels of analysis within an organization, while Rummeler and Brache (2013) state that there are three levels of analysis.

The dearth of university programs and experienced practitioners from whom one can learn, along with disagreements within the field about core competencies, leaves anyone not attending one of the few dedicated programs with significant challenges. Likely, as mentioned earlier, prospective OBM practitioners will have to be mentored by locating an experienced OBM practitioner and contracting with her for a period of time. Often this means regular meetings with the practitioners who will likely recommend readings and supplement learning with examples and lectures but mainly will serve to guide one through a number of consultations.

Members seeking entrance into the field may have trouble finding organizations willing to allow those new to OBM to come in and make significant changes. Many seem to start by running small projects within their current place of employment. This has several advantages in that employers are more likely to allow their own employees some leeway as opposed to a stranger cold calling from the street. A

second option is offering services for free to a local company. Likely, the newcomer will have to spend some amount of time approaching organizations before one is willing, but this is not a bad thing per se, in that selling services is a necessary skill for OBM practitioners. This option has its own advantages in that the business will expect results and the experience will more closely resemble an actual consultation, no matter which option one chooses. As stated earlier, it is not unusual to work for free while building a portfolio and gaining skills. Even if you conduct a project in the organization you work for, be prepared to assume the additional responsibilities outside of normal duties.

A final option for entering OBM is to take I/O coursework. There have been calls for the integration of OBM and I/O over the years (Geller 2003a, b). There has also been vocal opposition to this idea (Malott 2003). The field of OBM in general has seemed to have landed on the side of not incorporating more content and staying true to roots of radical behaviorism. However, it should be noted that several graduate training programs listed on the OBMNetwork website contain I/O in the title. In fact, arguably the most prestigious program for OBM training is at Western Michigan University and is in fact an I/O program; this is likely because I/O is a fairly broad field comprised of multiple theoretical orientations, and while OBM practitioners may not relish the idea of what could be considered mentalistic thought, OBM can fit into an I/O program.

Another reason to consider I/O programs is a greater breadth of topics. The topics listed on the Guidelines for Education and Training in Industrial-Organizational Psychology and job duties () contains many areas OBM practitioners are not generally familiar with. For example, many organizations are interested in assistance with personnel recruitment, selection, and placement, an area that OBM practitioners have traditionally avoided. Gaining competencies in these areas could open doors that were formerly unavailable. Similarly, completing a degree in I/O may provide recognizable credentials for organizations.

Should prospective OBM practitioners elect to obtain I/O coursework after receiving an OBM background, we recommend starting with the programs listed on the OBMNetwork. However, there are many I/O programs many of which can be completed online. With the wide variety of options available, it may be helpful to find an I/O faculty member who identifies as a behaviorist or is at least behaviorally friendly.

Summary and Conclusion

Most behavior analysts will one day find themselves charged with supervising others – even if it means evaluating the performance of those implementing their behavior plans. Moreover, many individuals who receive graduate degrees, no matter the area, will often find themselves at some point in charge of others. In this sense, everyone should have a strong interest in OBM.

There are two main roles a behavior analyst may find herself in, that of internal or external practitioner. Internal practitioners (trainers, supervisors) will incorporate the lessons learned from PM. External professionals represent a growing list of behaviorally trained professionals who consult with organizations, both human services and other industries, to improve employee performance. These external professionals are the group that will find the additional training in advanced topics listed in this chapter helpful. In addition, these professionals may also find coursework in human resources, finance, and business to be helpful in speaking in and understanding the context of business settings.

As ABA grows and more companies arise, the role of OBM is likely to grow within human services. The potential growth of OBM is good for behavior analysts in that more jobs may become available in this subspecialty but also an empirically validated, behaviorally based management system exists and is available to practitioners. However, the growth of OBM outside of behavior analysis is far from certain. OBM is an exciting and rewarding field that has much to offer the world. With enough interest and dedication from new OBM practitioners, we may be able to make large socially significant changes in the world.

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Educational Systems Administration: The Comprehensive Application of Behavior Analysis to Schooling (CABAS®) Model



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Abstract The science of applied behavior analysis has a lot to offer the area of educational administration. While many educational systems use some behavioral tactics and measures, one model has demonstrated an effective approach that applies behavioral strategies to all aspects of education. The Comprehensive Application of Behavior Analysis to Schooling (CABAS®) model of education is a systems approach to all aspects of an educational system, allowing educational administrators to make informed decisions that lead to the best possible outcomes for students. The CABAS® model views the behaviors of all members of the system (students, parents, teachers, mentor teachers/supervisors, and administrators) as dependent upon each other, and the behaviors of each can be measured, analyzed, and acted upon to effect better outcomes for students. The following chapter will outline the components of the CABAS® model and describe how each component affects the other. The structure and cybernetic relations between the various component members of the CABAS® model and its primary measurement system, training, and supervision procedures are outlined in the following chapter. This chapter will also address some ethical considerations, certification and licensure requirements, and general information about the CABAS® model of education.

Keywords Educational administration · CABAS® · Comprehensive · Behavioral applications · Schooling · Educational systems · Training and supervision

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Educational administrators should have one goal in mind: the achievement of the students to whom they are responsible. All decisions, such as which curriculum to adopt, which programs to fund, and which teachers to hire, should be driven by what will produce the best outcomes for students. Far too often, it seems that administrators are more concerned with the interests of others, potentially at the cost of the students (e.g., saving money, keeping teachers happy). It may also be that administrators do not have the right measures to allow them to make the best decisions for their students. The science of applied behavior analysis (ABA) has a lot to offer the field of educational administration, particularly when its primary contribution is a system of objective measurement that allows for every individual involved in the education of students to be accountable for student outcomes. The Comprehensive Application of Behavior Analysis to Schooling (CABAS[®]) model of education is a systems approach to supervision that places the learners at the center of an analytic matrix, emphasizing ongoing rule-governed communication among all component members of the system (www.cabasschools.org). CABAS[®] is a data-driven, research-driven system whereby the performance of all individuals involved in the educational process – from principals to teachers to facilities support staff to financial office personnel – is measured, monitored, and analyzed in an effort to produce the best outcomes for the students, who are the core of the system. Although there are other models of behavior analysis in schools, the CABAS[®] model stands out in its application of behavior analysis to all aspects of learning, beginning with student curriculum and learning and ending with the administrative behaviors that ultimately support what the students need. As such, this chapter will outline the components of the CABAS[®] model, paying particular attention to its basic unit of measure (the learn unit) and how each component is responsive to the students, parents, teachers, staff, and the community at large.

Schools are comprised of many component parts. No one part is effective without the others. If we think of each component as a gear, the cogs of the gears fit together and turn in unison to make the system work. The system only works if all gears are turning, and each gear depends on the others. Similarly, if one gear stops working, so will the rest of the system. The school system that we refer to is not the typical bureaucratic organizational structure that describes most public schools. The system, rather, is comprised of groups of individuals, each of whom play a critical role in the functioning of the system. It is a system of working parts within an educational organization. We must note that the term “school” refers to the concerted delivery of educational services, regardless of where those services occur (e.g., school building, learning center, clinic, home). Further, we refer to those who deliver instruction as “teachers,” regardless of their actual job title (e.g., clinician, therapist, interventionist), and we refer to those who receive those services as “students,” whether they attend a school, learning center, or clinic or receive home-based services. The component parts of the school system include the students, parents, teachers, those who supervise and mentor teachers (called teacher mentors), university faculty who train teachers and supervisors based on cutting-edge research related to best practices, and an advisory board that ensures the component parts are functioning properly. Further, the philosophy behind this systems approach

is that, aside from students and parents, who are viewed as the consumers, each member of the system is responsible for the success of the students, and each is held accountable.

The CABAS® model originated through efforts to provide educational services for a group of students at a residential school for individuals with severe intellectual and behavioral disorders in the early 1980s (Greer 1991a, b; Greer et al. 1989; Lamm and Greer 1991; Selinske et al. 1991). With the Individuals with Disabilities Education Act (IDEA) only recently enacted, little had been done to try to provide an education to this group of children before. As curricula were developed and supplies were purchased, what became abundantly clear was that the most important step toward successfully educating these students was not stocking the classrooms with materials but training their teachers in a strategic science of instruction. Science-based instruction, as opposed to instruction based on the premise that teaching is an art form, meant that effective procedures could be replicated and taught to others. What followed was the development of a unit of measure that enabled researchers to measure student, parent, teacher, and supervisor behavior and implement tactics to improve the performance of any one of those individuals (Greer 2002; Greer et al. 2002; Singer-Dudek et al. 2010).

This unit of measure, called the *learn unit* (Albers and Greer 1991; Bahadourian et al. 2006; Greer 2002), was based on the three-term contingency. Rather than simply viewing the antecedent (delivered by the teacher), behavior or response by the student, and consequence delivered by the teacher, the learn unit takes into account the motivating conditions, setting events, ontogenetic history, and phylogenic makeup of the student that could be impacting the students' performance at any time. The learn unit is a natural fracture of pedagogy (McDonough and Greer 1999) and is used to measure not only student responses (correct and incorrect) but teacher behaviors and even supervisor and administrator behaviors. By measuring the number of learn units students receive, the number of objectives they master, and the number of learn units-per-objective, administrators can take the cost of educating each student (tuition) and calculate the amount of money it costs per learn unit, per objective, and the average cost of each student's education. These figures can be made publicly available and be used to hold administrators accountable for the performance of their teachers and hence their students.

The learn unit is more than a three-term contingency – it involves multiple interlocking contingencies for the teacher (two or more) and the student, as each responds to the antecedents, behaviors, and consequences of the other. Learn units frequently include multiple operants as component parts and are presented within a context that can be analyzed and measured as a means of providing continuous measurement of student's responding. Examination of the learn unit in context is the means for analyzing instructional components and making changes in order to ensure student learning.

Learning objectives are based on state and international standards. Instruction is provided by mentored teachers and teaching assistants. The composition of the curriculum is logical and empirical and based on verbal developmental milestones. Assessments that identify learning rates, prerequisite skill deficits, and missing ver-

bal developmental capabilities are used to pinpoint the potential source of each student's instructional problems and suggest rule-governed approaches to remediation. The data generated through the measurement of each student's responses drive the system. Teacher, and hence supervisor, performance is functionally related to student outcomes. School-wide data monitor the productivity and quality of instruction, and administrators review the data on a weekly basis.

Ongoing Training and Supervision

CABAS[®] is a dynamic systems-wide approach to education. Changes/adjustments are made as part of an ongoing analysis of individual and summary data. Teachers and teaching assistants are trained through CABAS[®] teacher modules that provide in situ opportunities specifically related to the accurate implementation of students' programs, data-based selection of evidence-based strategies and tactics, materials appropriate to the students' objectives, and selection of new short-term and long-term objective as part of an ongoing curricula sequence. These in situ trainings include modeling and opportunities for independent practice, followed by immediate reinforcement or corrective feedback. The measurement tool used during these trainings is the Teacher Performance Rate/Accuracy (TPRA), discussed in detail below. Verbal behavior analysis is the basis of teacher education and mentored supervision in CABAS[®] programs (Greer and Ross 2008). It is a framework through which all aspects of teaching and professional development in CABAS[®] programs are measured and analyzed. It provides an epistemological base for strategic and tactical analysis of program design and measured outcomes.

The organizational matrix is in place to train and mentor teachers, teaching assistants, and parents as well as teacher mentors and related service personnel as a way to support increased academic literacy, communication, and social skills. CABAS[®] schools serve neurotypical preschool through school-age students. Self-contained and inclusion classrooms as well as 1:1 settings are provided for students diagnosed with autism spectrum disorder and related communication disabilities in both school and clinical settings.

The Students in the CABAS[®] system make up the core. They "drive" the system. Students are viewed as the consumers of the educational services provided. Their behavior is measured using learn units, including the number of correct and total learn units presented per day, the number of objectives met, and the number of learn units-to-criterion, a ratio of the number of learn units it took a student to meet an objective. Learn units-to-criterion is perhaps the most sensitive measure of student progress. Students' academic, social, communication, self-management, and conditioned reinforcers are measured using a criterion-referenced assessment. Deficits that the child demonstrates on the assessment indicate objectives to be taught. Hence, each child's curriculum is unique, as each child's repertoire of behaviors is unique. Further, the behavioral tactics necessary to teach each child are also individually applied based on the child's unique learning style. Children are

grouped into classes with varying teacher-student ratios according to their levels of verbal behavior or according to their academic and language performance as well as learning capabilities (e.g., whether they can learn through observation of others). They are not grouped by diagnosis, which becomes highly irrelevant when the above is taken into consideration.

The Parents in the CABAS® system are also viewed as consumers. The onus of a child's behavioral or learning problem is never placed on the parents. Parents are viewed as consumers just like their children. Parents are offered opportunities to participate in parent education, which involves individual, criterion-referenced assessment, individualized goals, and education about strategies and tactics from the science of behavior as they relate to their child. Parents are also taught about advocacy and their legal rights. Parent education is provided by the teachers, supervisors, or specialized parent educators within the CABAS® system.

The Teachers in the CABAS® system receive ongoing training. The term "teacher" here refers to the one who is primarily responsible for the education of the students in a given classroom. In public or publicly funded schools, the teacher must possess the relevant certifications required by the State Education Department. BCBA and LBA are not required for teachers in CABAS® publicly funded schools but are preferred due to the training and supervision needs of junior colleagues and graduate student trainees. These credentials may be required for individuals who work in CABAS® clinical settings, as determined by state and local authorities, but are not CABAS® requirements. Certification and licensure requirements will be discussed in a later section.

Teachers are the primary members of the system responsible for the progress of the students. The philosophy of the CABAS® system is that students will learn as fast as their teachers can teach them, and students' progress depends in large part on the expertise of their teachers. Teachers' behaviors are measured and monitored on a daily basis, through public postings of their daily learn units presented, correct responses emitted by their students, objectives achieved by their students, and learn units-to-criterion for their students. Teacher data are examined at the individual student and class-wide levels. Graphs of teachers' daily data are posted outside the teachers' classroom for public viewing. In addition to their own learn units, teachers are also responsible for the learn unit presentations of their **teaching assistants** (TAs), whose data are displayed in the same way and publicly posted. Teachers and TAs receive ongoing training from supervisors and university faculty through three-tiered training modules, to be described later.

The Mentors in the CABAS® system are experienced teachers. They have received the same training as the teachers in the system received and have mastered up to 30 three-tiered modules. Supervisors' primary responsibility is to train and mentor teachers within the system. They conduct in situ observations of teachers and assist teachers in analytic decision-making. Supervisors also ensure that teachers' classroom performance meets expectations. They check the teachers' individual and class-wide learn unit graphs, objectives, and learn units-to-criterion graphs to ensure that the rate of learning for the classroom is adequate. They also conduct graph checks on the students' individual graphs, to see if the teacher is making

accurate decisions in a timely manner. If a teacher's performance is not meeting expectations, it is the supervisor's responsibility to identify and fix the problem. The supervisor's behavior is measured by the performance of the teachers, and hence the students, the supervisor is responsible for. Supervisors are also responsible for some administrative tasks, including assurance that all educational requirements are met for their students. Supervisor performance is displayed on graphs depicting a weekly supervisor rate of tasks completed, including teacher observations, quizzes written or graded, graph checks completed, decisions made, feedback given (vocal or written), curricula written or reviewed, assessments reviewed, and administrative tasks completed.

The Consultants (university faculty or others with necessary expertise) who consult to the CABAS® schools have demonstrated mastery of all of the competencies of the teachers and mentors and are also accomplished researchers in the applied and basic science of behavior analysis. Their role within the system is to mentor the supervisors within the system. They also bring cutting-edge research advances in behavioral tactics and developmental interventions to the system. They monitor the behaviors of the supervisors as well as the overall performance of the system as a whole. Data from individual classrooms are summarized to produce school-wide data depicting the total number of learn units presented along with the total number of correct learn units, the total number of objectives achieved, the mean number of learn units-to-criterion, the number of supervisor observations with and without errors, the total number of decisions made and the number of correct decisions, and the number of training modules completed by each member of the system.

Administrators are not viewed as separate from the system, nor are they viewed as a distinct component of the system. CABAS® administrators are senior **Mentors**. Administrative duties are performed by those with expertise in behavior analysis and the CABAS® system, but above all else they are viewed as support for the system. They have achieved the necessary expertise as evidenced by completion of CABAS® advanced ranks. Though some administrators may hold positions that necessitate the bulk of their time to be spent on administrative tasks, all individuals holding senior administrative positions (e.g., Director of Education, Principal) continue to play some role in the mentorship of others within the system. This ensures that administrators are never too far removed from the vital components of the CABAS® system, but most of all the students. Administrators are also trained in behavior analysis, and they use their expertise to make scientifically based decisions and to monitor and solve problems. They can measure the performance of all individuals within the educational system and make data-based decisions accordingly. For example, administrators can measure the number of supply requisitions filled, invoices received, lunches served, busses serviced, as well as countless other behaviors from all members of the system. They can analyze those data and make adjustments accordingly, in order to improve the performance of every individual within the system, including clerical, facilities, and other support staff.

Finally, the **CABAS® Professional Advisory Board** is responsible for monitoring the entire system, including the research and coursework components that con-

stitute the ranks. They meet three times per year and review CABAS® advanced ranks and rank requirements. They conduct site visits to each CABAS® school every 3–5 years, endorsing schools that meet the rigorous standards outlined here (e.g., teacher training resulting in achievement of ranks, ongoing mentor training, adequate student progress, and parent support to name a few). The learner’s placement at the center of the matrix drives the CABAS® system. The data generated by students, teachers and teaching assistants, parents, mentors, school administrators, educational leaders, and university affiliations are key to the success of the system. The focus is on the components of teaching and the design of educational systems that drive the component parts.

The CABAS® Training System

The emphasis of our training system is on an ABA approach to service delivery based on data-driven outcomes. The more expertise those who deliver instruction have, the better the outcomes for students (Albers and Greer 1991; Greer 2002). The CABAS® modules and university programs are aligned with the state and national teaching standards (e.g., EdTPA), as well as the BACB task list, and are approved programs to prepare teachers for the BCBA certification exam. In some states, the course sequence and supervised experience also qualify candidates for Licensure in Applied Behavior Analysis (LBA). Most teacher mentors and supervisors are qualified to provide BCBA and LBA supervision, having achieved the credentials to do so as part of their own training. CABAS® model schools provide supportive environments for professional development, curricular design, and the development of verbal developmental protocols based on ongoing research.

The Measure of a Teacher

CABAS® international research and development programs provide ongoing research-based training for supervisors who are teacher mentors, teachers who mentor teacher assistants, researchers, and parents and offer accountability through a systems-wide summary of data. The training consists of the completion of three-tiered modules consisting of competencies associated with (a) verbal behavior about the science, (b) contingency-shaped teaching repertoires, and (c) verbally mediated data decision analysis repertoires. These competencies are gained through either coursework associated with degree programs in teaching as applied behavior analysis, nondegree teacher training programs, or on-site individualized training. Currently, these programs reside in two universities (Columbia University Teachers College in New York and Nicholls State University in Louisiana, which also provides distance learning), but CABAS® training opportunities exist at all of the CABAS® schools and affiliates around the world. Please see our website at www.cabas.com.

cabasschools.org for a complete list of CABAS® endorsed programs. Further, CABAS® has recently joined the Foundation for a Strategic Science of Teaching (FASST), a not-for-profit organization, which has begun providing teacher training courses and in situ supervision and training. Please contact FASST at <https://www.scienceofteaching.org> for more information about these CABAS® training opportunities. There are entry-level and professional-level position opportunities at all CABAS member schools, and information on these can be obtained by contacting the individual schools as listed on the references above. Those at the entry level of employment are supported to advance through training and the CABAS® rank system (discussed in more detail below), and ongoing training is provided to those entering schools at a higher, professional level.

The three-tiered modules that comprise the training system are completed through a Personalized System of Instruction (PSI) format (Keller 1968). Modules are based on increasing levels of verbal complexity and in situ training in model school and classroom environments. Mastery of training module components leads to CABAS® ranks, which are conferred by the CABAS® Professional Advisory Board as acknowledgement of the competencies gained. Two separate doctoral dissertations have demonstrated that the CABAS® ranks are the only variable that can predict student achievement, when compared to commonly used variables such as teacher level of education, certification, years of experience, and demographic variables such as teacher ethnicity, age, and native language (Scherzo 2010; Silsilah 2019).

Rate of progression through modules, though individualized, is usually faster for those enrolled in master's degree or formal teacher training programs. Teachers complete a minimum of 20 modules, or 2 CABAS® teacher ranks, during a master's program, due to the rigorous schedule of graduate course requirements. CABAS® Teacher I and CABAS® Teacher II ranks are divided into ten modules each, with three sections per module. *Verbal behavior about the science* competencies are gained as teachers master scientific texts related to the concepts, principles, and tactics of the science of ABA. Mastery of verbal behavior modules provides the teacher with "knowledge" about the science, the vocabulary of the science, and the ability to characterize student learning and instructional operations using the vocabulary of the science and to demonstrate mastery of the epistemology and pedagogy of the science. Measures of verbal behavior about the science include 90% mastery criteria on quizzes associated with the readings. *Contingency-shaped behaviors* are taught in situ and provide a means to demonstrate research-based approaches to best practice for each student as well as fluently demonstrate contingency-shaped automatic responses based on classroom contingencies. Contingency-shaped behaviors include high rates of errorless learn unit presentations as measured by flawless TPRAs observations (described below), high numbers of objectives achieved, and low numbers of learn units-to-criterion for all students under that teacher's responsibility. *Verbally mediated behaviors* consist of expertise needed to find and remediate learning problems (i.e., rule-governed problem-solving strategies and tactics from the science). Teachers learn to combine the vocabulary learned through verbal behavior about the science with the practical experience acquired through

contingency-shaped repertoires so that the instructional decisions they make are driven by an analysis of the learn unit in context. Verbally mediated competencies include demonstrations of knowledge of research through article summaries, data analysis projects that involve accurate analysis of the problem within the learn unit context, and the application of research-based tactics to remedy the problem, the number of errorless strategic and tactical graphic decisions made, and the number of research-based tactics teachers used to remediate instructional problems.

