

Instruction in Functional Assessment

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The College at Brockport, State University of New York

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State University of New York

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About the Textbook

Instruction in Functional Assessment introduces learners to functional assessment (FA), which includes a variety of assessment approaches (indirect, observational, and experimental) for identifying the cause of an individual's challenging behavior for the purpose of designing effective treatments. FA is mandated by federal law and is a recognized empirically based approach to treatment of individuals with challenging behaviors (e.g., disruptive, self-injurious, and aggressive behaviors). Instruction in FA is essential for students who will one day enter professions as educators, psychologists, social workers, counselors, or mental health professionals.

The purpose of this textbook is to provide instruction in FA skills for pre-professionals in the fields of education and psychology. This supplemental resource provides the context, background, and knowledge to facilitate students' acquisition of the methods, decision-making, and skills involved in conducting FA. Each chapter begins with focus questions designed to promote reflective thinking and ends with discussion questions. To promote application of FA in diverse situations and teach important lessons, case studies of individuals with challenging behaviors, interactive activities, and opportunities for practice are embedded in the chapters. Moreover, the text includes the ingredients to facilitate students' role play and rehearsal of appropriate FA skills while working in cooperative groups and using performance-based training.

About the Authors

Marcie Desrochers earned her Ph.D. in experimental psychology from the University of Manitoba with specialization in developmental disabilities, applied behavior analysis, and computer applications in psychology. She is a board certified behavior analysis at the doctoral level (BCBA-D). Dr. Desrochers is an Associate Professor of Psychology at The College at Brockport, State University of New York. Marcie Desrochers has conducted research on teaching functional assessment and evaluating the effectiveness of a computer simulation program called Simulations in Developmental Disabilities. Marcie has extensive experience teaching undergraduate and graduate students, and supervising students and practitioners in the field.

Dr. Moira Fallon earned her Ph.D. in Educational Foundations from the University of New Mexico with specialties in cognitive development and special education. She has over thirty years of experience in the field of special education in public schools. She holds certifications from several states in learning disabilities, behavior disabilities, early intervention, and assistive technology. Dr. Fallon has published widely in issues of inclusion and advocacy for individuals with disabilities. Dr. Moira Fallon has been a leader in developing learning communities, promoting school leaders for continuous improvement, and identifying research based, supportive resources for improving professional skills. She is a Professor in the Department of Education and Human Development at The College at Brockport, State University of New York.

Reviewer's Notes

Instruction in Functional Assessment is a resource for students who plan to pursue a career in education, mental health, and related disciplines. Dr. Marcie Desrochers has expertise in the area of functional assessment, applied behavior analysis, and treatment of behavior disorders. Dr. Moira Fallon possesses expertise in the area of inclusive education and curricula design. Together, they have been able to combine their knowledge and skills to describe the application of functional assessment in educational settings. The resulting work expertly details a complex clinical procedure, functional assessment, by providing important introductory material such as the cause and prevalence of behavior disorders, the behavioral principles that underlie functional assessment, and practical considerations for conducting a functional assessment. The material is based on empirically-supported research, and the authors present the information in a well-written and easy to follow format. In addition, the text offers focus questions to serve as identifiers for critical information presented within each chapter. Case examples and role-play scenarios are also included to facilitate student acquisition of the material. Unlike other reviews or functional assessment, this book is very process-focused and places an emphasis on linking assessment outcomes to intervention development—a socially relevant outcome for any child or educator who is affected by challenging behavior. This is a highly recommended text and one that I plan to use in my own practice.

Henry S. Roane, Ph.D.

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Dr. Roane received his Ph.D. in Psychology with an emphasis on Applied Behavior Analysis from Louisiana State University in 2000. He is a former Associate Editor for the Journal of Applied Behavior Analysis (JABA) and serves on the editorial boards of five professional journals. Dr. Roane previously served on the Board of Directors for the Behavior Analysis Certification Board (BACB) and presently serves on the Board of Directors for the Society for the Experimental Analysis of Behavior. Dr. Roane has published 70 papers in various peer-reviewed journals and books and has given over 200 presentations at national and international conferences. His research and clinical work focuses on the assessment and treatment of challenging behavior displayed by individuals with developmental disabilities.