The Measure of a Teacher Mentor

The desired teacher competencies are arranged and monitored by teacher mentors, who have themselves acquired the necessary expertise, as demonstrated through advanced CABAS® ranks. The work of a teacher mentor is multifaceted. Mentors provide data-based support to teachers as the teachers complete CABAS® Teacher I and Teacher II modules that demonstrate the teachers' acquisition of competencies aligned with student's progress. Teacher mentors provide instructional resources and collect and analyze individual student, teacher, and school-wide data. They also take on administrative tasks that benefit the whole school.

Those in supervisory positions within CABAS® schools have successfully completed 20 or more PSI modules (hold a CABAS® Teacher II rank) and are actively pursuing more advanced ranks, particularly the master teacher rank. Candidates for the master teacher rank are expected to have maintained or exceeded the expectations of a Teacher II when they apply for the rank, presenting evidence of errorless contingency-shaped and verbally mediated behaviors. Master teachers are mentors who are expert teachers and as such are expected to impart their expertise to others, using their analytic skills and knowledge of scientific principles and the strategies to problem-solve at the classroom level as well as at the level of individual students. Analytic thinking is an important component of the master teacher rank. When master teachers analyze students' and teachers' data, they are thinking creatively (Keohane and Greer 2005). When they use prior experience, environmental interactions, and related research and theory to analyze problems and develop novel approaches to solving those problems (Cautilli 2004), rather than expecting to find new outcomes from old procedures that have not worked in the past, they are behaving creatively.

The *verbal behavior about the science* modules for this rank provide for increased expertise in verbal behavior analysis, tactics to increase learning for children with and without disabilities, and research associated with new developments in the basic science. The contingency-shaped modules of this rank provide opportunities for candidates to use their expertise to mentor others across all three tiers of the CABAS® teacher ranks and to contribute to the school or CABAS® system as a whole. The verbally mediated modules of this rank are associated with the identification of a problem and the selection of a scientific tactic or verbal behavior developmental protocol to solve it. Problems require the analyses of data at the student/

teacher level, classroom level, and school-wide level for both students and teaching staff. Candidates are expected to provide definitions of the problems identified and rationales for the selection of the tactics chosen. Importantly, a number of these verbally mediated modules are specifically selected to help the master teacher to mentor and improve the performance of junior teachers or teaching assistants by creating yoked contingencies for teaching and learning. It is expected that when the master teacher rank is awarded, the candidate will not only know how to analyze data and solve problems but will have also achieved the skills to teach others to do the same.

Teacher mentors provide mentored supervision to teachers as a conduit to increasing students' academic literacy and language acquisition. Evidence-based resources are provided by mentors who themselves complete coursework at the university teacher education program or complete continuing education modules within their CABAS® schools. Mentors provide interobserver agreement (IOA) and ensure procedural fidelity as they analyze a teacher's delivery of learn units through TPRA (Teacher Performance Rate/Accuracy) observations. They monitor the number of strategic and tactical decisions teachers make based on graph checks and provide feedback and suggestions using scientific facts and intraverbals. They assess the teacher's correct and incorrect decisions using a dynamic algorithm (Keohane and Greer 2005) designed to analyze the component parts of the learn unit in context and provide analytic feedback related to instructional problems.

The Measure of an Educational Administrator

Those who have completed master teacher ranks actively work toward achieving CABAS® advanced ranks. Assistant, associate, and senior behavior analyst ranks consist of ten module components across five categories: scholarship expansion, peer teaching, conceptual contributions, direct and systematic replications, and new research findings. Examples of advanced behavior analyst rank components are completion of essays or papers on scientific topics, summaries of research articles, poster or symposia presentations at professional conferences, creation of new curricula or assessments that are disseminated across classrooms, development of research protocols for advancing students' verbal development, implementation and dissemination of existing research, and new research findings.

With increased expertise come increased administrative responsibilities. Master teachers who serve as teacher mentors take on increasingly more tasks and responsibilities that benefit the school as a whole. Some of these tasks include generating graphic displays of school-wide data for analysis and decision-making about the performance of the school overall; participating in meetings with parents, teachers, and school districts about students' progress and planning; conducting tours and intake assessments and making placement decisions for new students; conducting interviews and hiring new staff; completing local, state, and federal reporting requirements; participating in the generation and review of budgets; and making

purchasing and other fiscal decisions. While maintaining some of their mentor responsibilities, some teacher mentors may eventually move into administrative roles. Administrators' and mentors' performance is measured through analysis of the data of the students and teachers for whom that mentor is responsible. Mentors and administrators can also keep track of their supervisory and administrative tasks by completing supervisor rate forms, which are counts of the tasks that individual performs on a daily basis. These data can be used to monitor weekly performance and to set goals for the administrator to improve his/her performance. The data can also be used to inform how an administrator is allocating his/her time.

The TPRA

One of the roles of the mentor is to support, assist, and guide a teacher in flawless presentations of learn units. The Teacher Performance Rate/Accuracy (Ross et al. 2005; Singer-Dudek et al. 2010) observation provides a data-based assessment of a teacher's performance in situ. During the session/assessment, a mentor observes and records the accuracy of a teacher's presentation of learn units as well as the student's performance on the learning objective. Three interlocking three-term contingencies are in place during a TPRA: one set for the student, one set for the teacher, and one set for the mentor. The mentor typically makes suggestions during the observation using scientific facts to reinforce the teacher's performance as well as offer feedback through strategic questions. At the beginning of the observation, the mentor analyzes the prior data as graphed; checks for appropriate materials, tactics, and short-term objectives; and offers feedback by asking the teacher strategic questions related to the learning objective and providing model answers in the form of suggestions to the teacher. Mentors use scientific facts and intraverbals, verbally governed algorithms, and visual displays to help teachers analyze their students' data.

During a TPRA observation, mentors often complete graph checks using the Decision Protocol (described below) to identify decision opportunities, provide accurate facts of the data trend as graphed, and ask strategic questions about the learn unit in context. Questions may include, "are learn units in place?" "Was the tactic implemented appropriate for this learning objective?" If the teacher's analysis is not consistent with the supervisor's, suggestions in the form of scientific facts will be provided by the supervisor. Examples could include a teacher saying, "It is time to make a decision. The student is not making progress on the objective. I think he needs more time and I would like to continue the phase." The mentor could suggest, "The data demonstrate a descending trend and a decision opportunity is present requiring a phase change. Let's change tactics now and use a within stimulus prompt."

Analytic Decision-Making: The Decision Protocol

The composition of the curriculum for all learners in the CABAS[®] system is measurable, logical, and spiraling so that mastered instructional objectives are crafted to include more advanced levels of instruction with increasing levels of difficulty for the mastered targets. Instruction is based on the *learn unit-in-context*. When instructional problems arise, teachers analyze students' responses using a dynamic algorithm that prompts them to ask themselves strategic questions based on a graphic analysis of the data.

The CABAS[®] Decision Protocol (Keohane and Greer 2005) is a framework through which all aspects of teaching and professional development in CABAS[®] programs are measured and analyzed. It provides an epistemological base for strategic and tactical analysis of program design and measured outcomes. When teachers make accurate decisions about their students' learning based on a visual display of data, the students make significant rates of progress. Mentors provide verbally governed interactions at multiple levels of complexity of verbal behavior when they teach teachers to analyze their student's data. Graph checks using the Decision Protocol include (a) identification of decision opportunities, (b) accurate tact of the data trend as graphed (i.e., ascending, descending, no trend), (c) strategic analysis of the learn unit in context (i.e., Are learn units in place? Does the student have the prerequisite skills? Is instructional history interfering with the acquisition of the objective?), (d) selection and implementation of an appropriate evidence-based tactic, and (e) strategic analysis of the result.

The selection of evidence-based tactics is based on the body of scientific research and each individual teacher's training and experience. The problem-solving strategies and analytic "thinking" used by the teacher to design instructional objectives and implement protocols are intended to induce complex levels of verbal capability so that a teacher is able to, for example, assess a student's need for an early observing response protocol to induce conditioned reinforcement for looking at adult faces as well as a protocol to induce concept formation and other higher-order thinking for their students. Basic levels of decision-making include graphical identification of decision opportunities based on trend and selection of evidence-based tactics and scripted procedures. Mid-levels of decision-making may include selection of an evidence-based tactic to remediate a missing instructional history and prerequisite skills, consideration of the materials to assure consistency and clarity of learn unit presentations, analysis of the short-term objective to assure it is accurate, an assessment of setting events, and the possible interference of instructional history to assure that intact learn units were in place. High levels of decision-making include rule-governed analysis of the learn unit in context, protocols and procedures related to missing capabilities and cusps, and ongoing analysis of instructional problems.

The decision-making protocol associated with the learn unit-in-context provides a yoked contingency for students, teachers, and mentors. The behavior of one affects the behaviors of the others, resulting in continual responding to each other. Mentors and teachers are both responsible for the educational achievement of their students,

while administrators are held accountable for the performance of the system as a whole, including each of its component parts. The philosophy of the CABAS® model is the student is always right!

Important Ethical Considerations

As a data-driven system, CABAS® programs account for protections to students, families, and professionals through targeted policies and practices. These protections are part of best practices and are also in line with the Professional and Ethical Compliance Code for Behavior Analysts set forth by the BACB (<https://www.bacb.com/ethics/ethics-code/>). All CABAS® schools adhere to a high standard of ethics across all areas of schooling, with the students' and parents' best interests in mind. Following this code of ethics when developing policies and procedures helps to not only ensure the protection of those in need of services, but it enhances the professional, state, and federal requirements most schools and agencies are already required to adhere to such as the Department of Education, local community service boards, and/or other professional licensing entities within their state. Addressing this prior to providing services is key in ensuring the safety and protection of all. These protections include, but are not limited to, how confidentiality is maintained, how student data are handled and protected, how research is conducted, and how the overall communication and interactions occur between students, caregivers, and members of the student's educational team. A school's policies and practices will provide specific direction on how these are handled, and initial and ongoing staff training in ethics and the policies and practices ensures opportunities to train and assess how well the overall school is complying with the code. The following provides more specific details within some of the key ethical areas of focus:

Confidentiality

Schools have an obligation to protect the confidentiality of students and families. The BACB Professional and Ethical Compliance Code for Behavior Analysis provides guidance to behavior analysts as well as a reporting and resolution system to ensure this is met. All CABAS® schools have established policies and practices that ensure these ethical codes are addressed. For example, Code 2.0 of the BACB Professional and Ethical Codes sets forth the responsibility of operating in the best interest of clients, and Code 2.06 establishes the obligation to take reasonable precautions to protect the confidentiality of those receiving services (p. 92). These policies are written into organizational policy and procedure manuals which are reviewed with those receiving services and staff on a regular schedule. Practices within the school include how the administrative team ensures that these policies are reviewed annually, that the annual reviews are documented, and that the structures

are in place in the school building to prompt compliance such as posted rules about confidentiality and file audits, to name a few examples.

Student Data

CABAS® schools are founded on student learning, and as such, student data are regularly collected, graphed, and analyzed. In all CABAS® programs, the teaching team creates, maintains, disseminates, stores, retains, and disposes of records and data relating to their research, practice, and other work in accordance with applicable local, state, and federal laws, regulations, and policies and in accordance with the BACB Professional and Ethical Code 2.11. Protecting students and data associated with them is also addressed in the day to day functions of CABAS programs. The policies and practices of the schools adhere to protecting the confidentiality of the students as well ensuring any data shared or stored is in line with the confidentiality requirements as well as all other governing regulations. Further, these practices are outlined in the job requirements and regular trainings for the staff. Since the CABAS® schools are involved in ongoing research and dissemination, the requirements may involve not only state and federal requirements but also internal research review boards associated with universities. As such, the base protections and practices at all CABAS® schools ensure protections for student data, and any additional requirements posed by a university serve to extend these protections further.

Research

All CABAS® programs are involved in research whether it is through the founding program at Teachers College, Columbia University, and Nicholls State University or through locally associated programs partnered with the member CABAS® schools. Policies and procedures as to how research is conducted are developed within each school. These policies are in line with state, federal, and professional practices, including our professional ethics guidelines. The Professional and Ethics Code 2.10 states that there is a responsibility to create and maintain documentation in the kind of detail and quality that would be consistent with best practices and the law. Research and dissemination in CABAS® programs are used to solve student learning issues and to share these efforts with other professionals and families who may benefit. As such, all CABAS® schools have policies and practices related to research, and some have their own Institutional Review Boards (IRB). Additionally, CABAS® member schools must acquire and maintain an affiliation with a university which helps to ensure these protections are established and maintained. Research is conducted according to the CABAS® school's policy manual on research and is additionally reviewed by a university IRB committee, as often as required.

Communication

As with any school program, there is typically a great deal of communication between families, students, school administrators, related services professionals, and others involved in the life and education of a child. As a result, protections have to be in place to ensure all communication occurs in a way that protects the confidentiality, safety, and privacy of the student. In addition to what was described for confidentiality above in Ethics Code 2.06, intrusions on privacy are minimized by only communicating information that is germane to the purpose for which the communication is made in written, oral, and electronic reports, consultations, and other avenues. These procedures are also reviewed regularly with staff, and safe communication practices are recognized and reinforced as part of the overall school culture. Again, the nature of the schooling environment provides ample opportunity to practice sound ethical processes, and all employees of CABAS® schools are trained to adhere to these practices. For many, working within a data-driven setting such as this sets the occasion to more naturally follow and practice these behaviors as opportunities are readily available and reinforcement and feedback can be contacted frequently for doing so.

Regulatory Oversight and Licensing

Institution-Level Regulatory Oversight

Although CABAS® offers membership to schools and agencies approved to use the model and who have demonstrated the ability to do so with competence, it also expects all schools and organizations to adhere to their state and federal regulatory requirements and professional practice requirements. Often schools and agencies must be licensed by local state departments such as the Department of Social Services for early intervention and preschool/daycare programs and the Department of Education for school programs. In this way, these agencies/schools are expected to apply for, obtain, and continually meet all of the regulatory requirements of these departments in addition to meeting and maintaining the CABAS® membership requirements. Given that CABAS® is student-driven, there is often little conflict in meeting all of these standards.

Although state and federal regulations can appear overwhelming at first glance, it is necessary to keep in mind that their purpose is to protect consumers of services. As such, schools and agencies typically designate one or more in-house professionals to oversee and implement policies and procedures to meet regulatory requirements. Having dedicated professionals with job descriptions to this effect ensures that this area of need will get the attention it requires. As stated earlier, these policies and procedures generally function in harmony with CABAS® practices. However, in some cases, what the regulatory bodies may require can exceed the trainings and

practices that are currently part of the CABAS[®] system. For example, the Department of Social Services may require the early intervention/preschool teachers to have training and certification in CPR, first aid, and person-centered practices. Again, these are certainly not in conflict with CABAS[®] but rather are complementary. However, the CABAS[®] curriculum and teacher rank systems do not inherently offer training in these areas. Therefore, the schools and agencies are expected to acquire these additional trainings by these local authorities or by hiring trainers to do so.

It is important for all schools doing this to take into consideration that providing additional trainings such as these will require additional time and effort on the part of the agency/school and staff. Further, there may be added expenses to the trainings, they may need to be renewed on an annual basis often times, and in many cases, they are required PRIOR to an employee starting work or within the first 7 to 30 days of employment. It is necessary to check with state regulatory agency(ies) to determine what regulations apply to a particular organization and what their requirements are regarding training and timelines. As an agency/school, it will be necessary to allot time and funds to these regular trainings and to be prepared to coordinate these trainings alongside the CABAS[®] components. Once the agency/school is licensed by a regulatory agency, the agency/school will also be subject to regular audits by the regulatory agencies and will need to be ready to respond to issues as they arise.

Although there is usually no conflict between agencies/schools and the regulatory bodies, at times, a regulation may require the school to make an adjustment that has the potential to conflict with a CABAS[®] practice. In one example, a CABAS[®] school that was funded directly by a state agency was subjected to state employment practices that governed the schedule and amount of promotions made available to staff. As such, the school was unable to promote people in accordance with the CABAS[®] rank system alone. Rather, all promotions were subject to state agency review following the state human resources system. In order to address the desire to have a reinforcement system for the teacher ranks that was in line with the state agency requirements, the CABAS[®] school created a separate compensation system for CABAS[®] ranks which provided access to other backup reinforcers for rank completion, rather than salary and job promotion. These included gift cards, opportunities to leave work early, and staff privileges (such as not having to assist with the morning bus line). This example is worth sharing in order to illustrate the importance of thinking ahead to ensure the most supportive system by which to grow and maintain an organizational program driven by student learning.

Staff Certification and Licensing

The regulating body under which the school/agency exists may have requirements that must be met, in addition to what CABAS[®] requires. These can include requirements for staff at all levels. Behavior analysts working within CABAS[®] schools may be required to hold state teacher or teaching assistant certification and/or be working to obtain a BCBA or BCaBA from the BACB as well as any associated

licensing for behavior analysts their state may require (see apbahome.net for more information on licensing and the professional practice of behavior analysis). Additionally, some states, such as New York, require a school supervisor or administrator to hold a supervisory certificate (nysed.gov). Teachers may hold a CABAS® rank but also need to meet their state's teacher licensing or certification requirements. As stated earlier, this might also require these staff to hold these requirements prior to working within these capacities. So again, careful planning and budgeting will have to occur to ensure that the staff meet these regulatory requirements in addition to meeting the CABAS® components. Further, these may have to be renewed annually, in most situations, and will be subject to audits.

Conclusion

Educational systems are complex and are comprised of many important components, including those who are consumers of the system and those who serve those consumers. In order to keep the system moving, some components (e.g., teachers, mentors, administrators, and governing board members) need to respond to the performance of others (students and parents). Students will only learn as fast as their teachers can teach them, and their teachers need to continually respond to their needs and increase their expertise in scientific knowledge, implementation, and analysis.

The CABAS® Professional Advisory Board encourages and expects those working in its member schools to continually advance in the CABAS ranks. Although BCBA certification is not required to advance through CABAS® ranks, what is required is expertise based on the individual's demonstration of competencies (specified in the ranks) to mastery criterion. In this way, the teaching team is improving its skills in an ongoing fashion which results in significantly more learning for the students (Keohane and Greer 2005). The more accurate teaching opportunities the teaching team presents, the more student learning is achieved. Further, the CABAS® rank system arranges advancement opportunities within the school according to teacher ranks. As teachers and TAs advance in their ranks, bonus opportunities and higher salaries may become available. In this way, the ranks become part of the school's professional development program in which success in training, via completed ranks and classroom performance, is reinforced.

The CABAS® model is founded on student learning such that the teachers, mentors, administrators, and parents work together to respond to the individual learning needs of the students. These learning needs decide what types of classes, ratio of students to teacher, qualifications of teachers, and classroom structures must be in place for progress to occur. Rather than a model whereby students must fit into pre-planned classes with teachers who may or may not have the skills needed to address their learning needs, the CABAS® approach puts the student at the center. Classrooms are established according to the students' level of verbal behavior and support needs. Supervision is paramount to the CABAS® model through the continual train-

ing of all involved. Further, those in supervisory and administrative positions possess all of the expertise expected of the teaching staff and help to mentor newer teachers through ranks to acquire that same expertise. Accordingly, decisions are made that are in the best interest of the students and on what will advance their educational achievement. Finally, administrators can calculate and report the cost-effectiveness of their programs, making them accountable to parents, school districts, and the community at large.

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Behavioral Education



Kendra Newsome, Timothy C. Fuller, Staheli Meyer, Kimberly Nix Berens, and Donny Newsome

Abstract Historical and contemporary data on educational achievement suggest that the United States is still very much a nation-at-risk. Less than half of fourth-grade students read proficiently. Moreover, in response to market demands, few behavior analysts work in educational settings focused on academic skill-building, and few teachers receive coursework in behavioral education. Behavioral science, however, is well-positioned to inform and benefit the practice of teaching. Behavioral education, or the methods of academic skill acquisition informed by the science of behavior, offers a framework for a scientific approach to education that can alter the current trajectory in educational outcomes. In this chapter, the benefits of a behavioral education approach are discussed, illuminating the positive outcomes achieved with students as a result of these practices. Additionally, the cultural and ideological variables influencing the adoption and implementation of behavioral education practices are considered, and solutions for a path forward are offered. The chapter is concluded with a proposed course syllabus to increase exposure to behavioral education content in the training of teachers and behavior analysts.

Keywords Behavioral education · Precision teaching · Curriculum-based measurement · Education reform · Instructional design

Introduction

The purpose of this chapter is to highlight the benefits of a behavioral education approach to pedagogy as well as to illustrate how behavior analysts and teachers may become behavioral educators. As an introduction to the topic, this chapter provides a brief history of behavioral education in the twentieth century, considers barriers to adoption and implementation in the classroom, and suggests the

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knowledge and skills-training that are essential to diversify behavioral science into the broader academic domain. The chapter concludes with a sample course syllabus for graduate-level training in behavioral education that could be employed in the training of behavior analysts and as part of teacher training curriculum.

A scientific approach to education holds great promise for ameliorating the challenges posed in America's education system. Behavioral education, defined here as the methods of academic skill acquisition informed by the scientific methodology (time-series design) and its dependent variables (dimensions of behavior) of the science of behavior, is well positioned to lead this approach. Skinner envisioned that answers to significant issues facing mankind could be provided by a science of behavior, and he considered applications to education among the most important. In the *Technology of Teaching*, he declared, "Education is perhaps the most important branch of scientific technology" (Skinner 1968, p. 19). Despite promising results obtained by bringing the science into the classroom, the resulting practices of behavioral science – which revised traditional pedagogy – were not broadly adopted. Educators did not turn to behavioral science to inform the nature of educational reform initiatives.

While the twentieth century was marked by efforts to bring behavioral science to education (Johnson 2015), only remnants of those early efforts focused on evidence-based instruction remain in U.S. classrooms. As in other fields (medicine stands out as a prime example, e.g., Djulbegovic and Guyatt 2017; Wolf 2000), the uptake of science or evidence-based practices faces formidable obstacles. Conflicting world-views and prevailing contingencies have shaped notions about teaching and learning and can be incompatible with a behavioral science approach. As it stands educational practice is based more on systems of belief than science (White et al. 2019).

A Brief History of Behavioral Education

The science of behavior has long been focused on the cumulative refinement of behavior as it occurs in concert with an individual's environment, otherwise known as learning. Behavior analysts have focused on two distinct domains of student behavior: (1) content acquisition, and (2) preparing students to behave appropriately in a classroom setting. The definition of behavioral education included above, in this chapter, is concerned with the former.

The 1950s were characterized by efforts to take nonhuman laboratory findings and create technologies that might enhance education. Skinner (1954) outlined how shaping and schedules of reinforcement can be applied to the classroom to support students' acquisition of academic skills. A student of Skinner's, Susan Markle, characterizes the transition from laboratory experimentation to practical application to education in developing programmed instruction. Markle et al. (1961) make clear that to teach is to arrange environmental conditions for students to learn (p. 1). This early demonstration contributed to the prolific activity in the 1960s, culminated by the launch of the *Journal of Applied Behavior Analysis* in 1968, including Keller's

introduction to programmed instruction, “Goodbye Teacher.” During this decade Skinner’s *Technology of Teaching* (1968), Keller’s *Personalized System of Instruction* (1968), Lindsley’s *Precision Teaching* (PT; Potts et al. 1993), and Engelmann’s system of direct instruction (DI; Engelmann 1970; Engelmann et al. 1988) represented behavior analytic science in education.

During this time, evidence accumulated to support the efficacy of technologies of teaching derived from behavior science. In 1968, Project Follow Through, the largest and most expensive government-funded educational experiment highlighted the effectiveness of DI for academic skill acquisition (Watkins 1988). Specifically, the DI model of instruction produced superior outcomes when compared to the other instructional models. One of the most notable large-scale implementations of PT took place in Great Falls, Montana, in 1975. Three of the participating schools implemented a PT program and three served as control sites, with classroom instruction continuing in the usual way. For the PT schools, classroom instruction was bolstered by adding daily, timed practice, standard celeration charting and frequent decision-making. After 3 years, students in the experimental sites scored between 20 and 40 percentile points higher on standard achievement tests than students in the control sites (Beck and Clement 1991).

There were also concurrent studies of how to adequately prepare students for classroom settings, so that behavior more frequently contacted reinforcement (rather than punitive) contingencies. Examples include the development of token economies (Kelleher and Gollub 1962; Wolf et al. 1968) and the “good behavior game” (Barrish et al. 1969), both of which continue to be used by contemporary applied behavior analysts to support behavior management. Moreover, school-wide positive behavior intervention and support (Horner et al. 2005) demonstrates the implementation of behavior analytic behavior management strategies on a large scale through which the influence of work conducted in the 1960s can still be seen.

Limited Adoption of Behavioral Science for Academic Instruction

Relatively few behavior analysts work in mainstream education, and of those who do, many work in the private sector rather than public education. According to the Association of Professional Behavior Analysts’ (APBA) 2014 employment survey, over 60% of certified behavior analysts reported working primarily with individuals diagnosed with autism spectrum disorder (ASD) (Association of Professional Behavior Analysts 2015). Given the disproportionate workforce development to provide services to children with autism, it is no surprise that considerable attention has been allocated to applying the principles of behavior to this population. The second and third most reported areas of work are other intellectual/developmental disabilities services (13.1%) and education (12.5%), with “education” likely referring to administrative and behavior management roles rather than enhancement of

classroom or teaching strategies. In the common parlance of school settings, passing mentions of “behavior” among educators can be reliably taken to mean “problem behavior,” or behavior to be eliminated, and is rarely used to describe academic repertoires.

It is worth considering, therefore, the cascade of variables that have contributed to a limited influence of behavioral science on academic instruction. Of the Association of Behavior Analysis International (ABAI)-accredited behavior analysis programs housed in colleges of education, all reside in special education departments. One outcome of that arrangement is the relegation of behavioral science to special education populations. Behavior analysts have demonstrated the effectiveness of behavioral education with special populations – the Comprehensive Applications of Behavior Analysis to Schooling (CABAS[®]) schools are an example of a highly successful private school focused on education of special populations using the science of behavior.

It is likely that additional variables have limited the integration of a behavioral approach to instruction in mainstream classrooms. Hall (1991) suggests that the limited impact on mainstream education is the outcome of several factors, including the failure of behavior analysts to develop practices easily adaptable to a mainstream classroom, poor marketing of our science, and publishing practices that fail to reach educators. To be clear, behavioral analysts are no more to blame for the current state of affairs than classroom teachers are. The barriers on both sides are structural and systemic.

University Training

The course sequences from behavior analysis university programs provide further insight to the narrowed applications of the science. Figure 1 depicts the cumulative number of universities with ABAI accredited programs coded by their inclusion or exclusion of behavioral education content.

Programs were coded by the authors as containing either (a) coursework that takes place in educational settings, (b) coursework with a focus on academic behavior acquisition, and (c) no courses related to behavioral education. Coding was done on the basis of course catalogues, program handbooks, and course descriptions available from universities’ websites and include doctoral, master’s, and undergraduate approved course sequences.

Of the 32 programs accredited, only 50% include coursework related to effective teaching methods and behavioral education. Three accredited programs contain coursework related to special education or to behavior analysis in schools, more generally. Eleven accredited programs contain content with a distinct focus on academic acquisition. Of those 11 programs, most coursework is focused on teaching in college settings.

Teacher-training programs also lack curriculum and practical experience in behavioral instruction. The federal government has called for educators to employ

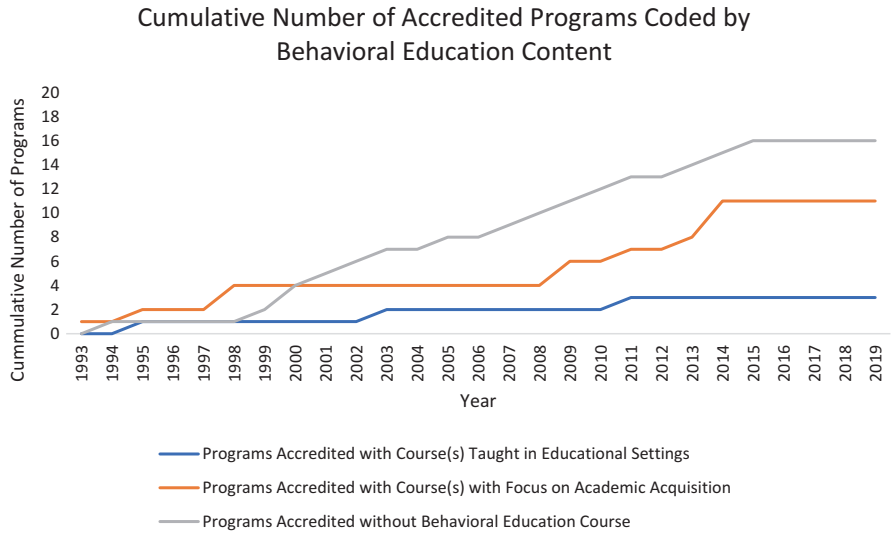


Fig. 1 Cumulative record of the number of ABAI-accredited programs that include instructional or experiential content that is (a) taught in an education setting, (b) focused on academic acquisition, or (c) contains no instructional or experiential content pertaining to behavioral education. (Note: two of the accredited programs did not have course sequences available for review in English)

scientifically based research to inform educational practices and interventions for students with learning difficulties. However, the National Science Foundation states that, “what is known from empirical study...even in this age of electronic communication...remains outside the purview of most classroom teachers” (National Science Board 1999).

Begeny and Martens (2006) examined the extent to which graduate students enrolled in master’s programs for elementary, secondary, and special education teaching received coursework and skills-based training in behavioral instructional practices. They distinguish a behavioral instructional approach as including the following features: (1) a view that all students are capable of learning, (2) instruction utilizing systematic and specific antecedents and consequences, (3) ongoing progress monitoring/graphing of student performance, (4) matching of instructional materials to learners’ level, and (5) frequent opportunities to practice/perform skills with frequent feedback on performance. The findings of their study revealed that teacher training programs provide few opportunities for students to learn or apply behavioral instructional practices. Moreover, their findings substantiate Hall’s (1991) assertion that most training in behavioral education practices are geared toward future special educators rather than on mainstream classroom instruction.

Educational Reform

Since the 1960s and the efforts of Skinner, Lindsley, and others, the education industry has evolved while teaching methods informed by the science of behavior have fallen increasingly out of vogue in the culture of mainstream educators. Teachers, unfortunately, often have limited resources or ability to freely design their classroom instruction (Ahlquist 2003). They are subject to the bureaucratic regulations of the education system, and arguably things have become increasingly challenging for today's teachers (Ahlquist 2003). Class sizes have increased. Students continue to be grouped by age and grade rather than by skill level. The push for inclusion of special education students into mainstream classroom increases the demands on teachers. Academic standards are established and changed on a whim with each reform initiative. And, as we have seen, teachers are not privy to the most effective and evidence-based practices available. They have little exposure to the *science* of teaching and learning in their graduate training programs, and new discoveries in educational research remains outside of the purview of most classroom teachers. In the absence of a deliberate effort at the level of educational systems, mainstream teachers are unlikely to receive the training and support needed to integrate behavioral educational practices into the classroom.

While classroom teachers may benefit from learning effective methods for teaching, ideological and cultural factors impede the adoption of technologies labeled "behavioral." A consistent feature of the US education system has been top-down initiatives representing a steady evolution away from viewpoints coherent with a natural science of behavior. Instead favor is given to progressive methods aligned with eclecticism and pseudo-science, despite clear indicators that it is the wrong path. Since the 1940s when the first large-scale investigation of educational outcomes was ever conducted, our nation's schools have consistently failed to produce proficiency with a majority of students (Bestor 1953; A Nation at Risk 1983; Watkins 1997; National Assessment of Educational Progress 2017; Program of International Student Assessment 2015).

Educational reform targets either policy or practice, often in a "top-down" fashion, with both areas largely influenced by cultural ideology. American efforts toward educational reform can be traced back to the early twentieth century, where rigorous academic training was replaced with an almost exclusive focus on child adjustment, happiness, and self-esteem (Sykes 1995). In 1918, a commission appointed by the National Education Association released a document entitled "The Cardinal Principles," which dismantled traditional curricula in favor of child-centered education (Commission on the Reorganization of Secondary Education 1918). In line with humanistic and developmental psychology, the commission influenced schools to move away from models of rigorous academic training in favor of those emphasizing the adjustment of the whole-child. Rather than functioning primarily as academic training institutions, schools were expected to serve roles similar to that of families, churches, and communities with respect to child development (Sykes 1995).

This early movement led to the rise of progressive education, which continues to dominate teacher training programs and guide educational practices (Cremin 1961).

As such, exploratory learning is emphasized where learners are expected to construct their own unique solutions to problems with the teacher serving only as a gentle guide (see Brooks and Brooks 1999). Within this framework, there have been many reform movements such as “child-centered education” of the 1920s; “Life Adjustment Education” of the 1950s; “Schools Without Failure” of the 1960s; and “Outcome-Based Education” of the 1990s. Although repackaged as novel, each of these school reform movements stems from the same underlying progressive worldview with the primary goal of building “self-esteem” rather than ensuring mastery in academic areas (Sykes 1995).

Despite these reform efforts, standardized test results for students in the United States have been declining, which has resulted in US students underperforming on international assessments of academic proficiency (National Commission on Excellence in Education 1983; Organisation for Economic Co-operation and Development 2015). For example, data from the National Assessment of Educational Progress (NAEP) indicate that only 40% of fourth graders in this country read proficiently (National Assessment of Educational Progress 2017). Reversing these results appears unlikely if the same “top-down” policy strategy continues to be rebranded to appear new while not addressing the flawed underlying assumptions. Without a science of learning to influence the training of educators, student outcomes are subject to eclectic policy.

As reflected in the above information on university coursework, a focus on academic skill acquisition as the primary means by which behavioral science affects social and cultural trends is no longer paramount in the training of future ABA practitioners and researchers. While there is no evidence to suggest this has been an intentional dismissal of Skinner’s ideals, there are still grounds for behavior analysts to see our responsibility in the matter as an unintended consequence of the field’s focus on specific (e.g., autism spectrum disorder, intellectual disabilities) populations (see Friman 2010; Normand and Kohn 2013). While mainstream education pulled away from behavior analysis, behavior analysts were also pulled toward other work. Our attention on autism treatment has had cascading effects on what was viewed as most important in our ABA training programs. As it stands now, the training options for aspiring behavior analysts interested in mainstream education are scarce. As Normand and Kohn (2013) state:

As of now, the only games in town seem to be academia or autism, if not a combination of both. Even for those who pursue an academic track, it appears that the vast majority of graduate programs and, hence, faculty positions are aimed at research and intervention programs focused on autism. (p. 111)

Behavioral Education Today

Despite the prevailing institutional barriers both in education and behavior analysis, there are successful behavioral education models to celebrate. Largely, these examples have arisen in the private sector and illuminate a path forward for aspiring

behavioral educators. Morningside Academy, a private laboratory school founded in 1980 by Dr. Kent Johnson, employs behavioral instruction procedures and consistently produces 2 years' academic growth in 1 academic year (Johnson and Street 2004). The primary population served at Morningside is general education students who failed to thrive in traditional classrooms. Morningside Academy has also created a subsidiary program, Morningside Teachers Academy. This program creates partnerships with schools in an effort to bring the Morningside Model of Generative Instruction to the students through teacher-training initiatives.

Fit Learning™ provides another example of behavioral education in the private sector. Fit Learning™ is a network of affiliated learning laboratories worldwide that provides 1:1 instruction to learners with varying academic needs. While Fit Learning™ does serve learners with special education needs, the overwhelming majority is enrolled in typical mainstream classrooms – students who have fallen through the cracks of a struggling education system. Learners enrolled at Fit Learning™, on average, gain an academic year in 40 hours of instruction, again demonstrating the effectiveness of a behavioral education approach to teaching and learning of mainstream populations. In addition to Morningside Academy and Fit Learning™, there are numerous other private schools and learning centers employing a behavioral education model. In 2019, there were an estimated 24 private entities offering direct or consultative behavioral education services (White et al. 2019). Additionally, Headsprout®, an online evidence-based curriculum designed to teach reading and comprehension skills, provides another example of an innovative, behavioral education initiative arising in the private sector. The Headsprout® reading and comprehension programs have demonstrated efficacy with several populations through numerous case studies and peer-reviewed publications (e.g., Grindle et al. 2013; Huffstetter et al. 2010; Layng and Layng 2012).

Mainstream public education stands to benefit from a behavioral education approach to ensure that the maximum number of students receive the most effective education possible. Moreover, the present discourse around what teachers should know and be able to do is remarkably “behavioral” (“Standards for NBPTS: The Five Core Propositions” n.d.). The five propositions outlined by the National Board of Professional Teaching Standards (NBPT) align closely with Begeny and Martens' (2006) definition of behavioral instruction. They hold the position that (1) all students can learn and achieve high standards, (2) the learning environment and instruction are modified as needed and student learning is monitored, and (3) teachers are engaged in professional development and utilize current research to improve instruction and student outcomes. A final proposition for teachers is that they establish collaborative relationships with other professions to improve school efficacy. Taken together, these propositions suggest an access for collaboration between teachers and behavior analysts despite the institution barriers noted earlier.

The examples of success in the private sector and the propositions outlined by the NBPT suggest an opportunity waiting for both education and behavior analysis. Behavior analysis will benefit from diversifying applications of the science to areas beyond autism and other special populations. The eventual saturation of the market for autism treatment will require that the field reorganize itself to meet other market

demands and to fulfill on the intended vision of the science. In service of this opportunity, behavioral education coursework could be offered in behavior analysis and teacher-training university programs. Students of behavior analysis, if provided an opportunity to learn and practice applications of the science to education, will be more adequately prepared to work in this domain and perhaps influence educational practices more broadly. Teachers who receive coursework and applied practice in the methods of behavioral education will be better prepared to meet the needs of more students.

Diversification of Behavior Analysis to Education: Recommended Topics

To prepare behavioral educators, additional courses and experience are critical to this end. The development of graduate and undergraduate courses and practical training focused on best practices in behavioral education is also likely to precipitate changes in the instructional tactics employed in the teaching of those courses. The dissonance of using a standard lecture-based teaching format to share the virtues of concepts like competency-based progression, active student responding, and direct measures of behavioral fluency in context will require some reconciliation. The next generation of behavioral education courses will not just be *about* effective educational practices, they will model it. As such, the strategies, measurements, and procedures delineated below are intended to suggest not only the content of behavioral education courses but also their own design principles.

Inductive Science

An inductive science approach to academic instruction would require that the scientific method be brought to bear in the classroom. In other words, the effectiveness of teaching strategies on the acquisition of new skills would be evaluated through direct observation and measurement. Thus, inductive methods are bottom-up. Contrast this with a deductive approach. Deductive models are top-down in that rather than empirical investigation informing theory, theory informs the nature of investigation. The hypothetico-deductive practices that influence the educational establishment have largely prevented a natural science approach in this enterprise. In fact, when inductive process has illuminated demonstrably effective educational technologies, these technologies were abandoned in favor of less effective methods more closely aligned with philosophical positions and ideologies (Beck 1979; Beck and Clement 1991; Binder and Watkins 1989; Engelmann 1992). Behavioral science, however, is an inductive science. Therefore, students of behavioral science who learn to apply the inductive process to matters of academic skill acquisition will be positioned to contribute to the educational domain. Several of the following sections highlight graduate course content in service of this end.

Measurement

Rate of response served as the primary datum, or dependent variable, of interest in the discovery of behavioral principles and processes. With rate of response identified as the dependent variable of behavior analysis, functional relations among environment and behavior were illuminated through the inductive process (Ferster and Skinner 1957; Skinner 1974). Though rate of response, or *frequency*, was the most widely used dependent variable in behavioral science and the measure employed in virtually every discovery in the basic laboratory, its use was largely abandoned in favor of percent correct when bringing the science to education (see Skinner 1954, 1968). Skinner later (1976) lamented the transition from sensitive metrics that visually and empirically captured moment-to-moment performance in favor of derivative summaries of behavior. In his words, “these molecular changes in probability of responding are most immediately relevant to our own daily lives. They seem to me much more useful in the interpretation and design of contingencies which bring about the kinds of changes likely to be of technological interest” (p. 218). Unfortunately, this trend remains today, with most applied behavior analysts relying on accuracy measures in lieu of dimensional measures of behavior (Kubina and Yurich 2012; Richling et al. 2019; see also Newsome et al. 2018). While percent correct might be useful at times, it does not reflect a dimension of behavior and, therefore, can hinder the analysis of environment-behavior relations. A full discussion of this point is beyond the purview of this chapter. See Binder (1996) or Newsome et al. (2018) for a full discussion on this topic.

Precision Teaching (PT)

The behavior-analytic framework of PT provides one exception to the abandonment of the use of frequency as the primary dependent variable. Lindsley, its founder, was Skinner’s student and heavily influenced by the methods employed in the basic operant laboratory. In Lindsley’s efforts to bring the science to education, he retained two features that Skinner later considered to be his greatest contributions, the use of frequency and a standard data display (Skinner 1976).

PT is perhaps the most widely applied technology of behavioral education. PT is a measurement approach and set of decision-making strategies that can be applied to any curriculum or teaching scenario (Binder and Watkins 1990; Kubina and Yurich 2012; White et al. 2019). The hallmark of PT is the use of the standard celeration chart (SCC), which was inspired by the cumulative recorder and permits a standard view of how behavior changes in frequency in time. The quantified value given to changes in frequencies over time is called *celeration*. Celeration is the only quantifiable index of learning and is a measure of changes in frequency over time (Johnston and Pennypacker 1980). As such, educators using the SCC to measure learning can determine whether instructional interventions are producing learning outcomes at an optimal rate.

The second hallmark of PT applications in the classroom was the practice of increasing the frequency of academic skills to the point of fluency, or automaticity. Early applications to the classroom served as the impetus for discovery of important variables related to teaching and skill acquisition. One of the greatest benefits of the SCC is its utility for evaluating changes in performance. Due to the standard nature of the axes and scale, a learner's performance across multiple skill areas can be effortlessly compared (Lindsley 1992a, b). As such, the generative nature of instruction can be evaluated for the design of the most efficient and effective programming. Celerations observed in the teaching context can be compared with celerations produced on untaught but related skills, such that generative gains can be identified. Such practices lead to discoveries regarding the relation between foundational skills and the emergence of more complex, untrained repertoires.