About Open SUNY Textbooks

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The pilot launched in 2012, providing an editorial framework and service to authors, students and faculty, and establishing a community of practice among libraries. The first pilot is publishing 15 titles in 2013-2014, with a second pilot to follow that will add more textbooks and participating libraries.

Participating libraries in the 2012-2013 pilot include SUNY Geneseo, College at Brockport, College of Environmental Science and Forestry, SUNY Fredonia, Upstate Medical University, and University at Buffalo, with support from other SUNY libraries and SUNY Press.

For more information, please see <http://opensuny.org>.

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This chapter briefly describes the characteristics of individuals with developmental disabilities and the challenging behaviors frequently displayed by this population. Research on the behavioral principles that have been shown to account for the occurrence of challenging behaviors is summarized. The risk factors contributing to individuals' challenging behaviors and the context in which they occur are explored to lay the groundwork for the need for effective assessment and treatment methods.

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This chapter defines functional assessment and describes why this approach is useful. It focuses on the methodology of functional assessment, including surveys, rating scales, observations, and experimental approaches to determine the function of behavior. The step-by-step process of functional assessment and ethical considerations are described.

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Consideration is given to the relevant factors involved in making treatment selections based on current research and function of the individual's challenging behaviors. To put it all together, the design of treatment as reflected in behavior intervention plans is reviewed.

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Identification of the relevant content material that provides the foundation for knowledge of functional assessment and the multiple resources available to access it are noted. Several instructionally effective methods for teaching knowledge and clinical decision-making are then briefly described.

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This chapter reviews how performance-based instruction and role play have been used to develop practitioner skills. Functional analysis, one type of functional assessment, involves an experimental manipulation of possible reasons for the challenging behavior. A brief description of past research involving how to teach functional analysis is reviewed. Additionally, methods of promoting generalization of those newly acquired skills beyond the training situation by incorporating case-based learning and general case strategy are described.

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This chapter describes a plan to guide teaching functional analysis skills in a comprehensive manner through role play, case-based teaching, and performance-based training methods. This exercise, with content material based on actual research cases, is designed to teach the process and implementation of functional analysis for use in classrooms, in-service training, and workshops.

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In this chapter, the differing perspectives of the functional assessment process are summarized. Additional examples and blank templates are shared to help broaden the reader's approach to functional assessment.

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Preface

A background in functional assessment is critical for all pre-professionals who are entering educational and mental health service fields and preparing to work with children and adults with developmental disabilities. Functional assessment (FA) includes a variety of assessment approaches (e.g., indirect, observational, and experimental) for identifying the cause of the individual's challenging behavior in order to design effective treatment. FA is mandated by federal laws for use in schools (IDEIA, 2004) and is an approach based on several decades of research demonstrating its effectiveness (Beavers, Iwata, & Lerman, 2013). As new professionals enter applied settings with initial training, they must demonstrate the knowledge and skills to work with all persons, including those whose behaviors are different and challenging. Children and adults whose behaviors are challenging deserve the opportunity to develop to their full potential (Fallon & Brown, 2010). FA procedures give professionals the tools to analyze and remediate those challenging behaviors that stand in the way of healthy development and high quality of life.

As inclusion continues to evolve in public school classrooms, work sites, and residential communities, psychologists, social workers, educators, counselors, and mental health professionals need to know FA procedures well and apply them with a variety of client characteristics and in multiple settings. The authors of this book believe that all interdisciplinary professionals and the families of persons with challenging behaviors need expertise in the professional skills of assessing and managing challenging and unique behaviors.

What is the purpose of this book? The purpose of this book is to teach interdisciplinary professionals about the process of functional assessment (FA). As inclusion continues to evolve in public school classrooms across the United States, those professionals' beliefs and practices are challenged by the changes in the students who make up their classroom communities (Shapon-Shevin, 2007). As many more people with challenging behaviors and unique characteristics enter new inclusive or heterogeneous settings, professionals may be ill-prepared to manage their behaviors. As new, pre-service level professionals enter their disciplines of education and psychology with initial training, they must demonstrate the dispositions, knowledge, and skills to work with all persons, including those whose behaviors are challenging. Children whose behaviors are challenging deserve the opportunity to develop to their full potential (Fallon & Brown, 2010). The emphasis of this book is on empirically-based strategies for teaching functional assessment to pre-professionals who will work in inclusive settings. The intended audience for this book is students who will be future teachers, therapists, and practitioners in the disciplines of psychology, mental health, counseling, social work, and education. The book may be used as the main textbook for teaching FA techniques, a supplementary text, or as a reference source for new professionals working in the field. Although methods to effectively teach various aspects of a FA approach have been studied (e.g., Iwata et al., 2000; Wallace, Doney, Mintz-Resudek, & Tarbox, 2004), none have put it all together in a comprehensive package that guides