One of the most important guiding tenets of PT is that the *learner knows best* (Lindsley 1972). Said another way, failures in skill acquisition are not attributed to internal traits or characteristics of the student; rather, a failure to learn is viewed as a failure in instruction. Under these conditions, a precision teacher changes some feature of the teaching situation until learning is demonstrated. This process is perhaps best exemplified in a quote from Owen White (1986). He states,

Precision teaching is not a way of teaching, but a way of evaluating whatever teaching strategies and curricula one might be using. As such, it is not the sort of thing one puts on "automatic" and ignores. It demands constant attention and a willingness to accept the fact that one might be able to improve what one is doing. (White 1986, pp. 7–8)

Component-Composite Relations Skinner (1984) maintained that to address the shortcomings in education, we must teach "first things first." To teach first things first means to teach foundational repertoires prior to teaching more complex skills. While it seems logical that first things would be taught first, the theoretical models rampant in education suggest a different path and inform notions about teaching and learning that are in stark contrast with those of behavior science (see Heward 2003). When the dictum of teach first things first is applied to the teaching and learning of academic repertoires, it is useful to situate the notion of a foundation skills in a framework of component and composite relations among academic skills. With component-composite analyses, we are tasked with identifying the academic constituents involved in the execution of a particular academic skill. This is to be distinguished from a task analysis, which is a commonly taught analytic strategy applied to the breaking down of steps involved in a daily-living activity.

An analysis of component-composite relations looks at multiple dimensions of mutually entailed relations that reflect the breadth of the concepts being trained while a task analysis typically focuses on the skills needed for a more linear execution of an integrated activity. Take, for example, long division. A task analysis is part of a successful performance as it is necessary to know the algorithm for solving such problems. But it is also necessary to be fluent in the component skills entailed in the algorithm, such as digit writing fluency, basic division, multiplication, and subtraction. Only when a student has mastery of both the foundational computation

skills (resulting from component-composite analysis) and the order in which those skills are to be executed (the algorithm resulting from task analysis) will they reliably find a correct answer.

One of Lindsley's first doctoral students, Eric Haughton, discovered important relationships between component skill strength and the acquisition of composite repertoires. One such discovery was that accuracy alone of an elementary component "tool" skill was insufficient for more complex learning when the tool skill was necessary to the performance of more advanced composite skills (Binder 1996; Haughton 1972). Rather, the frequency and accuracy of the tool skill were better predictors of the acquisition of the composite skill. For example, it was discovered that classroom students who could read and write digits at a frequency of 100 per minute were more likely to acquire and master addition and subtraction (cf. Binder 1996; Haughton 1972; Starlin 1972). Thus, students of behavioral science will need to learn how to analyze and synthesize academic repertoires to mitigate the threat of cumulative skill dysfluency in classroom learners. This will require moving beyond task analyses of daily living activities to component-composite analyses of academic repertoires.

Functional Mastery: From Frequency Aims to REAPS Related to the understanding of component and composite relations is the notion of skill mastery. In a colloquial sense, mastery is understood as a behavior that is easy, effortless, automatic, and readily available as part of an individual's repertoire. Mastered skills are rarely forgotten and are easily applied to the learning of other related skills. A masterful skateboarder, for instance, might find the acquisition of snowboarding facilitated by similar aspects of the two sports (e.g., stance and technique).

The concept of mastery has exceptional relevance to education practice, and to behavioral science, more generally. The inquiry into the concept of mastery can be traced back to the thirteenth century, and the debate around what constitutes mastery remains in the forefront of education today. Guskey and Anderman (2013) ask, "what concept of mastery will most effectively guide curriculum and instruction today?" (p. 19). They note that all educators are familiar with the concept of mastery but lack a shared definition. Bloom (1968) took the position that mastery was achievable by all learners for any skill if learners were provided ample time under ideal learning conditions. This notion of mastery is consistent with a behavioral instructional approach that holds that all learners are capable of learning (e.g., Begeny and Martens 2006; Lindsley 1972). Guskey and Anderman state, "just as a coach has players run a play over and over again until they have mastered its execution, teachers must give students multiple opportunities to achieve success" (p. 22). Inherent in this approach to mastery is that students benefit from repetition. While Bloom appeals to time and optimal learning environments, the more important consideration is what takes place in that time. In the expert performance literature, the importance of repetition is central in the process of mastery and it is particular kinds of repetition that set the occasion for skill mastery (Ericsson and Pool 2016). PT provides a framework for how educators might arrange instruction when approaching mastery in this way.

The most common practice in both education and behavior analysis is to assign arbitrary mastery criteria, usually based on percent correct measures (Kubina and Yurich 2012; Newsome et al. 2018). In both education and ABA, it is common to consider a skill “mastered” when it can be performed at a criterion of 80% correct (Richling et al. 2019). Mastery, however, is determined functionally. Said another way, mastery is defined by outcomes, not arbitrarily selected criteria. The risk in assigning arbitrary mastery criteria is that skills may not be mastered at all. Skills that are taught to an arbitrary mastery criterion may lack the features of ease, automaticity, application, and retention. To avoid this possibility, it is critical that students of behavior analysis learn to utilize functional mastery criteria.

Functional mastery criteria refer to objectives for skill mastery that yield important learning outcomes. Thus, the determination of mastery is inductive and objective, not preordained. Around the time that discoveries were being made about component-composite relations, precision teachers also noted that skills that had reached certain frequencies were more likely to be (1) retained following periods of no practice, (2) sustained over longer periods of time with little to no deterioration, (3) performed with stability even in distracting environments, and (4) readily applied to the learning of new skills often with little or no instruction. Thus, these features of mastery represented by the acronym REAPS (retention, endurance, and application performance standards) became a hallmark of a PT approach to skill acquisition (Binder 1996; Haughton 1972, 1981; Johnson and Layng 1992). In PT, that is, skills are only considered mastered when the qualities of REAPS are observed. In order to powerfully influence the educational establishment and to move the science of behavior forward in general, students of the science need to understand the difference between functional and arbitrary mastery criteria.

Proximal and Distal Measurements

In the empirical process of academic skill acquisition, proximal and distal measures of learning are important distinctions for the behavior analyst interested in applications to education. Like the tools used in other scientific domains, such as microscopes and telescopes, an infinite variety of “lenses” may be applied to assess academic repertoires at differing levels of granularity. A proximal lens entails the ongoing measurement of learner behavior that is either being directly taught or is a generative skill that is very close in proximity to the trained skill (e.g., taking a weekly measure of a learner reading sentences while being taught daily to decode words in isolation). A distal lens describes the less frequent measurement of composite skills that are likely to be affected as a function of instruction and mastery of simpler component skills.

As an inductive science utilizing single-subject research design, applied behavior analysts are well versed in the process of systematically manipulating independent variables and monitoring the effects of that manipulation. From the perspective of behavioral education, assessment and instruction are viewed as symbiotic

practices that cannot be separated from one another. In other words, ongoing assessment of learner performance is an essential element of instruction, which enables precise, reliable, and valid decisions to be made regarding the effectiveness of such instruction. In this way, assessment is not something that occurs once per year under completely different stimulus conditions but rather is a continuous practice that accompanies instruction (West and Young 1992).

Proximal Assessment To effectively guide instructional practices in the classroom, proximal measurement practices that assess whether or not a student is learning are critical and rarely utilized in the common classroom. PT provides an example of how proximal measures can be incorporated into classroom practices. For instance, if students are learning to solve single-digit multiplications problems (e.g., 6×8), a proximal assessment of learning might entail a daily measure of students' performance on that skill following instruction, plotted on the SCC. Assessment of this trained skill would continue until the learner achieves the frequency aim or mastery criterion for that skill. An additional proximal assessment might include a student's ability to solve multidigit multiplication problems (e.g., 11×68). In this way, teachers can evaluate application, an important quality of skill mastery. The steady stream of data from proximal assessments charted on the SCC allows teachers to assess skill acquisition for each student and to make more frequent data-based decisions regarding learning and skill mastery.

In much of traditional education, however, assessment occurs as a practice that is separate from ongoing instruction. For example, in most school districts standardized tests are implemented once per year – typically toward the end of the year – as a means of evaluating a learner's performance with respect to peers and established norms for proficiency. Such standardized tests are disconnected from the types of ongoing skills that are learned in the classroom and, as such, test scores do not reliably measure these kinds of daily academic behaviors. These tests can also be culturally biased and are not useful for making daily instructional decisions (Deno 1985). Traditionally, summative assessments are also administered at the end of a chapter or unit. Although more frequently administered than annual standardized tests and more closely aligned with the current lesson plan, these types of assessments are also removed from the act of instruction and rarely serve as a means of evaluating skill mastery. In other words, tests are administered, a score is given to the learner, and the learner is moved ahead in the curriculum sequence regardless of test performance. As with yearly standardized assessments, these summative tests also serve little purpose in terms of decision-making regarding instructional effectiveness and skill mastery (Kubina and Yurich 2012).

Distal Assessment Progress monitoring refers to the method of obtaining repeated measures of academic performance to assess and to quantify improvement, and to evaluate the effectiveness of instruction for a particular student. Curriculum-based measurement (CBM), the most common type of progress monitoring, provides a distal measurement lens that is still closely aligned with instructional content. CBM is a national assessment method with over 30 years of research supporting its reli-

ability and validity at predicting long-term academic success. Stemming from the field of education, Deno, the founder of CBM, was influenced by behavior analysis and PT (Deno 1985, 1997, 2003). CBM arose as an “effort to decrease the separation between measurement and instruction” (Deno 1985). CBM assessments are designed directly from classroom curriculum and are administered weekly, or even daily, throughout the school year.

Similar to PT, the CBM procedure measures learner performance directly, often as count per time, and data are displayed graphically with calendar time on the horizontal axis – as with the SCC. Educators gain a time-series display of student progress enabling instructional decision-making. In this way, CBM assessment is individually referenced such that a student’s current performance can be compared to past performance. Moreover, the CBM research program has also led to the national norm-referencing of thousands of learners such that assessment performance can also be evaluated with respect to percentile rank (Deno 2003). Thus, individual student performance can also be compared with performance of peers within a classroom, school, or district. Through this more distal lens, progress on proximal targets can be compared with percentile rank gains on a more global targets. As with the expanded proximal lens, comparisons between proximal and distal gains provide educators with the opportunity to discover important functional relations between specific instructional variables and their broad-scale impact on learning.

The process of progress monitoring has been incorporated into educational practice in recent years and is a key component of the response to intervention (RTI) and multitiered systems of support (MTSS) movements (Johnson and Street 2013; Kubina and Yurich 2012). Unfortunately, its use is often reserved for students with academic difficulties or students in special education rather than utilized in a ubiquitous manner to evaluate functional mastery of academic content for all students. However, the points above highlight the benefits likely to be afforded when proximal and distal measurement practices are a universal classroom practice.

Academic Standards and Effective Technologies of Teaching

Students of behavioral science interested in applications to education will benefit from learning how to structure academic content and how to program instruction for the individual learner as well as the group. Federal or state initiatives outline the standards and/or objectives educators are to teach to their students. While educators are clear on *what needs to be taught* (outcomes), the means, or *how things should be taught* (process), in service of those standards is not specified. As was noted earlier, teachers often lack the support and resources needed to explore new materials and methods that could produce better outcomes. In answering the question of how to best teach important skills in a manner that is effective and efficient for all students, a few areas are worthy of discussion. First, students of behavior analysis must be

familiar with academic content standards. At the time of this chapter, the common core content standards dictate grade-specific learning objectives and have been adopted by most states. This is the current iteration of standards-based educational reform. It is unknown whether or not these or similar standards will continue to be implemented; regardless, it is highly likely that some standards will endure, outlining the critical learning objectives for each grade of primary education. Thus, it is critical that those interested in behavioral education are familiar with those standards.

Personalized System of Instruction (PSI) Personalized system of instruction (PSI) represents another technology developed for the application of behavioral science to education. The five central tenets of PSI (Keller 1968) create a compelling outline for a behavior analytic orientation to teaching academic content. Self-pacing, a concept of mastery, elaborated student response requirements, providing immediate feedback, and having the instructor actively manage student motivation are arguably clear derivations from our science's single subject experimental methodology. Said another way, PSI attempted to take traditional group instruction and create a way for each student to have an individualized experience with academic content. A further contribution from PSI is the attention to logically sequencing course material for the purposes of continuity and efficiency (Keller 1968; Keller and Schoenfeld 1949).

A successful demonstration of the PSI model applied in a university setting can be found at the University of Nevada, administered by Houmanfar. Since 1994, the "self-paced, personalized, interactive networked (SPIN)" system has provided a unique experience for undergraduates in an introductory psychology course, in which they may choose which lectures to attend, utilize vast supplemental course resources, get individualized support through course proctors, set their own pace for progression, and receive continuous feedback about their performance. In addition, it serves as a practicum placement for graduate students and high-performing undergraduates where they can gain direct experience as behavioral educators and conduct graduate research (Butterfield and Houmanfar 2003; Chase and Houmanfar 2009; Rafacz et al. 2019).

Direct Instruction Direct instruction (DI) is an instructional approach that utilizes planned, sequential, and systematic teaching of specified learning objectives. While behavior science was not a source of influence on the content of DI curriculum, how it was delivered and managed was strongly influenced by one of its behavior-analytic founders, Wes Becker (Gersten 2001). There are essential features of DI that distinguish this model from traditional classroom instruction. Perhaps most importantly is that every DI program on the market has been empirically validated; the inductive process is applied to ensure the program is generally effective before it is released. Secondly, a student's placement in the curriculum is based on skill, not grade level. Consider the extent of heterogeneity of skills across students in the typical classroom. It is flawed logic to assume that the same instruction at some predetermined level applied to all students would result in learning for all. DI

attempts to address this situation through a more homogenous grouping of students by skill level. Thirdly, the structure of the program is designed to ensure mastery. Repetition is a key feature of DI based on the understanding that complex skills must build on previously established skills (i.e., component/composite relations). In fact, only 10% of each lesson contains novel content. Again, this can be contrasted with the more typical approach in the classroom in which the majority of instruction is spent introducing new concepts, with little to no opportunity to practice prerequisite skills related to those concepts. The latter can contribute to a phenomenon discussed earlier of “cumulative dysfluency,” a phenomenon that is part of the PT vernacular.

A final feature of DI is the modification of instruction to accommodate each student. Recall that DI programs are field-tested for their efficacy before publication. Despite this, individual student modification is an inherent feature of DI. Again, this can be contrasted with the more typical approach of moving through content based on calendar time, not content mastery. The latter contributes to the growing number of students labeled with learning disabilities and the failure to acknowledge that instruction can only be deemed effective if learning occurred.

Curriculum Design for Generative Instruction

In addition to the effective technologies outlined above, the concept of generative instruction is important for the behavioral educator. Generative instruction refers to instructional practices that set the occasion for previously acquired skills to be applied to novel situations or to combine with other skills in novel ways with little to no instruction (Alessi 1987; Epstein 1991; Johnson and Layng 1994). Several models have been effective in guiding the process of generative instruction in behavior analysis. For example, the Tiemann and Markle (1978) System for Instruction provides a model for evaluating how both the teaching and learning processes interact, the results of which created a detailed evaluative system that can aid in the organization of instructional content such that generative learning outcomes are likely.

Also important to the process of instructional design and, therefore, important for the behavioral educator is the contemporary theoretical account of language and cognition, Relational Frame Theory (RFT). The correlation between language abilities and academic progress has been thoroughly explored and documented, and it is well known that early language deficits influence academic difficulties (Bishop and Adams 1990; Dickinson 2011; Hart and Risley 1995). Consider that *all* academic behaviors rely on a sufficient foundation of generative language. RFT, therefore, is relevant to academic skill acquisition in two ways: first, the theoretical framework and taxonomy of relational operants help the behavioral educator ensure that foundational language skills, or relational operants, are at strength to support the learning of academic skills; second, intact relational operants can be employed in the expedient acquisition of new academic behavior.

Stewart et al. (2017) describe generative language as “the ability to produce sentences never before said, and understand sentences never before heard.” Zettle et al. (2016) (see also, Hayes et al. 2001; Torneke 2010) outline a framework of common relational operants (coordination, distinction, hierarchy, spatial, comparative, causal, temporal, and perspective-taking relations) and corresponding learning processes (i.e., mutual entailment, combinatorial entailment, and transformation of stimulus function) that undergird the sorts of flexible, generative language skills a student needs for academic success. That framework has been recently elaborated upon by Barnes-Holmes et al. (2017) who have conceptualized a “multi-dimensional multi-level” model for further parsing the complexity and levels of relative abstraction across instances of arbitrarily applicable relational responding. Empirical support for the utility of RFT concepts for improving academic skill acquisition is growing rapidly (Berens and Hayes 2007; Dixon et al. 2016; Dixon et al. 2014; Gorham et al. 2009; Luciano et al. 2009; Meyer et al. 2015; Newsome et al. 2015). A thorough orientation to these concepts equips behavioral educators with tools sufficient to the challenge of teaching highly complex academic skills such as summarizing, elaborating, organizing, reconciling, inventing, imagining, comprehending, and problem-solving.

Conclusion

The American education system is underperforming, and the science of behavior has much to offer in the area of academic skill acquisition. However, the educational system has not adopted the effective and efficient teaching technologies that have emerged from the science of behavior. Conflicting ideologies about teaching and learning have imposed barriers to collaborative efforts and the adoption of behavioral education, and teachers receive little knowledge and skill training in behavioral instruction in their training programs. Concurrently, behavior analysis has drifted from its original aspiration: diversified applications to *all* areas of human behavior. In response to growing market demands to serve individuals diagnosed with autism spectrum disorder, graduate students of behavior analysis also receive limited exposure to coursework and practical experience in behavioral education. Rather, ABAI-accredited university programs have increasingly shifted focus to prepare students to work with this specific population. While that work is imperative, so too is the diversity of applied behavior analysis to areas beyond behavior reduction and diagnostic-specific interventions.

Several avenues stand to influence the further adoption of behavioral education methods in mainstream classroom instruction. There are exemplary behavioral education models in the private sector. These behavioral education sites can provide employment and practical opportunities for budding behavior analysts interested in applications of the science to education. Moreover, the educational outcomes produced with all students, mainstream or otherwise, in these programs will continue to capture the attention of parents, teachers, and educators – perhaps behavior

analysis will impact education policy and practice through the exceptional results obtained in the private sector. Furthermore, as young faculty of behavior analysis programs housed in colleges of education become tenured, they will be positioned to influence teacher-training curriculum in behavioral education. Thus, another path is to offer coursework in university training for behavior analysts and teachers. Thus, this chapter is concluded with a suggested course syllabus for behavioral education. Topics included therein might serve to guide the content of a required behavioral education course for undergraduate and graduate students in behavior analysis, an elective course for those students, or as a course for teachers in colleges of education.

Behavioral Education: Suggested Course Syllabus

Intention of the Suggested Course Syllabus: To organize the content of the preceding chapter, for students and faculty, in a 16-week semester format

Suggested Course Outline

Week 1: The promise of behavior science and Skinner's vision for the field

Readings: Skinner, [1954](#); Skinner, [1974](#)

Week 2: The failure of the U.S. education systems: Review policy and practice

Readings: Keller, [1968](#); Skinner, [1984](#)

Week 3: Current state of applied behavior analysis: Congruence or conflict with Skinner's promise?

Readings: Axelrod et al. [2012](#); Friman, [2010](#); Hall, [1991](#)

Week 4: Historical review of behavior analytic attempts to influence education: Part I Content acquisition

Readings: Watkins, [1988](#); Johnson, [2015](#)

Week 5: Historical review of behavior analytic attempts to influence education: Part II Classroom behavior management

Readings: Horner, et al., [2005](#); Hill

Week 6: Worldviews and theories of teaching and learning in education

Readings: Hayes et al., [1988](#); Heward, [2003](#); Lindsley, [1992](#); Kubina & Morrison, [2000](#)

Week 7: Measurement: The evolution of measurement practices in behavior analysis

Readings: Skinner, 1976; Kubina, et al., 2015

Week 8: Measurement: Dimensional vs derivative and non-dimensional measures of behavior

Readings: Newsome et al., 2018

Week 9: Precision teaching Part I: Lindsley's operant freedoms

Readings: Lindsely, 1992; Lindsely, 1996; Potts, et al. 1993; White, 2005

Week 10: Precision teaching Part II: The standard celeration chart

Readings: Pennypacker et al. 2003

Week 11: Precision teaching Part III: Component-composite relations of academic skills and academic content standards

Readings: Johnson & Layng, 1994; White, 1986

Week 12: Precision teaching Part IV: Functional mastery

Readings: Haughton, 1981; Binder, 1996; Johnson & Layng, 1996; Guskey & Anderman, 2013

Week 13: Proximal and distal measurement

Readings: Deno, 1985; Deno 2003

Week 14: Effective technologies of teaching

Readings: Binder & Watkins 1989 & 1990; Becker, 1992; Johnson and Layng, 1992; Markle, 1961

Week 15: Generative instruction Part I

Readings: Tiemann & Markle, 1978

Week 16: Generative instruction Part II: Relational frame theory

Readings: Newsome, et al., 2015; Stewart et al., 2017

Supporting Texts and Resources

Foxy Learning™ Tutorial on Relational Frame Theory.

Hayes, S. C., Barlow, D. H., Nelson-Gray, R. O. (1999). *The scientist practitioner: research and accountability in the age of managed care*. Boston: Allyn and Bacon.

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Companion Animal Behavior Analysis



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*"You enter the forest at the darkest point, where there is no path.
Where there is a way or path, it is someone else's path."*

- Joseph Campbell, The Hero's Journey

Abstract Applied animal behavior analysis is an extension of the science of behavior to animals in nonlaboratory settings for the purpose of (a) improving that animal's well-being or welfare (e.g., by promoting species-typical behavior); (b) teaching that animal more adaptive or effective ways to interact with its current environment; (c) training behavioral repertoires or responses that are entertaining, appealing, or useful to humans; or (d) improving human-animal relationships that are strained or diminished by the animal's behavior. As behavior analysts working with companion animals (primarily dogs and cats) in home and animal shelter settings, the authors represent a sample of those who have utilized a graduate education in behavior analysis in pursuit of applied work with nonhuman animals. In this chapter, we review areas of overlap between the concepts and tactics of behavior analysis and applied animal behavior more broadly. We consider ethical issues that are especially relevant or unique to applied work with companion animals, and provide a brief overview of credentialing opportunities in the field. Finally, we delineate additional educational or supervisory experiences recommended for behavior analysts who are interested in applied animal behavior.

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Introduction

Applied animal behavior analysis is an extension of the science of behavior to animals in nonlaboratory settings for the purpose of (a) improving that animal's well-being or welfare (e.g., by promoting species-typical behavior); (b) teaching that animal more adaptive or effective ways to interact with its current environment; (c) training behavioral repertoires or responses that are entertaining, appealing, or useful to humans; or (d) improving human-animal relationships that are strained or diminished by the animal's behavior. The Association for Behavior Analysis International (ABAI) includes the following topic areas in its description of its Applied Animal Behavior program: enrichment, welfare and management, conservation, training, and treatment of problem behavior. Not limited by species or context, applied behavior analysis is utilized widely in zoos, aquariums, laboratories, animal shelters, and training facilities, with a broad range of exotic and domesticated species. Students interested in learning more about applications of behavior analysis in these settings will find a vibrant research literature relevant to this work as well as opportunities for employment, internships, research, and teaching (Alligood et al. 2017; Forthman and Ogden 1992; Maple and Segura 2015). Within the narrower scope of this chapter, we focus on the conduct of applied behavior analysis with companion animals (most commonly, dogs and cats) in the home or in animal shelter settings. Acknowledging that the term is informal and utilized in this chapter for convenience only, we will hereafter refer to such individuals as companion animal behavior analysts, or CABAs.

While still a relatively small subdiscipline within behavior analysis, the area of companion animal behavior consulting has received increasing attention and interest among behavior analysts in recent years. Twenty years ago, behavior analysts and animal trainers were first formally introduced to the confluence of behavior analysis and dog training with the publication of *How Dogs Learn* (Burch and Bailey 1999). Since then, we have seen the development and expansion of an Applied Animal Behavior Special Interest Group and the establishment of Applied Animal Behavior as an independent program area within ABAI. Recent years also have seen a flourishing worldwide research literature devoted to the study of dog behavior and cognition (Bensky et al. 2013) and at least one behavioral journal's special issue devoted entirely to feline behavior and cognition [*Behavioural Processes*, 141(3)]. This growing academic interest is taking place within a booming national market in the pet care and pet service industry more generally. Americans spent \$23 billion on their pets in 1998, a number that had increased to \$50 billion by 2011 and currently stands at \$72 billion annually (www.americanpet-products.org). In this context, many students in behavior analysis may already have

an interest in working with companion animals or find themselves developing a deeper interest in this area as they move through their behavior analytic studies.

Unfortunately, such students may find that the only available paths toward this work are those which others have carved for themselves. The authors of this chapter represent a sample of behavior analysts who have forged independent paths through behavior analysis to provide behavior consultation services to families and/or caretakers of companion animals with behavior problems or training deficits. Specifically, we work primarily with dogs or cats who exhibit behavioral excesses or deficits in the home or in a clinical setting, or who require behavioral assessment or intervention services in the animal shelter setting. Our work is dyadic in nature: While it is the dog or cat's behavior that is our nominal target for behavior change, in most cases, we work directly to change the behavior of relevant human caretakers (e.g., pet owners, shelter staff). This distinction is important for students considering supervision in pursuit of their board certification in behavior analysis to the extent that such supervision currently requires work with human clients.

Applied Animal Behavior

Many psychologists and biologists who study the behavior of nonhuman animals work within the science of comparative psychology or ethology, respectively. These disciplines may include the study of animal behavior in the laboratory or in the animal's ecological habitat, and both emphasize the evolutionarily adaptive, or phylogenetically determined, nature of animal behavior. The Animal Behavior Society, for example, is one prominent organization which promotes the study of animal "behavior across all levels of biological organization, under natural and controlled conditions, and using descriptive and experimental approaches (www.animalbehavioriansociety.org/web/about-mission.php)." Research presented at the annual meeting features species as diverse as whip spiders, starlings, or hyenas. Only a sliver of that conference is devoted to the study of *applied* animal behavior, however; this includes the applied work conducted with companion animals or exotic species living in zoos, labs, and aquariums. Others who study animal behavior focus on statistical models of behavior (Koko et al. 2006), behavior in its evolutionary context (Wada-Katsumata et al. 2013), behavioral genetics (Pennisi 2005), or animal cognition (Balint et al. 2016). While these areas offer important insights into the etiology of animal behavior, their focus is not typically the pragmatic application of behavioral principles to solve socially relevant animal behavior problems or training needs.

At the same time, behavior analysts working with animals must walk the dual paths of ethology and psychology. As early as 1961, Marian Breland Bailey and Keller Breland, who studied with Skinner at University of Minnesota, drew attention to phylogenetic history that impacted behavior in ways that ran counter to predictions based on current environment-behavior relations alone (Breland and Breland 1961). Whether considering these observations of "instinctive drift" (in which species-specific behavior competes with current operant contingencies),

Seligman's (1970) concept of preparedness (in which animals putatively learn certain associations more rapidly or easily than others when such associations are or have been evolutionarily adaptive), or other behavioral phenomena framed within a biological constraints approach (see Domjan and Galef 1983, for a review), it is important when working with nonhuman animals that behavior consultants understand and appreciate the role of species-specific behavior.

Because CABAs work with animals that live in close proximity to humans, the animals' behavioral or training needs have direct social impact on people and communities. For example, the Center for Disease Control and Prevention estimates the number of dog bites per year in the United States to be approximately 4.5 million, and dog attacks contributed to over 392 human deaths between 2005 and 2016 (Nolen 2017). Outside of serious cases of aggression, companion animal behavior problems cause stress and tension between the animal and the caretakers and between human family members as well. Among the reasons for shelter relinquishment of cats, for example, Salman et al. (2000) list house soiling, interactive problems between the new pet and other pets, human- and animal-directed aggression, and destruction. Thus, inspired behavior analysts who stick their toes into the waters of companion animal behavior consulting will face challenges that are unique to interactions of human and nonhuman animals living together and will benefit from an understanding of how human behavior is affected by its social environment and the family culture.

What primarily sets CABAs apart from other professionals who consult on companion animal behavior problems is their training in and use of behavior *analysis*. They rely either on numerical data or on owner report combined with direct observation, and problem behavior is characterized in terms of functional response classes. In framing the history and etiology of behavior problems of companion animals, behavior analysts regularly incorporate the concepts of stimulus control, discrimination and generalization, extinction and habituation, and reinforcement and punishment schedule effects. They must be fluent in their understanding of the role of respondent conditioning, and utilize concepts such as Premack's Principle, the Matching Law, behavioral momentum, and conditioned reinforcement in the development of behavioral intervention plans. While they may rely on procedures whose effectiveness was first demonstrated with human participants, such as reinforcer preference assessments (Fisher et al. 1992) and systematic desensitization (Wolpe 1954), behavior analysts working with companion animals must be proficient in the implementation of antecedent and consequent manipulations whose efficacy has been demonstrated across a range of species and response topographies (e.g., Dorey et al. 2012; Hall et al. 2015; Mehrkam and Dorey 2015; Vitale Shreve et al. 2017). An individual with a minimum of a master's degree in behavior analysis typically will have more training in these principles and practices than an animal trainer or consultant who lacks training in behavior analysis.

A student in a typical behavior analysis training program may receive extensive coursework in basic and applied behavior analysis. What often will be missing for those who want to pursue a career with animal training, however, is coursework related to species-specific repertoires or phylogenetic characteristics of, for

example, dogs or cats. Current students in behavior analysis should pursue coursework in ethology, animal science, animal husbandry, anatomy, and/or physiology. Such courses, especially when they emphasize species of interest to the student, can be essential in filling in areas of knowledge not directly taught in behavior analysis. Of particular relevance is coursework or continuing education in behavioral pharmacology, especially as the practice of prescribing psychoactive medication for pet behavior problems has become more common. Although CABAs do not prescribe medication for an animal, they may work in collaboration with the animal's veterinarian when medication is deemed prudent. Additionally, a period of observation, apprenticeship, and training with an expert familiar with the species in which the student is interested is highly beneficial. For those interested in working with companion animals, this might take the form of working (albeit in an entry-level position), volunteering, or interning in an animal shelter, a dog training or boarding facility, an animal behavior laboratory, or an animal hospital.

Although currently there are no doctoral programs designed specifically for applied animal behavior in a clinical setting, existing programs may have opportunities for interested students. In our experience, individual advisors may be willing to supervise committed students who can seek independent experiences. One could argue that applying the principles of behavior analysis to target a new, or relatively new, population meets and exceeds the dimension of generalization (Baer et al. 1968), and such a challenge may be welcomed by academic advisors in behavior analysis.

While students may gain a better understanding of underlying behavioral principles in a basic research program, they may benefit additionally from a program that offers coursework and experiential opportunities in performance management, a specialty area in organizational behavior management. In performance management, principles of behavior analysis are applied to the behavior of those who are responsible for implementing behavioral protocols. In addition to its common application to the behavior of employees in various organizations, performance management research and practice also have targeted the behavior of parents, caregivers, pet owners, and volunteers at local animal shelters (Bright and Hadden 2017; Echterling-Savage et al. 2015; Howard and DiGennaro Reed 2015). As mentioned above, while the animal's behavior is often the primary outcome, the behavior analyst must focus on the behavior of the animal's human owners or caretakers. In the home environment, the behavior analyst assesses the behavior of the companion animal and creates a training or behavior change protocol designed to teach caretakers how to best implement behavioral strategies. When working in or consulting with an animal shelter, the behavior analyst typically must teach and coach shelter staff to implement behavior change protocols for the animals in their care. A background in performance management allows the behavior analyst to use antecedent and consequent interventions to shape and guide the behavior of these human caretakers as well as the animals.

Because they rely on these caretakers to effect change in the animal's behavior, CABAs must consider variables that influence treatment adherence and treatment integrity (Allen and Warzac 2000; Hagermoser-Sanetti and Kratochwill 2008) as

well as the effects of various errors during implementation (St. Peter Pipkin et al. 2010). This is important in understanding the response to treatment of the nonhuman animal and helps the professional determine the structure of training sessions or services offered. As in other areas of behavior analysis, an emphasis on achieving generalization and maintenance of behavior change is important and, in working with companion animals and their caretakers, is relevant to the behavior of both parties. For example, in working with a dog who snarls and barks at unfamiliar people, a behavior analyst might develop a protocol that involves reinforcing calm and tolerant responses to replace aggressive or fearful ones. These new responses must generalize across contexts (e.g., in the home and on walks), family members (e.g., with each of two owners), and discriminative stimuli (e.g., when a delivery person knocks on the door and when a visitor stands up or moves). In addition, the behavior analyst would reinforce the behavior of the owners as well, as they carry out the behavior plan and strive to produce generalization and maintenance in their behavior. Initially delivering praise, for example, and then helping owners contact the naturally reinforcing consequences of observable improvement in their pet's behavior can help to maintain implementation of the treatment plan over time. This unique relationship between behavior analyst, animal, and pet owner leads to a necessary reliance on many of the skills in section I of the BCBA Task List (5th ed., 2017), Personnel Supervision and Management. In this context, the caretakers are analogous to the "personnel" who must be taught to assess and conduct intervention procedures with their companion animals.

Ethical Considerations for CABAs

As with other service areas, no two behavior cases are exactly the same. Making decisions that guide appropriate action in some situations can be difficult. Like other behavior professionals, the CABA must create effective programming that considers the behavior of the service recipient (e.g., the dog or cat), the human caretaker, and other family members (human and nonhuman). In many cases, the behavior of the service recipient may be dangerous to self or other family members, the severity of which is magnified when children are involved. Aggression is one of the most frequent behavior problems for which dogs are referred for behavioral intervention (Denenberg et al. 2005), and bites to children are overrepresented (Overall and Love 2001). Determining the most effective but safe interventions is paramount, because failure can mean pet relinquishment or euthanasia. Many factors can influence the efficacy of behavioral programming, and there are inherent challenges when enlisting nonprofessional caregivers in the delivery of treatment, as is almost always required. There is no script for what should be done when and by whom under all conditions. Fortunately, codes of ethics and standards of practice provide some professional guidance.

Professional societies are viewed as representative of the discipline and reflect that discipline's standards and values (Bird 1998). Behavior analysts who work with

companion animals are professionally (albeit voluntarily) directed by the standards of ethical and professional conduct established by behavior analysis more broadly. There is no independent set of ethical guidelines governing applied behavior analysis with nonhuman animals, however, and CABAs are not required to obtain membership or certification with any professional organization or certifying body at this time. Nonetheless, many choose to join one or more organizations that are relevant to applied behavior analysis, companion animal behavior, or psychology as a discipline. The standards established by the organization dictate an adherence to a specific code of ethics and professional behavior, the violation of which could result in sanctioning or expulsion. While most applied animal behaviorists and even CABAs are not board-certified behavior analysts and are under no formal obligation to comport with its directives, the *Professional and Ethical Compliance Code for Behavior Analysts* (i.e., the Code; Behavior Analysis Certification Board 2014) prepared by the Behavior Analysis Certification Board (BACB) to address service delivery to human clients is, of all those that might be relevant, the most comprehensive and representative ethics code with respect to our work in applied animal behavior.

Like all applied behavior analysts, CABAs have an obligation to “do no harm.” Harm can occur in a variety of areas related to the delivery of behavioral services to companion animals and their caretakers. Most of these areas overlap those outlined by the code: responsible conduct, the assessment of behavior, research, the nature of public statements, our role as supervisors, and our responsibility to the profession, to our colleagues, to the credentialing or certifying agency, and to our clients (including confidentiality). The code is particularly important in that it highlights the obligation of behavior analysts to rely on professionally derived knowledge based on the science of behavior analysis in the development of behavior change programming. Yet, there are some areas related to professional conduct and ethics that are unique and challenging to companion animal behavior consultation, which may or may not be addressed by other certifying or credentialing organizations. These areas include issues of competency, euthanasia, and methods of behavior change.

Competency

In organizations in which professional licensure is available, competence is typically defined by the credentialing agency’s specific criteria or qualifications and other organizational (namely licensing) requirements. Lacking professional licensure, organizations or associations in the field of companion animal behavior consulting and training have developed in-house or proprietary evaluations and experiential requirements. These criteria may include written examinations, case study submissions, a minimum number of hours working with a species, professional contributions such as presentations or peer-reviewed publications, and requirements for continuing education. The ethical codes of these organizations then require that members work only within their areas of education, expertise, and/or area of certification.

Section 1.02 (b) of the code states that, “Behavior analysts provide services, teach, or conduct research in new areas (e.g., populations, techniques, behaviors) only after first undertaking appropriate study, training, supervision, and/or consultation from persons who are competent in those areas.” In human service settings, this means that a person who has experience working with children would not engage in service delivery to an individual from a geriatric population without obtaining study, training, and supervision with that population (Cooper et al. 2007). Likewise, behavior analysts working with nonhuman animals are ethically bound to acknowledge current limitations in knowledge, skills, and abilities and to remediate these as necessary. However, because the specific areas of study and supervision within the field of companion animal behavior consulting are yet to be formally defined, the discernment of competency is left in part to the individual practitioner and/or the association or organization to which that individual may voluntarily belong. Because perceived knowledge can sometimes exceed actual knowledge (e.g., Dillenburger and Fennell 2018), there remains a great need for standardization and methods of empirical evaluation of companion animal behavior consultants’ competency requirements. Until formal standards are further delineated, practitioners should seek effective outcome measures including but not limited to owner satisfaction, documented increases or decreases in responses targeted for change, and social validation. Competent professionals in the field will be wise to maintain and broaden their contact with appropriate literature, attend professional conferences and workshops, actively seek new opportunities to work with varied populations, techniques and behavioral classes, and collaborate with colleagues from other relevant disciplines.

Euthanasia

Active euthanasia of humans is illegal in the United States (Steinbrook 2008; however, see Pereira (2011) for legality worldwide), but in the field of companion animal behavior, it may be deemed the only safe or available option in some cases of serious behavior problems, such as aggression. While applied behavior analysts without a veterinary degree cannot provide medical advice, veterinarians sometimes recommend that clients seek an opinion from a behavior professional before confirming a decision to euthanize a companion animal, and shelter staff may reach out for similar advice. In some cases, veterinarians will discuss with their clients the variables related to a decision on euthanasia (e.g., the option of rehoming the animal, the animal’s current and future quality of life; see Hetts 1996); these discussions are mirrored by those who staff shelters. However, there are some variables which an applied behavior analyst familiar with the case may be uniquely qualified to assess. These include the client’s accurate understanding of the etiology and function of the problem behavior, the future probability of the problem behavior (based on current and historical frequency and the ability to control relevant evocative stimuli, motivating operations, and/or maintaining consequences), and an

owner's or imagined future owner's ability to safely manage the problem or adhere to a behavior change program (Allen and Warzac 2000).

Animal behavior consultants of any background must be honest about their own capabilities and competency to evaluate these variables, especially when addressing severe behavior problems such as aggression. If the safety of the animal, human caretakers, or members of the community are at risk, the decision to euthanize may be easier for the client – whether family caretaker or staff. Yet, the choice to euthanize a companion animal under any circumstances, especially one who is medically healthy, takes an emotional toll on those involved in the decision, including staff and volunteers of animal shelters (Rogelberg et al. 2007). Though the ultimate decision to euthanize rests with the caregiver, applied behavior analysts may face professional and personal challenges when they are asked to weigh in on these decisions.

Treatment Issues

Human service recipients have the right to effective treatment. According to Van Houten et al. (1988), this right includes access to a therapeutic physical and social environment, personal welfare as an overriding service goal (including oversight by peer review and human service committees), treatment by a competent behavior analyst, programs that teach functional skills, behavioral assessment and ongoing evaluation, and the most effective treatment procedures available (including an evaluation of level of restrictiveness). While applied behavior analysts working with companion animals aim to provide these as well, there are three issues of service delivery in the field of companion animal behavior consulting today that seem especially concerning: professional and community oversight, level of restrictiveness, and access to peer-reviewed and scientifically supported treatments.

In human service delivery, individual welfare may be protected by peer review and human rights committees that determine the acceptability of treatment programs. While CABAs may discuss strategy and programming with colleagues, and while renewal of some certifications (e.g., the Animal Behavior Society's board certification as an applied animal behaviorist) requires peer review of case submissions, formal review committees overseeing individual treatment or training plans by most pet behavior professionals do not exist. This leaves the appropriateness, ethicality, and effectiveness of the treatment plan open to interpretation only by the treatment provider (the behavior professional) and/or the animal's caregiver. Caregiver approval is indeed important, especially because nonhuman service recipients cannot provide consent. However, with no professional regulation, national or statewide standards, or even general agreement on appropriate methods or procedures, caregivers are left at the mercy not only of their individual pet behavior professional (whose expertise is not guaranteed) but also other questionable sources, including the Internet, popular television shows, or a neighbor.

To the extent that applied behavior analysts working with nonhumans voluntarily adhere to the ethics and standards of practice specific to the professional

organizations to which they belong, choice of treatment strategy is constrained by those requirements. For instance, the code (BACB 2014) recommends that treatment decisions be made in adherence with what constitutes the least restrictive alternative (LRA) likely to be effective. For other nonhuman animal service providers, policies similar to the LRA have been adopted including those that are *least intrusive, minimally aversive* (LIMA; see Friedman 2008; Lindsay 2005) or that are evaluated in accord with the *least intrusive effective behavior intervention* (LIEBI) algorithm (O’Heare 2009). In all of these policies, treatment options are considered part of a continuum from least to most aversive, intrusive, or restrictive and those further toward the aversive end of the continuum are to be attempted only after less aversive strategies have been tried and have failed.

There is a remarkable similarity between the history of the recommendation and use of aversive, invasive, intrusive, or restrictive interventions in the human (e.g., Johnston 1991; Repp and Singh 1990) and nonhuman applied literature (Guilherme Fernandes et al. 2017; Todd 2018; Ziv 2017). Some human service delivery professional organizations advocate for an elimination of aversive interventions of any kind (see TASH <https://tash.org/advocacy-issues/human-rights/>) and others (e.g., ABAI) have policies on utilizing the least restrictive but effective interventions, which could potentially allow for aversive interventions when other strategies have failed (e.g., Iwata 1988). This split is reflected across companion animal behavior and training organizations as well, with some prohibiting the use of “any intentional physical act against a pet that causes psychological or physical pain, harm or damage to the pet” (The Pet Professional Guild’s Guiding Principles 2018), while others recommend aversive technologies be utilized only after less invasive and aversive strategies have been unsuccessful. One difference between human and nonhuman service delivery, however, seems to lie in the degree of community-wide use and acceptance of control by aversive stimuli, particularly in the arrangement of positive punishment and negative reinforcement procedures. For instance, the use of special devices designed to deliver electronic stimulation as part of a punishment or negative reinforcement intervention is limited in humans to the most intractable behavioral challenges (and even this limited use is under consideration for elimination by the US Food & Drug Administration; “FDA proposes ban” 2016). The use of electronic stimulation with companion animals (in the form of electronic collars, fencing, and other containment systems), however, remains widespread. In hierarchies of least restrictive alternatives (human and nonhuman alike), technologies that inflict pain or discomfort often rank as more restrictive (Morgan 1989), more aversive (Friedman 2008), or more intrusive (O’Heare 2009) despite the fact that agreement on how to rank interventions or technologies into hierarchies is very difficult (Johnston and Sherman 1993). Nonetheless, and despite being banned or restricted in several European countries (Masson et al. 2018), devices that deliver electronic stimulation are currently legal and widely available to any caretaker or consumer in the United States. Without specific, legally mandated directives on the best practice use of any intervention, including those utilizing aversive stimuli, matching interventions to problems is left to the discretion of the individual service provider or pet owner.