college students and pre-professionals through the research, theory, and practice needed to perform this useful and effective method that is the cornerstone of practice in many professional disciplines today.

One of the unique features of this book is the integration of both psychological and educational perspectives embedded into the content. For instance, a psychologist may encounter a situation in which an individual's challenging behavior is presented in the school, home, vocational rehabilitation site, or work setting. An educator or counselor may find instances of challenging behaviors with children in kindergarten through 12th grade and across academic and social areas.

What features will the learner find helpful and useful in this book? Focus questions are presented at the beginning of each chapter to assist the reader in understanding the critical content of the chapter. Case studies of persons with challenging behaviors, interactive activities, quizzes, and practice activities are embedded in several chapters. Sample blank forms pertaining to tasks in the FA process are contained within the final chapter for duplication and use by readers as resources within their own settings. Terminology is defined within the context of each chapter. At the end of each chapter, discussion questions are available to use for reflective thinking in either a written, online format, or in-person oral discussion.

Acknowledgments

The authors are extremely grateful for the encouragement, advice, and expertise provided by Mary Jo Orzech and Cyril Oberlander. Additionally, our reviewers, Drs. Henry Roane, BCBA-D and Joseph Pear, contributed many invaluable suggestions and comments that shaped the focus of our writing efforts and resulted in a far better product.

Chapter 1

Challenging Behaviors of Individuals with Developmental Disabilities

Focus Questions:

- *What are the characteristics and types of developmental disabilities?*
- *What are some of the major challenging behaviors that this population often engages in and how can they be defined and measured?*
- *What is the prevalence of challenging behavior of individuals with developmental disabilities?*
- *What risk factors are associated with the occurrence of challenging behaviors?*
- *What is applied behavior analysis and the principles that account for behavior?*

Understanding Developmental and Intellectual Disabilities

Children and adults with developmental or **INTELLECTUAL DISABILITY** require the assistance of interdisciplinary professionals and parents to support their full development across adaptive areas. There are often many areas of need seen in a changing context across the individual's lifespan. A developmental disability (Developmental Disabilities Assistance and Bill of Rights Act of 2000 PL 106-402) is a chronic mental and/or physical condition that occurs between 5 and 22 years-of-age and is likely to occur indefinitely [www.govtrack.us/congress/bills/106/hr4920] (Brown & Felce, 2007). For a diagnosis of developmental disabilities, the individual shows functional limitations in three or more categories of: self-care, receptive and expressive language, academic learning, mobility, self-direction, independent living, and economic self-sufficiency. The ability of individuals with developmental disabilities to interact with others in an appropriate manner, to take care of one's self and one's needs, and to maintain focus and active learning are critical skills. Failure to perform in a general education classroom is often linked to poor social skills (Salend,

2005). The related services, care, and treatment required to provide the individually tailored support needed may span professional areas such as: medical, speech-language pathology, special education, psychology, occupational therapy, physical therapy, counseling, and social work among others (<http://www.acl.gov/Programs/AIDD/Index.aspx>).

The current diagnostic criterion for developmental disabilities is based more on function (limitations and capabilities) than category. As seen in Table 1, the main developmental disabilities include intellectual disability, autism spectrum disorder (ASD), cerebral palsy, and seizure disorder (Odom, Horner, Snell, & Blacher, 2007). Some individuals may have social, emotional, and behavioral issues within the definition of the disability (Vaughn & Bos, 2009). A functional diagnostic system provides information for treatment possibilities and deemphasizes labels that may produce negative connotations and reactions by others (Panek & Smith, 2005; Scior, Connolly, & Williams, 2013).