Credentialing for CABAs

The terms “applied animal behaviorist,” “animal behavior analyst,” “dog behaviorist,” and others like it are not legally protected. The effect of this omission is that any individuals who have spent time and resources to become dog trainers, for example, may informally or professionally refer to themselves as “dog behaviorists” or “animal behaviorists,” regardless of the philosophical or scientific underpinnings of their work. Adding to this complication and especially relevant to work with dogs, a large number of private organizations provide certifications in pet training and behavior management. Consumers, veterinarians, and the media more broadly, as well as budding professionals in the field, are easily confused by the seemingly endless array of certification options.

Among the many board certifications available in the field, only two require completion of a graduate degree in a relevant academic discipline (e.g., veterinary medicine, psychology, biology, animal science). The first is a diplomate status available to veterinarians who receive additional training in animal behavior and are awarded board certification (Diplomate of the American Board of Veterinary Behaviorists) as a veterinary behaviorist through the American College of Veterinary Behaviorists. The second, more likely to fit the academic path of behavior analysts, is the board certification as a Certified Applied Animal Behaviorist (CAAB) offered through the Animal Behavior Society. The latter requires a master’s degree (for associate-level certification) or a doctoral degree (for full certification) in a field related to animal learning and behavior. In addition to a graduate degree “in a biological or behavioral science with an emphasis in animal behavior and a research-based thesis,” requirements for the CAAB designation currently include a minimum number of credit hours in undergraduate or graduate coursework in comparative and experimental psychology and several years of research experience working with animals in a laboratory or applied setting. While this certification may not be a perfect fit for those trained as behavior analysts (i.e., due to some disparities in coursework focus and the conceptual approach to behavior’s etiologies and functions), there is enough overlap that many behavior analysis graduate students can fulfill the application requirements and will benefit from the professional reputation, exacting standards, and community of educated and experienced peers provided by this certification (Gray and Diller 2016).

Recommended Supervision Experiences/Practices

When a prospective student is seeking advisement in this field, it is recommended that, among others, two benchmarks are met: (1) the specialty area in the existing program spans or can be generalized to applied animal behavior analysis; and (2) a prospective advisor is willing to allow the student to gain experience with companion animals, both academically and clinically. There are multiple paths within

behavior analysis by which this can be achieved, ranging from specialty areas focused on basic, underlying principles of behavior analysis to those heavily weighted on the application of those principles. Each program offers unique strengths that CABAs will rely on in their practice.

Supervisors whose students are interested in applied animal behavior analysis should encourage coursework in ethology, biology, or animal science in addition to the behavior analysis curriculum. They should arrange for opportunities for students to work with the species of interest, either informally through volunteering or interning as described above, or formally in the form of allowing for research or practicum experience directly through the university. Supervisors may arrange for an individualized reading practicum, which emphasizes research literature in applied animal behavior, or projects that require the students to apply behavioral principles and strategies to solve various pet behavior problems.

For those behavior analysts who have studied companion animals and are interested in supervising others, there are no current standards for supervision. However, the authors have carved paths for themselves in serving as both mentors and business owners. Supervision is a natural extension, given the same skills are necessary to work with owners or shelter staff. More specifically, best practices in delivering verbal instruction, video modeling, rehearsals, in vivo modeling, and in vivo feedback are critical in developing early skills for new trainers. In our experience, animal trainers without an educational background in behavior analysis can be taught how to conduct functional assessments and how to observe patterns of behavior of companion animals. This is perhaps not surprising given that teachers have been taught to perform functional analyses as well (Kunnavatana et al. 2013). In our own practices, two authors have faded in vivo support to trainers and currently support cases remotely. In some cases, trainers are taught to self-manage treatment programs, and probes are taken to observe both trainer behavior and the permanent products of dog behavior. Such probes are used to maintain trainer behavior and encourage quality standards. In other cases, client surveys are conducted to assess client satisfaction and this feedback is reviewed with the trainer. Resources are available for those interested in developing an organization or a compensation system for trainers (e.g., Abernathy 2001, 2014).

Conclusion

The paths to a career in pet behavior consulting for behavior analysts and students in behavior analysis, while remaining loosely defined, have indeed been forged and traversed by others, including the authors of this chapter. Some of us were trained in basic behavior analysis and some in applied behavior analysis programs. Some of us worked with an advisor who had explicit interest in applications of behavior analysis to pets or other animals, while others worked to convince an advisor that this area provides both a rich foundation for research and an area of application where operant conditioning and behavior analytic principles are already receiving

much fanfare and wider acceptance. Some of us had worked with companion animals before we discovered behavior analysis, while others were behavior analysts who developed an interest in applied animal work after studying or practicing in other areas. What we share is a passion for the science of behavior change and a commitment to the application of behavior analysis to improve the lives of nonhuman animals and their human caretakers.

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Index

A

- ABA discussion groups, 13
- ABAI Verified Course Sequences, 20
- ABA master's degree, 334
- ABPP Board certification process, 232–233
- ABA service provision
 - clinical roles, 65–66
 - consent and intake, 48–49
 - EI, 47
 - FBA, 51
 - functional behavior assessments, 51
 - goals setting, 51–53
 - progress monitoring, 59–62
 - referrals, 47, 48
 - service delivery locations, 67–70
 - services termination, 62–64
 - skills assessments, 50, 51
 - treatment
 - approaches, 54
 - chaining, 57–58
 - consent, 53, 54
 - DTT, 54–56
 - NET, 56–57
- ABA therapy, 53
- ABA training curriculum, 323
- Abstinence-based reinforcement procedures, 327, 331, 335
- Academic instruction, behavioral science
 - ABAI-accredited university programs, 392, 393
 - ASD, 391
 - CABAS[®], 392
 - educational reform, 394, 395
 - factors, 392
 - university training, 392, 393
- Academic skill acquisition, 395
- Academic standards, 394
- Academy of Certified Brain Injury Specialists (ACBIS), 281
- Acceptance, 343, 344
- Acceptance and commitment therapy (ACT), 81, 220, 233, 327, 328
- Accreditation, 232
- Accreditation Council for Graduate Medical Education (ACGME), 16
- Accreditation demands, 132
- Adaptive Behavior Assessment System, Third Edition (ABAS-3), 101
- Addiction-Comprehensive Health Enhancement Support System (A-CHESS), 328
- Administrators, 374
- Advanced Alcohol and Drug Counselor task list, 320
- Advocacy, 308, 310
- Ageism, 293
- Aggression, 420
- Aging, 311
- Aging tsunamis, 293
- Akathisia, 301
- Alcohol abuse, 335
- Alternating designs, 103
- Alzheimer's disease, 299
- Alzheimerization, 296
- AMA code, 17
- American Board of Professional Psychology (ABPP), 22, 232
- American Counseling Association (ACA), 29
- American Medical Association (AMA), 17

- American Psychological Association (APA),
 - 231, 280, 363
 - accredited programs, 30
 - APPIC, 21
 - CoA accreditation standards, 18
 - doctoral training programs, 20
 - educational requirement, 33
 - ethical standards, 29
 - ethics code, 22
 - evidence-based practice, 22
 - health service psychology, 18, 27
 - master's level-practice, 36
 - policy, 22
 - state licensure, 19
 - subdivisions, 22
 - American Society of Addiction Medicine (ASAM), 325
 - Analytic thinking, 377
 - Animal Behavior Society, 417
 - Antecedent, 279
 - Antecedent-based treatments, 182
 - Antecedent-behavior-consequence (A-B-C), 54
 - Antibiotics, 300
 - APA ethics codes, 352
 - APA Guidelines for Clinical Supervision, 130
 - APA's competencies, 120, 121
 - APA's Ethical Principles of Psychologists and Code of Conduct, 123
 - APA's ethical standards, 124
 - APBA model licensure act, 32
 - Applied animal behavior analysis
 - ABAI, 416
 - animal's ecological habitat, 417
 - behavior science, 416
 - environment-behavior relations, 417
 - ethology, 417
 - psychology, 417
 - statistical models, 417
 - Applied behavior analysis (ABA), 203, 204, 209, 360, 370
 - application, 46
 - ASD treatment, 46
 - effects, 69
 - EI, 46, 47
 - interventions, 96
 - practice, 32
 - procedures, 318
 - research and practice, 47
 - service provision (*see* ABA service provision)
 - therapy, 46
 - Applied behavior science, 242
 - Applied verbal behavior (AVB), 96
 - Appropriate behavioral program, 194
 - Area under the curve (AUC), 322
 - ASPPB interactive guide, 21
 - ASPPB's Mobility Program, 129
 - Assessment of Basic Language and Learning Skills–Revised (ABLRS-R), 50
 - Assessment of Functional Living Skills (AFLS), 50
 - Association for Advancement of Behavior Therapy (AABT), 7
 - Association for Cognitive and Behavioral Therapies (ABCT), 7
 - Association of Behavior Analysis International (ABAI), 4, 290
 - Association of Psychology Postdoctoral and Internship Centers (APPIC), 21, 128
 - Association of Social Work Boards exam, 24
 - Association of State and Provincial Psychology Boards, 21, 291
 - Attachment interaction styles, 83
 - Attachment patterns/styles
 - ASD, 84
 - behavioral interventions, 84
 - categories, 83
 - dynamic pairing, 84
 - function, 82
 - insecure, 83
 - interactions and redefining, 83
 - interactions and transactions, 83
 - parental attention, 83
 - quality, 83
 - system, 82
 - Autism spectrum disorder (ASD), 391
 - ABA (*see* Applied behavior analysis (ABA))
 - APA, 47
 - developmental disabilities, 46
 - DSM-5, 46
 - treatment, 46
 - Avoidant/restrictive food intake disorder (ARFID), 178
- B**
- BACB code, 35, 196, 197
 - BACB ethics code, 352
 - BACB fifth edition task list
 - behavior change procedures, 189
 - behavioral analytic procedures, 198
 - behavioral assessments, 187, 188
 - concepts and principles section, 185
 - ethics, 187

- experimental design, 187
 - interventions selection/
 - implementation, 189
 - measurement/data display/interpretation, 185, 186
 - personnel supervision and management, 189
 - philosophical underpinnings section, 184
 - sections, 184
 - skill content areas, 184
- BACB Verified Course Sequence, 132
- BACB's 5th Edition Task List, 161
- BACB® regulations, 363
- Backward chaining, 58
- BCBA certification, 335
- BCBA competencies, 132
- BCBA credential, 32, 36
- BCBA master's programs, 33
- BCBA supervisory workforce, 39
- BCBA Task List, 122
- BCBA training, 132
- BCBA training programs, 33
- BCBA-D designation, 34
- BCBA-focused training programs, 10
- BCBA-level feeding therapist, 195
- Beck Depression Inventory (BDI), 222
- Behavior activation, 207
- Behavior analysis
 - ABAI, 4
 - application, 3, 7
 - autism spectrum disorder, 3, 4
 - business, 359
 - consumer behavior and substance use, 7
 - definitive guidelines, 5
 - fundamental aspects, 160
 - general introduction, 10
 - healthcare, 3
 - implications and utility, 7
 - interpretation/operant research, 5
 - narrow vs. broad training, 6
 - novel methodological approach, 4
 - principles and techniques, 10
 - professional settings, 11
 - reliability and generality, 4
 - SEAB, 6
 - self-interpretive, 5
 - techniques, 6
 - workforce development, 7
- Behavior Analysis Certification Board (BACB), 7, 124, 245
- Behavior analysts, 207, 208
 - applied, 5
 - BCBA-focused training programs, 7
 - behavior, 6
 - behavior analytic training, 10
 - clinical psychology licenses, 7
 - clinical settings, 10
 - experimental manipulations, 4
 - nonclinical, 10
 - procedures codification, 6
 - reimbursement policies, 7
 - research and practice, 10
 - training, 4
- Behavior analytic assessment approach, 300
- Behavior analytic language, 7
- Behavior analytic practice, 32
- Behavior analytic repertoires, 4
- Behavior analytic services, 196
- Behavior chain, 57, 94
- Behavior change procedures, SUD treatment
 - abstinence-based reinforcement, 327
 - ACT, 327, 328
 - behavior maintenance strategies, 329
 - crisis and trauma interventions, 328
 - family behavior therapy, 328
 - group treatment formats, 330
 - individual engagement, 329, 330
 - medication-assisted, 330
 - quality supervision, 326
 - RP, 327
 - shaping, 327
 - technological advances, 328, 329
 - training/supervision, 331
- Behavior gerontologists roles, NCDs
 - aging aspects, 304
 - baselines and systematic replications, 306
 - behavioral sequelae, 305
 - challenges, 304
 - collaborative assessment/intervention plans, 306
 - dyadic and interactional, 304
 - dyadic interactions, 305
 - ethical issues, 304
 - family training, 305
 - heterogeneity, 306
 - interpersonal repertoires, 304
 - provocations, 305
 - relationship-burdening events, 305
 - rule-governance teaching, 306
 - treatment plans implementation, 306
 - under-and overestimation, 305
 - verbal threats, 305
- Behavior health counselor (BHC), 331
- Behavior maintenance strategies, 329
- Behavior of Organisms*, 7
- Behavior pharmacological research, 322

- Behavior therapies principle, 6
- Behavioral activation, 220, 227
- Behavioral and Cognitive Psychology specialty board, 22
- Behavioral and mainstream interventions
 - ABA interventions, 96
 - BACB, 95
 - BCBA credential, 95
 - behavior analysis principles, 95
 - behavior-analytic treatment aspects, 96
 - BST, 94
 - dyadic parent-child interactions, 96
 - early interventions, 95
 - eclectic approaches, 96
 - ESDM, 97
 - evidence-based eclectic procedures, 96
 - infant development services, 95
 - interns/assistants, 95
 - natural home environment, 96
 - PCI scales, 97, 98
 - PCIT, 98
 - PRT, 98
 - scientific community, 96
- Behavioral and social sciences, 15
- Behavioral assessment, feeding disorders
 - classifications, 180
 - consultation, 180
 - descriptive evaluations, 181
 - direct methods, 180
 - feeding therapy, 180
 - functional analysis, 181
 - IMB, 180, 181
 - treatment components, 180
- Behavioral changes, 300
- Behavioral couple therapist, 345
- Behavioral economics, 322
- Behavioral education
 - behavior analysis, 397, 403
 - behavioral instruction, 396
 - behavioral science, 390
 - classroom settings, 391
 - curriculum design, generative instruction, 405, 406
 - definition, 390
 - DI, 404, 405
 - distal assessment, 402, 403
 - Fit Learning™, 396
 - government-funded educational experiment, 391
 - graduate/undergraduate courses, development, 397
 - Headsprout®, 396
 - individual's environment, 390
 - inductive science, 397, 401
 - measurement, 398
 - Morningside Academy, 396
 - NBPT, 396
 - next generation, 397
 - practical training, 397
 - proximal assessment, 402
 - PSI, 404
 - PT (*see* Precision teaching (PT))
 - public education, 396
 - reinforcement, 390
 - standard lecture-based teaching format, 397
 - technologies, 391
 - token economies, 391
- Behavioral factors, 178
- Behavioral feeding therapy
 - ABA treatment package, 194
 - child's comprehensive ABA program, 193
 - CPT codes, 194
 - feeding deficits, 193
 - interventions, 195
 - limitation, 195
 - medical professional, 194
 - treatment, 190
- Behavioral gerontology
 - assessments and interventions, 291
 - behavior analysis, 290, 292
 - behavior analysts, 311
 - behavioral problems, 292
 - constructional approach, 290
 - definition, 289
 - eligibility criteria, 291
 - experimental behavior analytic perspective, 290
 - experimental psychologists, 291
 - geriatric prosthetic environments, 290
 - health, 294, 295
 - mainstream research programs, 291
 - NCDs (*see* Neurocognitive disorders (NCDs))
 - person-environment fit, 292
 - physical/social environments influence, 290
 - population characteristics, 293
 - practice guidelines (*see* Practice guidelines, behavioral gerontology)
 - project REACH, 292
 - regulatory/licensing frameworks, 309, 310
 - reimbursement systems, 292
 - research and practice, 292
 - selective optimization, 290
 - specialization, 293

- state-of-the-art assessment, 293
- stigma, 293, 294
- supervision, 310
- theoretical frameworks, 291
- Behavioral Gerontology Special Interest Group, 291
- Behavioral health, 294, 295
 - behavior analysts, 206
 - evidence-based interventions, 206
 - pediatric primary care (*see* Pediatric primary care)
 - primary care, 205, 206
 - traditional mental health settings, 206
- Behavioral health services
 - children, 204, 205
 - pediatric primary care, 205
 - pediatricians, 205
- Behavioral instruction, 396
- Behavioral instructional approach, 393
- Behavioral interventions, 167
- Behavioral momentum, 144
- Behavioral parent training (BPT)
 - ABA principles, 136, 152
 - additional features, 146
 - behavior analysts, 136
 - behavior problems, 136
 - behavioral skills training, 136, 145–146
 - child development, 147
 - conceptual foundation/scientific framework, 137
 - ethical considerations, 150
 - indirect service delivery approach, 136
 - learning, 147
 - practices (*see* Evidence-based BPT programs)
 - prevention and treatment, 135
 - regulatory and licensing frameworks, 151
 - shaping target behaviors, 147, 148
 - supervisor competencies, 151
 - teaching parents, 135
- Behavioral pharmacology, 321
- Behavioral principles, 207, 219
- Behavioral Psychology Doctoral Education, 20
- Behavioral science training, 25, 29
- Behavioral sciences, 16
- Behavioral skills rehearsal, 258
- Behavioral skills training, 136
 - feedback, 146
 - instructions, 145
 - modeling, 145
 - practice, 146
 - teaching parents and caregivers, 145
- Behavioral skills training (BST), 94, 365
- Behavioral systems analysis (BSA), 362
- Behavioral treatment, feeding disorders
 - antecedent-based treatments, 182
 - behavior analytic principles, 181
 - consequence-based treatments, 181
 - differential reinforcement, 183
 - EE procedure, 183
 - high-probability instructional sequence, 182
 - NRS, 183
 - reinforcement-based procedure, 183
 - simultaneous presentation, 182
 - social-negative reinforcement, 183
- Behavior-analytic intervention development guidelines
 - ABA, 99
 - assessment procedures, 100–102
 - considerations, 99
 - defining and identifying goals, 102
 - practitioner's competency and responsibilities, 99–100
 - single-subject experimental designs
 - considerations, 103
 - step-by-step protocols, 99
 - treatment specifications, 104, 105
- Behavior-analytic orientation, 125
- Behavior-analytic principles and intervention, 105
- Behavior-analytic procedures, 100
- Behavior-analytic programming, 169
- Behavior-based safety (BBS), 361
- Behavior-environment interactions, 300
- Behavior-environment relations, 160, 161
- Billing and service requirements, 171
- Billing practices, 209
- Biopsychosocial framework/collaborative care, 230
- Bladder and bowel function, 272
- Board Certified Assistant Behavior Analyst (BCaBA), 65, 68, 70
- Board Certified Behavior Analyst–Doctoral (BCBA-D), 65
- Board Certified Behavior Analysts® (BCBAs®), 289
 - credential, 20, 32
 - education, 33, 34
 - ethical standards, 35
 - postdegree experience and licensure, 34
- Board-certified assistant behavior analysts (BCaBAs), 22, 166
- Board-Certified Behavior Analyst credentials, 22

- Board-certified behavior analysts (BCBA's), 204
 - Board-certified behavior analysts at the doctoral level (BCBA-Ds), 166
 - BPT conceptual foundation/scientific framework
 - behavior principles, 137
 - empirical research, 137
 - empirical support, 138
 - evidence-based programs, 137
 - parent-child relationship, 137
 - parenting influences child development, 137
 - parenting practices, 137
 - parents demands, 137
 - reinforcements, 137
 - BPT skills and competencies
 - assessment, 148
 - child-focused behavioral health specialties, 149
 - content domains, 148
 - education policies and procedures, 148
 - nontechnical terminology, 149
 - prerequisite communication, 148
 - procedural expertise, 148
 - Typical Day Interviews, 149
 - Brain injury
 - ABAI, 281
 - ACBIS, 281
 - awareness, 269, 277
 - behavior analysts, 271
 - BIAA, 281
 - categorization, 270
 - chronic traumatic encephalopathy, 270
 - clinical practice guidelines, 270
 - communication, 276, 277
 - contingencies, reinforcement, 278–280
 - definition, 268
 - diagnosis, 269
 - ethical considerations, 280
 - family, 271
 - functional analysis, 275, 276
 - functional assessments, 275, 276
 - interdisciplinary, 277
 - multidisciplinary team, 274
 - neuro-ophthalmology, 271
 - NIH, 270
 - organism-environment-behavior relations, 271–273
 - poor observation, 277
 - preference assessments, 274
 - prevalence, 269
 - rehabilitation, 271
 - reinforcement, 273–275
 - severity of injury, 268
 - supervision, 281, 282
 - traumatic, 268, 270
 - Breath carbon monoxide (CO), 324
 - Brief Assessment of Mealtime Behavior in Children (BAMBI), 178
 - Broad rule-governed dissemination, 309
 - Building rapport, 100
 - Burning Glass Technologies, 117
 - Business, 359, 360
- C**
- CABAS® training system
 - ABA approach, 375
 - educational administrator, 378, 379
 - ethical considerations
 - confidentiality, 381
 - schooling, 381
 - student data, 382
 - LBA, 375
 - teacher mentors, 377, 378
 - teachers, 375–377
 - TPRA, 379
 - university programs, 375
 - CACREP accredited programs, 27
 - Caregiver-child dyads, 181
 - Case assistants, 166
 - Case managers, 166
 - Case supervisor, 166
 - Centers for Medicare and Medicaid Services (CMS), 310
 - Certified Applied Animal Behaviorist (CAAB), 425
 - Certified brain injury specialist (CBIS), 281
 - Certified brain injury specialist trainer (CBIST), 281
 - Chaining procedures, 250
 - Changing-criterion designs, 103
 - Chaotic childhood, 349
 - Child development, 99, 147
 - Child problem behavior, 160
 - Child transitions, 63
 - Child's behavioral characteristics and markers
 - applied therapeutic services, 81
 - ASD, 80
 - at-risk environment, 80
 - behavioral cusps, 81
 - factors, 79
 - genetic disabilities/abnormalities, 80
 - guiding parents, 80

- physical/medical condition, 80
 - social skills, 79
 - social/communicative behaviors, 80
 - types, 80
- Child's personal goals and values, 52
- Child-centered education, 395
- Chronic health conditions, 300
- Chronic illnesses, 300
- Chronic traumatic encephalopathy, 270
- Classroom environment *vs.* barren, padded environment, 168
- Clinical behavior analysis (CBA)
 - assessment
 - diagnostic, 221, 222
 - functional, 222–224
 - verbal behavior, 224
 - behavior analysis, 218
 - behavioral activation, 227
 - behavioral principles, 219
 - biopsychosocial framework/collaborative care, 230
 - building motivation, 228
 - CBT, 219
 - clients visit, 218
 - confidentiality, 230, 231
 - distress tolerance, 229, 230
 - ethical considerations, 231, 232
 - evidence-based psychotherapies, 219
 - exposure, 227
 - generalization, 228
 - graduate-level training, 219
 - individuals, 218
 - insurance, 231
 - laws, 230, 231
 - licensed psychologist, 219
 - licensing frameworks, 232, 233
 - natural social consequences, 227
 - outpatient interventions, 218
 - PhD programs, 219
 - primary care clinics, 218
 - regulatory, 232, 233
 - resistance, 228
 - risk assessment, 230, 231
 - shaping, 227
 - Skinnerian philosophy, 219
 - stimulus control, 226
 - students, 218
 - supervision, 233
 - therapist repertoires, 228, 229
 - therapists, 219
 - treatment
 - plan, 225
 - principles, 225, 226
- Clinical competencies, 225, 232
- Clinical expertise, 14
- Clinical practice
 - decelerative targets, 242, 243
 - functional assessment, 242, 243
 - habilitation (*see* Habilitation)
- Clinical professions
 - clinical psychology, 18–23
 - counseling and counseling programs, 26–29
 - evidence-based practice, 14
 - licensed behavior analysts and BCBA's, 32–36
 - medicine, 15–18
 - practice and training standards, 13
 - practice-based competency benchmarks, 14
 - school psychology, 29–32
 - social work, 23–26
 - training requirements, 14
- Clinical psychologists, 18
- Clinical psychology
 - APA, 19
 - APA CoA, 18
 - APA master's programs, 36
 - basic training competencies, 38, 39
 - dominant model, 19
 - education, 19–21
 - evidence-based practice, 22
 - health services psychologists, 18
 - health systems, 18
 - licenses, 19
 - postdoctoral training and licensure, 21, 22
 - practical and research training, 23
 - program training curricula, 23
 - social-behavioral interventions, 36
 - training models, 19
- Clinical science model, 19
- Clinic-based feeding therapy
 - challenge, 191
 - clinicians, 192
 - consistent monitoring, 191
 - consultation, 192
 - feeding goals, 190
 - feeding protocol, 191
 - feeding sessions, 190
 - IMB, 192
 - inpatient, 191
 - intake evaluation and assessment, 191
 - intensive, 190
 - limitation, 192
 - outpatient, 191, 192

- Clinic-based services
 - advantages, 67
 - environment controlling, 67
 - home environment, 68
 - maintenance and generalization, 67
 - parent involvement, 67
 - RBT, 67
 - treatment, 67
- CMS regulatory framework, 310
- Cognitive behavior therapy (CBT)
 - ACT, 220
 - behavior analysis, 220
 - behavioral activation, 220
 - DBT, 221
 - evidence-based therapies, 221
 - FAP, 220
 - intervention plans, 220
 - problem-solving therapy, 221
 - reinforcers, 221
 - substance use, 221
 - treatment tools, 221
 - verbal behavior, 219, 220
 - workability, 219
- Cognitive behavioral therapy, 207
- Cognitive behavioral training, 20
- Cognitive psychologists, 105
- Collective conditioned reinforcement
 - system, 84
- Commission on Accreditation (CoA), 18
- Committed action skill, 246, 247
- Communication, 211, 276, 277, 383
 - motherese speech and vocal imitation, 88
 - vocalizations, 87
- Community behavioral health, 4
- Community mental health centers, 353
- Community reinforcement and family training (CRAFT), 330
- Community reinforcement approach (CRA), 329
- Comorbidities, 300
- Companion animal behavior analysts (CABA)
 - aggression, 418
 - behavior analysis, 418
 - behavior analyst, 416, 417, 420
 - behavioral intervention plans, 418
 - behavioral principles, 419
 - board certifications, 425
 - CAAB, 425
 - clinical setting, 419
 - dog behavior and cognition, 416
 - dogs/cats, 417
 - ethical consideration
 - aggression, 420
 - code, 421
 - competency, 421, 422
 - euthanasia, 422, 423
 - nonhuman animals, 421
 - professional societies, 420
 - service recipient, 420
 - treatment, 423, 424
 - etiology, 418
 - history, 418
 - home environment, 419
 - humans, 418
 - medication, 419
 - phylogenetic characteristics, 418
 - PM, 419
 - private organizations, 425
 - supervision experiences/practices, 425, 426
 - treatment, 419
- Competency areas comparison
 - BCBA Task List competencies, 121
 - ethical and professional
 - responsibilities, 121
 - NASP's domain, 122
- Competency-based framework, 130
- Competency-based instruction, 258
- Comprehensive and Integrated School Psychological Services, 120
- Comprehensive Applications of Behavior Analysis to Schooling (CABAS®), 392
 - administrators, 374, 386
 - BCBA certification, 385
 - behavioral tactics, 372
 - changes/adjustments, 372
 - children, 372
 - classrooms, 385
 - communication, 383
 - consultants, 374
 - curriculum, 371
 - data, 372
 - data-driven, 370
 - deficits, 372
 - education, 370
 - educational services, 371
 - educational systems, 385
 - IDEA, 371
 - institution-level regulatory oversight, 383–385
 - learn units, 371, 372
 - learning, 370, 371
 - measurement tool, 372
 - mentors, 373
 - organizational matrix, 372
 - parents, 373
 - Professional Advisory Board, 374, 385
 - research, 382

- research-driven system, 370
 - school system, 370
 - school-wide data monitor, 372
 - science-based instruction, 371
 - student learning, 385
 - students, 372
 - supervision, 385
 - supervisor performance, 374
 - supervisors' primary responsibility, 373
 - TAs, 373
 - teachers, 372, 373
 - training system (*see* Training system)
 - unit of measure, 370
 - verbal behavior analysis, 372
 - Condescension and benevolent coercion, 294
 - Conditioned response (CR), 322
 - Confidentiality, 381
 - Consent and intake
 - additional assessments, 49
 - assessments, 49
 - behavior analyst, 49
 - client's life aspects, 48
 - patient-provider relationship, 48
 - scope of services, 48
 - treatment dosage, 48
 - Consent procedures, 296
 - Consequence-based treatments, 181
 - Conservation, 147
 - Consultation model, 309
 - Content-specific task list, 330
 - Contextual approach to behavior change, 344
 - Contingency/experimental functional analyses, 101
 - Contingency management, 223
 - Contingency-shaped behaviors, 376
 - Contingency-shaped modules, 377
 - Cost-benefit ratio, 168
 - Council for Accreditation of Counseling and Related Educational Programs (CACREP), 26
 - Counseling programs, 26, 27
 - academic guidance, 26
 - aim, 26
 - classification, 26
 - education, 26–28
 - evidence-based practice, 29
 - human services, 29
 - postdegree experience and licensure, 28
 - practice scope, 26
 - profession, 28
 - Counselor Preparation Comprehensive Examination (CPCE), 27
 - Couples
 - balance empathy, partners, 351
 - behavior, 342, 344, 345
 - continued/deepened engagement, 343
 - distressed, 342
 - ICBT, 343
 - individual-level functional analysis, 351
 - managing conflict, 351
 - married, 341
 - non-distressed, 342
 - practitioners, 353
 - problem behaviors, 342
 - relationship health, 341, 342
 - relationship shape, 344
 - therapy training programs, 342
 - Couples therapy, 342
 - ethical considerations, 352, 353
 - training and licensing procedures, 353
 - Coursework content domains, 34
 - Credentialing
 - NCSP, 128, 129
 - professional credentials, 128
 - state board of examiners, 129
 - state-level credential, 128
 - Current procedural terminology (CPT), 171, 194
 - Curriculum, 371
 - Curriculum-based measurement (CBM), 402
- D**
- Data-based decision-making rules, 251, 331
 - Decision-making, 380
 - Decision Protocol, 380, 381
 - Deductive models, 397
 - Deinstitutionalization, 240, 241
 - Delay discounting, 322
 - Delirium protocols, 301
 - Dementia-friendly activities, 302
 - Denial, 329
 - Developmental disability, 158
 - Diabetes regimen, 299
 - Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-5), 46, 318
 - Diagnostic assessment, 221, 222
 - Dialectical behavior therapy (DBT), 221, 230, 233
 - Differential reinforcement of alternative behaviors (DRA), 86
 - Differential reinforcement of low rates of behaviors (DRL), 86
 - Differential reinforcement of other behaviors (DRO), 86

- Dignity and Rights of All Persons, 123
 Dignity of risk, 248, 249
 Direct-acting contingencies, 249
 Direct instruction (DI), 58, 59, 404, 405
 Direct-support professionals (DSPs), 256, 258, 259
 Discrete trial training (DTT)
 ABA, 55
 components, 54
 EI, 55
 limitation, 55, 56
 multiple opportunities, 55
 repetitions, 55
 skills teaching, 55
 teaching sessions, 55
 teaching trials, 56
 Discriminative stimulus (SD), 89
 Disruptive behaviors, 137
 Distal assessment, 402, 403
 Distress tolerance, 229, 230
 Division 12, Society for Clinical Psychology, 22
 Doctoral-level training, 126
 Doctoral programs curriculum, 20
 Doctoral training programs, 27
 Doctorate of Psychology (PsyD), 353
 Dose-response curves, 320
 Drug testing, 323
 Drug use effects, 323
- E**
- Early behavior intervention programs, 94
 Early intensive behavior interventions (EIBI), 48, 63, 95
 Early intervention (EI), 47, 55
 Early Start Denver Model (ESDM), 97
 Educational administrator, 370, 378, 379
 Educational reform
 academic skill acquisition, 395
 academic standards, 394
 autism treatment, 395
 behavior analysts, 395
 bureaucratic regulations, 394
 exploratory learning, 395
 international assessments, academic proficiency, 395
 NAEP, 395
 National Education Association, 394
 policy/practice, 394
 teaching methods, 394
 Educational systems, 385
- Effective behavior management practices
 clinicians work, 141
 discipline, 140
 grounding, 142–143
 Parent Management Training program, 140
 parenting practices, 141
 positive/negative punishments, 141
 timeout, 141–142
 Effective service-delivery structure
 clinical decision making, 166, 167
 front-line behavioral technicians, 166
 supervisors, behavioral-technician performance, 167, 168
 tiered-model approach, 166
 Emotional flooding, 345
 Emotionally vulnerable behavior, 345
 Employee assistance programs and hospitals, 319
 End-of-life presentations, 294, 301
 Enhanced milieu teaching (EMT), 57
 Escape extinction, 183
 Ethical standards, 197
 Euthanasia, 422, 423
 Evidence-based behavioral therapies, 17–18
 Evidence-based BPT programs
 antecedents, 144
 effective behavior management practices, 140–143
 emphasis on positive reinforcement, 138–139
 extinction, 140
 parental attention, 152
 parent-child interactions, 137
 Evidence-based cognitive-behavioral therapies, 24
 Evidence-based practice, 14, 70, 242
 Evidence-based tactics, 380
 Exam for Professional Practice in Psychology (EPPP), 21, 129
 Experimental functional analyses, 326
 Explicit instruction, 58
 Exploratory learning, 395
 Extensive baselines, 104
 External professionals, 367
 Eye contact
 acquisition, 91
 ASD, 91
 behavior-analytic interventions, 90
 eye contact, 90
 integral skills, 90
 parents/caregivers, 90
 synchronized reinforcement, 91

F

Fading procedures, 182
 Family behavior therapy, 328
 Family mealtimes, 302
 Family–school collaboration, 30, 114
 Fear development
 behavior-analytic interventions, 85
 fear responses, 85
 infant fear of dark, 84
 learned operant response, 85
 phobias, 85
 real-life settings, 85
 stranger anxiety, 84
 systematic analyses, 84
 Federal confidentiality rules, 333
 Federal regulations, 383
 Feedback, 146, 260, 261
 Feeder’s behavior, 186
 Feeding problems, 176
 Feeding services recommendations, 188
 Feeding-related problems, 176
 Feighner criteria (Strand), 178
 Fit Learning™, 396
 Food and Drug Administration, 330
 Food consumption, 176
 Food refusal behaviors, 176
 Food selectivity, 176
 Formulaic approach, 6
 Foundation for a Strategic Science of Teaching (FASST), 376
 Foundational competencies, 120
 Functional analysis (FA), 51, 275, 276
 Functional analysis screening tool, 162
 Functional analytic psychotherapy (FAP), 220, 229
 Functional approach, 86
 Functional assessment, 132, 222–224, 243
 Functional Assessment Interview (FAI), 51
 Functional assessments, 275, 276
 Functional behavior assessment (FBA), 51, 101, 326
 control conditions, 163
 idiosyncratic reinforcement contingencies, 163
 information, 162
 latency-based, 164
 problem behavior, 163
 problematic response, 163
 purpose, 163
 Functional mastery, 400, 401
 Function-based assessments, 309
 Function-based treatment, 163

G

Generative instruction, 405
 Generative language, 406
 Geriatric behavior problems, 291
 Geriatric pharmacy, 301
 Geropsychology, 309
 Glasgow Coma Scale (GCS), 270
 Goldiamond’s constructional approach, 290
 Graduate programs, 232
 Graduate Record Exam (GRE), 19
 Graduate training, 133
 Graduate training and APA program accreditation, 127, 128
 Graduate training and NASP program approval
 doctoral-level training, 126
 psychology practice, 126
 retraining programs, 126
 setting standards, 126
 specialist-level training, 126
 training standards, 127
 Graduate-level training, 219
 Grand-rounds model, 167
 GRE scores, 26
 Grounding
 antisocial behavior, 143
 children and adolescent, 143
 jobs, 143
 prosocial behavior, 143
 supervise adolescents, 143
 task-based, 143
 time-based, 143
 traditional, 143
 Group instruction, 58

H

Habilitation
 adaptive behavior scales, 243
 adult assessment methodologies, 243
 applied behavior analysts, 244
 assessment materials, 244
 assessment tool, 244
 behavior analysts, 243
 committed action, 246, 247
 coordination, 245
 decision-making, 244
 dignity of risk, 248, 249
 movement, 245
 pivotal learning skills, 244, 245
 practitioners, 244
 relational learning/critical thinking, 245, 246

- Habilitation (*cont.*)
 residential support, 243
 risk awareness assessment, 247, 248
 social bonds, 247
 therapeutic involvement, 247
 twenty-first-century skill, 249
- Habit reversal, 207
- Hallucinations, 331
- Hard emotions, 345, 346
- Headsprout®, 396
- Health literacy, 299
- Health services psychology, *see* Clinical psychology
- Behavioral health, 295
- Helping the Noncompliant Child* program, 139
- Heterogeneity, 306
- High-probability command sequences, 144
- High-probability instructional sequence, 182
- High-probability sequence (HPS), 182
- Hippocratic Oath, 168
- Home-based primary care, 310
- Home-based services
 advantage, 68
 challenge, 68
 natural reinforcers, 68
 RBTs, 68
 treatment integrity, 68
- Human service recipients, 423
- Hypothetico-deductive practices, 397
- I**
- IC&RC Clinical Supervisor task list, 334
- Inappropriate mealtime behavior (IBM), 176, 178
- Incidental teaching (IT), 56, 96
- Indirect assessments/interviews, 101
- Indirect/direct preference assessments, 101
- Individual's childhood experience, 349
- Individualized Education Plan (IEP), 63
- Individualized education programs, 162
- Individualized Family Service Plan (IFSP), 63
- Individuals with Disabilities Education Act (IDEA), 371
- Inductive science, 397, 401
- Industrial-organizational psychology, 362
- Infant's social behavioral milestones
 attachment patterns, 82–84
 communicative, 81
 contingencies, 82
 developmental psychologists' approach, 82
 eye contact, 90–91
 fear development, 84–86
 hypothetico-deductive constructs, 81
 interest and research, 81
 joint attention, 92, 93
 language and communication, 86–89
 ontogenic and idiosyncratic influences, 82
 social referencing, 93, 94
 stages of development, 81
- Infantilization, 294
- Infants at risk
 behavioral and mainstream interventions, 94–98
 behavioral characteristics and markers, 79–81
 intervention guidelines (*see* Behavior-analytic intervention development guidelines)
- Informal open-ended interviews, 102
- Informed consent, 295, 296
- Inherent problems, 147
- In-home behavioral feeding therapy, 193
- Inpatient feeding therapy, 191
- Institutional review board (IRB), 103
- Institutionalization, 241
- Institution-level regulatory oversight, 383–385
- Instructions, 144, 145
- Insurance, 231
- Insurance reimbursement, 171
- Integral operant responses, 90
- Integrated primary care, 4, 211
- Integrative behavioral couple therapy (IBCT)
 acceptance, 343, 344
 acceptance and behavior change, 343
 acceptance-based behavioral approach, 342
 assumption, 343
 emotional closeness, 343
 intimacy, 344
 skills training, 343
 therapist, 344
- Intellectual and developmental disabilities (IDDs), 240, 241, 247, 254, 256
 caregiver/teacher strategies, 158
 displaying problem behavior, 158
 intellectual and disabilities, 158
 intensive treatment, 159
 prevalence, 158
 problem behavior, 158
 topographies, 158
- Intellectual disability, 158
- Intensive behavioral intervention
 admission decisions, 162
 assessment and treatment, 169
 assessment procedures, 164
 barriers, 159
 behavior analysts, 163, 164
 behavior-change procedures, 165

- clients' problem behavior, 169
- clinical settings, 159
- communication, 163
- ethical considerations, 168
- experimental design, 164
- foundational knowledge, 160–161
- foundational skills and clinical applications, 161–165
- information sources, 163
- larger organization, 170
- multiple behavior-analytic repertoires, 159
- proficiency, 171
- regulatory and funding frameworks, 170–171
- service delivery structure, 166–168
- topographies, 164
- treatment plans, 165
- works, 163
- Intensive clinic-based therapy, 190, 196
- Interdependent group contingencies, 327
- Interdisciplinary, 277
- International Brain Injury Association (IBIA), 269
- International Certification and Reciprocity Consortium (IC&RC), 320
- International Society for Performance Improvement (ISPI), 363
- Interobserver agreement (IOA), 62, 378
- Inter-Organizational Task Force on Cognitive, 20
- Intimacy, 344
 - behavioral process, 344
 - disclosure and reinforcement, 344
 - identifying and labelling patterns, 347–349
 - intimate disclosure, 345
 - punishing event, 345
 - reinforcing environment, 344
 - soft emotions, 345–346
 - understandable reasons, 349–350
 - vulnerable behavior, 345
- Intimate disclosure, 345
- Intimate partnership, 344

- J**
- Job postings, 117
- Joint attention, 92, 93, 104
- Journal of Applied Behavior Analysis* (JABA), 4, 6

- L**
- Language, 86
- Language development, 86
- Late-life population, 293
- Latency-based functional analysis, 164
- Lay therapy movement, 333
- Learn units, 371
- Learning, 147
- Learning objectives, 371
- Least intrusive effective behavior intervention (LIEBI), 424
- Least restrictive alternative (LRA), 424
- Least restrictive procedures, 104
- Licensed behavior analysts, 36
- Licensed healthcare facilities, 170
- Licensed marital and family therapist (LMFT), 353
- Licensed psychologist, 219, 232
- Local governments, 170
- Loss of consciousness (LOC), 270

- M**
- Mand, 87, 224
- Master's level clinical social workers (MSWs), 23
- Medical
 - behavioral science training, 17
 - education, 17
 - professionals, 18
- Medical College Admissions Test (MCAT), 15
- Medical necessity, 162
- Medical professionals, 100
- Medical records, 162
- Medical rule-out, 300
- Medical school extensive testing, 17
- Medical service team, 299
- Medical setting, 210
- Medicine, 206
 - education, 15, 16
 - evidence-based practice, 17
 - medical degrees, 15
 - postdoctoral residency and licensure, 16, 17
 - profession, United States, 15
 - regulated professions, 14
 - state licensing boards, 15
 - supervised practice and examination standards, 36
- Mental health diagnoses, 208
- Mental health professionals, 333
- Mental health services, 221
- Mentors, 380
- Meta-analysis, 328
- Milieu teaching (MT), 57
- Modeling, 145