Table 1

General description of categories of developmental disabilities and resource links

Developmental Disability	Description	Resources
Intellectual Disability	Characterized by significant limitations in both intellectual functioning and adaptive behavior, which covers many everyday social and practical skills (AAIDD, 2010; DSM V, 2013)	www.aaidd.org
Autism Spectrum Disorder	A developmental disorder involving a wide range of significant impairment of social communication and interaction with repetitive behavioral aspects or restricted range of interest (DSM V, 2013)	http://www.cdc.gov/ncbddd/autism/index.html
Cerebral Palsy	Non-progressive, permanent brain damage that affects muscle movement, balance, and/or posture.	http://cerebralpalsy.org/about-cerebral-palsy/what-is-cerebral-palsy/
Seizure Disorder	A sudden disruption of the brain's electrical activity accompanied by altered consciousness or behavior.	http://www.epilepsyfoundation.org/

According to a survey of over 100,000 parents, approximately 14% of American children have a developmental disability (Boyle et al., 2011). In this study, developmental disability was very broadly defined and included learning disability, stuttering, and Attention Deficit Hyperactivity Disorder (ADHD) in addition to the categories listed in Table 1. The most common developmental disabilities include learning disability and ADHD with the prevalence of autism and ADHD increasing from 1997–1999 to 2006–2008 (Boyle et al., 2011). A recent United States nationally representative telephone survey of over 60,000 households with children found that the prevalence of autism spectrum disorder (ASD) was 2% among children ages 6–17 years in 2011–2012, an increase from 1.16% found in 2007 (Blumberg et al., 2013).

Behaviorally Defining & Measuring Challenging Behaviors

In addition to deficits in academic performance and adaptive behaviors, individuals with developmental disabilities often engage in **CHALLENGING BEHAVIORS** (Lowe et al., 2007; Poppes, Van der Putten, & Vlaskamp, 2010). Emerson (2001) defines challenging behavior as, “culturally abnormal behavior(s) of such intensity, frequency or duration that the physical safety of the person or others is likely to be placed in serious jeopardy, or behavior which is likely to seriously limit use of, or result in the person being denied access to, ordinary community facilities” (p. 3).

General categories of challenging behaviors include aggression, stereotypy, self-injurious, or disruptive behaviors. These categories require additional description to allow reliable assessment and treatment procedures to be performed. More specifically, self-injurious behavior (SIB) may consist of the individual forcibly (loud smack sound) hitting one’s own body with open or closed hand, or banging head against self or objects. A more specific and objective description of the behavior is necessary because one person’s definition of a general category of behavior, such as aggression, may differ from another’s, which is a problem in *reliability*. For instance, in one study in which 120 teachers were asked to define “disrespectful” behavior, over 17 different behaviors were given (e.g., talking back, not following teacher’s directions, interrupting adults) (Landers, Servilio, Alter, & Haydon, 2011). A behavior category would be inaccurately measured if it means one thing to one person and quite another to someone else.

A **BEHAVIORAL DEFINITION** must be objective, clear, specific, and complete such that two observers naïve to that person could read the definition and independently and reliably identify instances of the same behavior (Hawkins & Dobes, 1977). This approach to determining the accuracy of measurement and adequacy of definitions is called **INTEROBSERVER RELIABILITY**. Accurate measurement of the behavior is necessary for assessment purposes, to implement treatment procedures accurately, and to evaluate treatment effectiveness (Martin & Pear, 2011). For example, one behavioral definition of self-injury involves biting self by upper and lower teeth making contact with skin resulting in pink marks or indentations on skin (see Matson, & Turygin, 2012 for additional definitions of self-injury). Likewise, tantrumming is inadequate as a description of challenging behavior since it refers to a general category of behavior that would be open to interpretation. More specifically and objectively, tantrumming might be defined as screaming above a normal conversational level and forcefully banging one or both fists on the table. Aggression might be defined as making contact with an open hand, fist, or foot to any body part of another person. See Table 2 below for a list of questions to determine if your behavior definition is adequate.

Table 2

Checklist to gauge adequacy of behavioral definition

Checklist To Determine If The Behavior Of Interest, Challenging Or Desired Behavior, Is Appropriately Defined
Can you count or time the behavior, or measure how long it takes before it occurs?
Did you use observable and measurable terms in defining the behavior?
Will a stranger know exactly what behavior to look for after reading your definition?
Can you explain what the behavior is not (i.e., give non-examples of the behavior)?
Can you break the behavior into smaller specific, and more observable units?