- Modified incidental teaching sessions (MITs), 57
- Monitoring, 169
- Monitoring client behaviors
 - behavior analyst, 59
 - data collection system, 59
 - fluency and generalization, 59–60
 - picture exchange communication system, 60
 - problem behaviors, 60
 - repeated probes, 61
 - replacement behaviors, 60
 - target behaviors measures, 59
- Monitoring therapist behaviors
 - behavior analyst, 61
 - child responses recording, 61
 - commissions and omissions, 61
 - data collection procedure, 61
 - EI, 61
 - evidence-based practice, 62
 - goals and objectives, 62
 - interobserver agreement, 62
 - treatment implementation, 61
- Morningside Academy, 396
- Mother-child attachment style, 82
- Motherese speech, 88
- Motivational enhancement therapy, 329
- MSW programs, 24, 25
- Multidisciplinary feeding program/therapy
 - clinic-based (*see* Clinic-based feeding therapy)
 - in-home behavioral feeding therapy, 193
 - research setting, 193
- Multidisciplinary team, 100
- Multiple-baseline designs, 103
- Multitiered systems of support (MTSS), 120, 403

- N**
- NASP accredited programs, 31
- NASP Practice Model, 117
- NASP Research Report, 117
- NASP training standards, 127
- NASP's competencies
 - cognitive and academic skills, 120
 - collaborative skills, 120
 - diagnostic classification practices, 119
 - MTSS, 120
 - school psychology, 119
 - targeted/intensive interventions, 120
- NASP's Principles for Professional Ethics
 - fidelity and responsibility, 124
 - Principle I.3 Fairness and Justice, 123
 - responsibilities, 123
 - schools adds, 125
 - service provisions, 123
 - systems-based influence, 123
- NASP-approved program, 129
- NASP-recommended ratio, 117
- National Assessment of Educational Progress (NAEP), 395
- National Association for School Psychologists, 30
- National Association for Social Workers (NASW), 25
- National Association of School Psychologists' (NASP), 114
- National Board for Certified Counselors (NBCC), 28
- National Board of Professional Teaching Standards (NBPT), 396
- National Certification of School Psychology Credential (NCSP), 128, 129
- National Clinical Mental Health Counseling Examination (NCMHCE), 28
- National Counselor Examination (NCE), 28
- National Institute of Health (NIH), 270
- National Institute on Alcohol Abuse and Alcoholism (NIAAA), 325
- National Institute on Drug Abuse (NIDA), 325
- Nationally Certified School Psychologist (NCSP), 31
- Natural environment training (NET)
 - behavior analyst practices, 56
 - commonalities, 56
 - prerequisite skills, 57
 - research base support, 56
 - teaching procedures, 56
- Naturalistic Environment Teaching (NET), 96
- NCD-related barriers, 302
- NCMHCE examination, 28
- Negative-reinforcement relationship, 185
- Neurocognitive disorders (NCDs), 300
 - aging preconceptions, 295
 - behavior gerontologists roles (*see* Behavior gerontologists roles in NCDs)
 - cardiovascular conditions, 295
 - comorbid medical conditions, 299–301
 - diagnostic process, 296–299
 - excess disability, 302, 303
 - gerontological practice, 295
 - informed consent, 295, 296
 - medication effects, 301
 - neurodevelopmental disabilities, 295
 - physical and psychosocial environments, 295
 - questionable practices, 303

- sensory loss, 301
 - settings, 304
 - Neurogenic bladder, 272
 - Neuro-ophthalmology, 271
 - Neuropsychology, 277
 - Neuroscientific literature, 301
 - Nicotine replacement therapy (NRT), 330
 - Non-behavior analytic services, 332
 - Non-opioid drugs, 330
 - Nonremoval of the spoon (NRS), 183
 - Nontechnical language, 149
 - Novel stimulus cues, 93
- O**
- Older adults
 - assessments, 293
 - behavioral excesses/deficits, 307
 - endearment, 294
 - interpersonal/social situations, 308
 - medications, 301
 - NCDs, 304, 308
 - quality of life, 295
 - service delivery, 292
 - specialty practices, 310
 - substandard long-term services, 293
 - Open-door policy, 166, 167
 - Organism-environment-behavior relations
 - behavioral science, 273
 - bladder and bowel function, 272
 - brain injuries, 271, 272
 - contingency analysis, 273
 - delirium, 272
 - medication considerations, 273
 - pain, 272
 - sleep, 272
 - Organizational behavior management (OBM)
 - ABA programs, 365
 - advantages, 365
 - BBS, 361
 - behavior analysis, 360, 367
 - behavior analysts, 256
 - behavior change, 360
 - behavior science, 363
 - behavioral systems analysis, 364
 - BSA, 362
 - BST, 365
 - business, 365
 - clinical practice, 361
 - clinically oriented programs, 364
 - create opportunities, 261
 - DSPs, 256
 - employee behavior, 362
 - ethical considerations, 362, 363
 - external professionals, 367
 - human services, 367
 - I/O programs, 366
 - IDDs, 256
 - implementation, 242
 - industrial-organizational psychology, 362
 - PDC, 361
 - performance management, 259–261
 - PM, 360–362, 364
 - practice, 365
 - practitioners, 361
 - professionals, 360
 - radical behaviorism, 366
 - regulations, 363, 364
 - roles, 367
 - staff training, 258, 259
 - strategies, 257
 - systems analysis, 362
 - systems design, 257, 258
 - training, 364
 - Oropharyngeal function, 179
 - Outpatient clinic-based feeding therapy, 191
 - Outpatient interventions, 218
 - Outpatient treatment model, 192
- P**
- Pain, 272
 - Parent Child Interaction Therapy (PCIT), 96
 - Parent education, 373
 - Parent engagement, 64
 - Parent Management Training* program, 140
 - Parent report, 192
 - Parental consent, 333
 - Parental instructions, 144
 - Parent–child interaction (PCI), 97, 98
 - Parent–child interaction therapy (PCIT), 98
 - Patient confidentiality, 333
 - Patient values, 14
 - Patterns identifying and labelling
 - antecedents, 348
 - arguments, 347
 - collaboration and empathy, 348
 - conventionality/unconventionality, 347
 - criticizing/changing, 348
 - destructive behavior, 348
 - emotional distance and reactivity, 347
 - functional analysis, 347
 - individual’s personalities/behavioral repertoires, 347
 - problematic behaviors, 347
 - purposes, 348

- Patterns identifying and labelling (*cont.*)
 recognizing, 348
 relationship, 348
 response class, 347
 responsibilities, 347
 therapist role, 347
- Patterson's coercive family process model, 305
- Patterson's model, 137
- Peak level of the curve (C_{max}), 322
- Pediatric feeding disorders
 ARFID, 178
 behavior analysis, 179
 behavior topographies, 179
 behavioral assessment, 180–181
 behavioral treatment, 181–183
 biobehavioral, 177
 disciplines, 178
 ethical considerations, 195–198
 ethical situations, 177
 IMBs, 178
 medical conditions, 177
 medical professionals, 178
 multi/interdisciplinary evaluation, 179
 multidisciplinary therapy (*see*
 Multidisciplinary feeding program/
 therapy)
 multifaceted etiology, 198
 physiological factors, 177
 scope of competency, 196
 training (*see* BACB fifth edition task list)
 WHO's definition, 179
- Pediatric primary care
 adolescent depression, 207
 BCBA-D, 209
 behavior activation, 207
 behavior analysts, 207, 208
 behavioral health problems, 205
 behavioral health professionals, 207
 behavioral health providers, 205–208
 behavioral health services, 208
 behavioral principles, 209
 billing practices, 209
 children, 205
 cognitive behavioral therapy, 207
 ethical considerations, 209–211
 evidence-based treatment, 205
 face-to-face communication, 208
 integrated behavioral health, 206
 licensing requirements, 209
 medicine, 206
 mental health diagnoses, 208
 psychology, 206
 supervision, 211
- Performance Diagnostic Checklist (PDC), 361
- Performance management (PM), 259–261,
 360–362, 419
- Person's social learning, 349
- Personalized system of instruction (PSI),
 376, 404
- Person-centered planning (PCP), 248
- Person-environment fit, 290
- Personnel supervision, 161, 166
- Pharmacological interventions, 330
- PhD programs, 219
- Physical activity, 302
- Physical impairments, 303
- Picture exchange communication system
 (PECS), 60, 276
- Pikes Peak training model, 307
- Pivotal learning skills, 244, 245
- Pivotal response training (PRT), 57, 96, 98
- Polypharmacy, 302
- Population-based heuristics, 196
- Positive reinforcement
 availability, 139
 discriminative stimuli, 139
 inappropriate behavior, 139
 misbehavior, 139, 140
 parents, 139
 prosocial behavior, 138
 token reward systems, 138
- Post-certification training, 311
- Post-credential professional development, 310
- Postdoctoral experience guidelines, 30
- Post licensure continuing education
 requirements, 17
- Post licensure psychologists, 22
- Post-traumatic amnesia (PTA), 270
- Post-traumatic hydrocephalus, 268
- Practical medical education, 16
- Practice guidelines, behavioral gerontology
 BACB task list
 advocacy, 308
 knowledge, 307, 308
 populations and treatment targets, 307
 skill sets, 308, 309
 target behaviors, 308
 teams, 309
 goal, 307
 Pikes Peak training model, 307
 postdoctoral board certification, 307
 reimbursement, 307
- Practice-oriented PsyD programs, 20
- Practicing behavior analysts, 99
- Practicum courses/experiences, 30
- Practicum training, 21

- Praxis School Psychologist test, 129
- Precision teaching (PT)
- academic skills, 399
 - behavioral education, 398
 - behavior-analytic framework, 398
 - component-composite relations, 399, 400
 - functional mastery, 400, 401
 - measurement, 398
 - SCC, 398, 399
- Preference assessments, 274
- Prelinguistic milieu teaching (PMT), 57
- Primary care, 136, 206, 319
- Primary injuries, 268
- Probability of behavior, 5
- Problem behavior, 161, 347
- Problem-behavior severity, 162
- Problem-solving strategies, 380
- Problem-solving therapy, 221
- Process addictions, 325
- Profession's credentialing bodies, 14
- Professional and Ethical Compliance Code for Behavior Analysts, 35, 332
- Professional Competence and Responsibility, 123
- Professional competencies, 119, 196
- Professional development, 170, 198
- Professional ethics codes, 150
- Professional licensure, 421
- Professional regulatory frameworks, 14
- Professional societies, 420
- Progressive NCD, 310
- Progressive neurodegenerative diseases, 299
- Progressive respiratory disease, 294
- Project REACH, 292
- Promoting the Emergence of Advanced Knowledge (PEAK), 50
- Pro-social behaviors/engagement cues, 84
- Prosthetic environments, 299
- Protective-holding procedures, 169
- Provider behavior, 294
- Provisional certified brain injury specialist (PCBIS), 281
- Proximal assessment, 402
- Psychoactive drugs and classes, 320
- Psychoeducation, 147, 148
- Psychoeducational testing, 127, 132
- Psychological associate models, 38
- Psychological associates, 19
- Psychological Clinical Science Accreditation System (PCSAS), 232
- Psychology, 206
- Psychotropic medications, 230
- Pulmonary rehabilitative strategies, 294
- Q**
- Qualified Applied Behavior Analyst (QABA) Credentialing Board, 35
- Questionable practices, 303
- R**
- Radical behaviorism, 160
- Randomized controlled trial (RCT), 324
- Reciprocal imitation training (RIT), 57
- Recognized billing codes, 171
- Refusals, 176, 303
- Registered Behavior Technician (RBT), 33, 65, 68–70, 258
- Rehabilitation, 279, 282
- Rehabilitation and Independent Living (RAIL), 281
- Rehabilitative professionals, 280
- Reimbursement systems, 292
- Reinforcement, 58, 251, 252, 273, 278–280
- Reinforcement-based paradigm, 140
- Reinforcement-based procedure, 183
- Reinforcers, 221
- Relapse prevention (RP), 327
- Relational frame theory (RFT), 327, 405, 406
- Relational learning/critical thinking, 245, 246
- Relationship health, 342
- Relationship-burdening events, 305
- Repertoires, 52
- Request-response-reinforcement trials, 145
- Research-oriented PhD programs, 19–20
- Residential facilities, 303
- Residential supports
- applied behavior science, 242
 - behavioral assessment, 241
 - clinical practice (*see* Clinical practice)
 - institutionalization, 241
 - OBM, 256 (*see also* Organizational behavior management (OBM))
 - people with IDD, 241
 - teaching skill strategies (*see* Teaching skill strategies)
- Response to intervention (RTI), 403
- Responsibility to Schools, Families, Communities, the Profession and Society theme, 123
- Retention, endurance, and application performance standards (REAPS), 401
- Retraining programs, 126, 127
- Risk assessment, 231

S

- Saliva testing, 324
- Sandwich generation, 306
- Scarring/dark pigmentation, 323
- School contracts, 171
- School personnel, 162, 170
- School psychologists, 29
 - BCBAs, 118
 - behavior analyst skills, 117
 - behavior-analytic, 125
 - credentialing, 115, 116
 - delivery system, 120
 - educational and mental health services, 114
 - functional competencies, 120
 - Honesty and Integrity in Professional Relationships, 123
 - NASP, 123
 - practicing, 123
 - professional competencies, 118, 119
 - professional practice, 114
 - recruiting and promoting parent, 125
 - research, 114
 - roles and responsibilities, 125
 - salaries, 116
 - schools and families services, 114
 - scope of services, 117
 - state-certified, 118
 - themes, 123
 - working with parties, 114
- School psychology
 - ABA, 116, 132
 - applied professional discipline, 116
 - behavior analysis, 31, 116
 - credentialing requirements, 116
 - definition, 114
 - Division 16, 115
 - education, 30
 - ethics, 123–125
 - evidence-based practice, 31
 - fields, 114, 115
 - NASP's description, 114
 - postdegree experience and licensure, 30, 31
 - practice, 114
 - programs, 115
 - regulatory and licensing
 - frameworks, 125–129
 - services, 116
 - supervision, 130–131
 - training, 115
 - workforce development/job opportunities, 116–118
- School-based services, 68
- School-district guidelines, 170
- Schools, 370
- School-wide data monitor, 372
- Science-based instruction, 371
- Science-based practice, 114
- Scientist-practitioner approach, 164
- Secondary injuries, 268
- Self-Advocacy Behavior Management Model, 254
- Self-awareness, 277
- Self-care, 229
- Self-descriptive skills, 302
- Self-instruction, 58
- Self-management, 246
- Self-management strategies
 - adults with IDD, 254
 - behavior analysts, 254
 - opportunities, 255
 - procedures, 254
 - social validity, 254
 - supervision, 255, 256
- Self-paced, personalized, interactive networked (SPIN), 404
- Self-report, 222, 224, 300
- Service provision
 - social programming, 302
- Service recipient, 420
- Shaping, 327
- Sidman's behavior analytic methods, 5
- Sidman's *Tactics*, 5
- Simultaneous presentation, 182
- Single-stimulus preference assessment, 188
- Single-subject experimental designs, 103
- Skilled behavioral technician, 171
- Skills-building services, 310
- Skinner's *Behavior of Organisms*, 4
- Sleep, 272
- Smoking cessation, 326
- Social bonds, 247
- Social referencing, 93, 94
- Social reinforcement, 274
- Social significance, 52
- Social validity, 254
- Social work
 - education, 24
 - education competencies, 23
 - evidence-based practice, 25
 - MSW training curriculum, 23, 25
 - postdegree experience and licensure, 24, 25
 - professions, 23
- Society for the Experimental Analysis of Behavior (SEAB), 6
- Soft emotions
 - anger and frustration, 346
 - childhood experiences, 349
 - couples, 346

- hostility and intimacy, 346
 - loneliness, 346
 - partners' words and behavior, 346
 - recognizing, 346
 - therapy, 346
 - Soft-skills, 100
 - Specialist-level training, 126
 - Staff training, 258, 259
 - Standard celeration chart (SCC), 398
 - Standardized normative assessments, 101
 - Standardized task analyses, 57
 - State's postdoctoral residency training requirements, 16
 - Stigma, 311
 - Stimulus control, 226
 - Stranger anxiety, 84
 - Structured Clinical Interview for the DSM (SCID), 325
 - Student data, 382
 - Subspecialties, 196
 - Substance abuse counselors
 - employment opportunities, 318
 - functions, 319
 - Substance use disorders (SUDs)
 - basic pharmacological principles, 320, 322
 - behavior analysts, 318, 319
 - behavioral economics, 322
 - definition, 318
 - DSM-5, 318
 - genetic and neurobiological factors, 320
 - IC&RC task list, 323
 - physiological consequences, 323
 - prevalence, 318
 - psychoactive drugs and classes, 320
 - specialty training, 319
 - SUD treatments
 - ABA, 319
 - abstinence-based reinforcement, 323
 - BCBAs, 319
 - behavior assessment, 325, 326
 - behavior change procedures (*see* Behavior change procedures, SUD treatment)
 - biological testing, 323, 324
 - ethical considerations
 - BCBA ethical guidelines, 332
 - licensing and regulatory frameworks, 333, 334
 - parental consent, 333
 - patient confidentiality, 333
 - positive reinforcement procedures, 333
 - functional behavioral assessment and analysis, 335
 - IC&RC task list, 332
 - RCT designs, 324, 325
 - selection and implementation
 - interventions, 331
 - self-report measures, 324
 - specialization, 319
 - supervision, 334
 - Suicide/self-injury, 226
 - Supervised experience, 100
 - Supervisees, 130
 - Supervision, 159, 167, 211, 233, 281, 282, 426
 - competency-based framework, 130
 - multiple accreditors, 131
 - NASP's position statement, 130
 - professional expectations, 131
 - psychological services, 130
 - supervisees, 130
 - supervisors, 130
 - training opportunities, 131
 - training programs, 131
 - Supervision in School Psychology, 130
 - Suppressive events, 345
 - Synchronized reinforcement, 91
 - Syndromes, 300
 - Systems analysis, 362
 - Systems-based service delivery, 122
 - Systems design, 257, 258
- T**
- Target behaviors, 222
 - Targeting replacement behaviors, 105
 - Task analysis, 250
 - Task-based grounding, 143
 - Teacher certification exams, 31
 - Teacher mentors, 377, 378
 - Teacher Performance Rate/Accuracy (TPRA), 372, 378, 379
 - Teachers, 373, 375–377, 380
 - Teacher-training programs, 392
 - Teaching assistants (TAs), 373
 - Teaching skill strategies
 - antecedent interventions, 252, 253
 - prompts, 250, 251
 - reinforcement, 251, 252
 - self-management, 253–256
 - task analysis/chaining, 250
 - Telemedicine, 282
 - Therapeutic relationship, 228, 229
 - Therapeutic workplace, 329
 - Therapist, 223, 228
 - Therapist-specific factors, 230
 - Tiered service delivery model
 - BCaBA, 65
 - BCBA/BCBA-Ds, 65
 - licensure and insurance legislation, 66

- Tiered service delivery model (*cont.*)
 - RBT, 65
 - supervision, 65, 66
 - Timeout
 - applied research, 141
 - appropriate locations, 142
 - BPT paradigm, 142
 - child's noncompliance, 142
 - disciplinary procedure, 141
 - disciplinary strategy, 142
 - effectiveness, 141
 - environments, 142
 - inappropriate behaviors, 142
 - negative reinforcement, 142
 - parental narratives, 141
 - positive reinforcement, 141, 142
 - Token economies, 278, 279, 391
 - Token economy systems, 327
 - Token reward systems, 138
 - Topographical/structural approach, 86
 - Total food refusal, 176
 - Total task chaining, 58
 - Traditional behavioral couple therapy (TBCT)
 - behaviorally oriented approach, 342
 - problem-solving strategies, 342
 - relational distress treatment, 342
 - skills-based approach, 342
 - social learning/behavior exchange theories, 342
 - Training, 259
 - Transition plans
 - behavior analyst, 62, 63
 - child, 63
 - consistency, 63
 - IEP, 63
 - personnels, 63
 - strategies and treatment, 63
 - Traumatic brain injuries
 - neurobehavioral challenges, 269
 - neurodegenerative processes, 268
 - primary, 268
 - recovery measurement, 271
 - secondary, 268
 - Traumatic brain injury, 299
 - Treatment plans, 163, 165
 - Tummy time, 102
 - Typical Day Interviews and functional assessments, 149
- U**
- Unformalized principles, 5
 - United States Medical Licensing Examination (USMLE), 15
 - University training, 392, 393
 - Urine cotinine, 324
 - Urine drug tests, 324
 - USMLE exams, 15, 16
- V**
- Varenicline, 330
 - Verbal behavior, 219, 220, 224, 245, 380
 - Verbal behavior analysis, 372, 377
 - Verbal behavior assessment, 224
 - Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP), 50
 - Verbally mediated behaviors, 376
 - Veteran's Administration Hospital System, 319
 - Veterans Affairs Hospitals, 353
 - Video models, 58
 - Video-recorded sessions, 194
 - Vineland Adaptive Behavior Scale, 50
 - Virtual consultation, 194
 - Visual/picture prompts, 58
 - Vocal imitation, 88
 - Vocalizations, 86, 87, 104
- W**
- Work behavior domains, 28
 - Workability, 219