In addition to defining the behavior accurately, behavior measurement procedures must be specified. Behavior can be observed and measured in terms of how many times it occurs or its *frequency* (e.g., number of coughs, instances of throwing chairs, or interruptions), how long the behavior occurs or its *duration* (e.g., duration of screaming, out-of-seat, or off-task), the form or **TOPOGRAPHY** of the behavior (e.g., how a yoga move is made, or how hair is brushed), or how long it takes for the behavior to occur following a stimulus or its *latency* (e.g., how long before someone walks to school after being told to go, or does their homework after it has been assigned). A behavior can also be measured in terms of its remnants, called **PERMANENT PRODUCT** (e.g., throwing items can be measured by counting the items on the floor, destroying furniture may be measured by counting the disconnected pieces). The frequency or duration of behavior within a larger period of time can be measured (See Miltenberger & Weil, 2013 for more). This is termed **CONTINUOUS RECORDING**.

Reliable identification of the challenging behavior will facilitate assessment of its function so that effective interventions can be designed. We will review environmental reasons for challenging behavior after considering prevalence and associated factors.

Prevalence, Risk Factors, and Psychosocial Implications of Challenging Behaviors

The likelihood of professionals encountering individuals displaying challenging behaviors is fairly high. One prevalence estimate of challenging behaviors displayed by people with intellectual disabilities ranges from 15-17.5%, according to Koritsas and Iacono's (2012) review of 22 frequently-cited studies. It should be noted that estimates of prevalence of challenging behaviors for individuals with developmental disabilities varies depending on the methodology used (e.g., variations in definitions, assessment measures) and population addressed (e.g., institutional, residential, nationalities). When focusing on self-injurious

behavior, a 19.1% prevalence rate was found in one state-wide parent survey of children with developmental disabilities (MacLean & Dornbush, 2012).

There are many co-occurring factors (such as diagnostic category and level of functioning) that may compound the difficulties that the individual with challenging behaviors and others around that individual face. Children with autism are more likely to show behavior problems compared to children without autism and more individuals with severe conditions are more likely to engage in challenging behaviors compared to those with less severe conditions (Totsika, Hastings, Emerson, Lancaster, & Berridge, 2011). In their sample of over 1,300 North American children and adolescents with autism, Felce and Kerr (2013) found that 88% of individuals with autism engaged in mild to severe aggression, with those cases mostly occurring to caregivers (56%). However, even with a sample of high functioning children with autism spectrum disorder, 72–86% had some sort of behavioral or emotional problems (Yoon, Ze, Tze, & Min, 2011).

Similarly, more severe levels of intellectual disability and autism have been found to be associated with the occurrence of challenging behaviors in a sample of adults with disabilities in Sweden (Lundqvist, 2013). More than half (62%) of these individuals had at least one challenging behavior as gathered through administration of the Behavior Problems Inventory (Rojahn, Matson, Lott, Esbensen, & Smalls, 2001) via interview method.

Multiple challenging behaviors and/or comorbid psychiatric conditions may be more likely to be present with individuals who display challenging behaviors (Rosenberg, Kaufmann, Law, & Law, 2011). Based on the use of the Self-Help and Behavior rating scale administered to 943 children with severe disability, Oliver, Petty, Ruddick, and Bacarese-Hamilton (2012) found that high frequency repetitive or ritualistic behavior was associated with a greater risk of severe self-injury. Moreover, low mood of people with severe and profound intellectual disabilities has been associated with challenging behaviors (Hayes, McGuire, O'Neill, Oliver, & Morrison, 2011). A higher rate of challenging behaviors was found with young children with atypical development and no ASD and comorbid psychopathology (e.g., anxiety behaviors, conduct problems, eating/sleeping problems, inattention/impulsivity) as measured by the Baby and Infant Screen for Children with Autism Traits (Matson, Mahan, Sipes, & Kozlowski, 2010). Likewise, higher rates of challenging behavior have been found with a sample of adults with developmental disabilities and symptoms of depression (Turygin, Matson, MacMillan, & Konst, 2013).

The presence of communication deficiencies has also been linked to the occurrence of challenging behaviors (Kevan, 2003; Matson, Boisjoli, & Mahan, 2009). In one interesting study examining the relationship between communication skills, social skills and challenging behaviors with 109 children with ASD though, the presence of challenging behaviors was associated with more impaired social skills than difficulties in communication (Matson, Hess, & Mahan, 2010).

It is important to note that the studies cited above examining *associated* risk factors with the occurrence of challenging behaviors involved some form of descriptive/correlational research method, which merely provides information about the type of association and its strength. Correlational results do not provide information about *causation* or cannot tell if one variable causes another; such as the proposition that poor communication skills cause challenging behaviors to occur. It may be that poor communication causes challenging

behavior, challenging behaviors cause poor communication, or quality of early home environment causes both poor communication and challenging behaviors. The careful manipulation and control of confounding variables involved with an experimental research method rules out alternative explanations and that methodology is not present with correlational research designs. Correlational research simply portrays the relationship between two variables (e.g., positive relationship where both variables increase, negative relationship where one variable increases as the other decreases). In the research cited above, due to the nature of the variables studied (e.g., type of disability and occurrence of challenging behavior), only descriptive/correlational research is possible.

The ramifications of challenging behavior are pervasive. Severe behaviors such as aggressive, self-injurious, and disruptive behaviors can be some of the most intractable and troublesome to deal with, contributing to staff and teacher stress and burnout (Hastings & Brown, 2002; Male & May, 1998). Parenting stress has been associated with higher levels of child behavior problems (Rezendes, & Scarpa, 2011). Totsika et al. (2011) found that mothers of children with autism are more likely to have emotional problems compared to mothers of children without autism. The occurrence of challenging behavior by the individual may also negatively affect attachment with support staff (De Schipper, & Schuengel, 2010). Staff may see themselves as less able to control the individual's behavior if it is severe and thus less likely to step in to intervene to improve it (Dilworth, Phillips, & Rose, 2011).

The occurrence of challenging behaviors may lead to the use of restrictive procedures to curb those behaviors (Matson & Boisjoli, 2009). Allen, Lowe, Brophy, and Moore (2009) reviewed social service agencies' plans for 901 individuals with developmental disabilities in South Wales, UK, and found that more severe aggressive behavior was associated with a higher use of restrictive procedures (e.g., seclusion, emergency restraint, medications).

Applied Behavior Analysis

Applied behavior analysis (ABA) principles and techniques provide a means of addressing the challenging behaviors of individuals with developmental disabilities. ABA consists of a variety of environmentally-based procedures to increase socially significant behaviors (Cooper, Heron, & Heward, 2007). ABA is based on learning principles and procedures, and many of the techniques used in this field have been empirically validated to be effective at changing overt (observable) and covert (e.g., thoughts, feelings, images) behaviors. The use of ABA has led to a greater understanding of the occurrence of both normal and abnormal behaviors and has resulted in the development of many empirically-based treatment procedures for challenging behaviors (Fisher, Piazza, & Roane, 2012).

Environmental Factors Maintaining the Individual's Challenging Behavior

The main factors that contribute to the occurrence of challenging behavior include the immediate environmental consequences that follow that behavior and the cues or anteced-

ents that signal those desired consequences. A recent meta-analysis of over 170 empirical studies found that, in most clinical cases, a clear environmental reason for the individual's challenging behavior was identified (Matson et al., 2011).

Positive reinforcement and negative reinforcement are the basic environmental functions or maintaining variables for individuals' challenging behavior (e.g., Beavers, Iwata, & Lerman, 2013; Lancioni, Singh, O'Reilly, Sigafoos, & Didden, 2012; Matson, 2009). **POSITIVE REINFORCEMENT** is a term used when events, objects, or sensory stimuli presented immediately following a behavior result in an increase in that behavior in similar situations (Martin & Pear, 2011). For instance, an adolescent who has severe intellectual disability and is in a wheelchair may grab at staff's clothes resulting in much negative attention from the staff member (e.g., a stern look and statement to, "Please don't do that!"). Although the staff member may be attempting to decrease the individual's behavior, if the grabbing behavior is increasing and occurring when someone is around, then that behavior may be maintained by positive reinforcement in the form of attention. **POSITIVE REINFORCERS** are the specific consequences that increase the individual's behavior, and can include attention, toys (tangibles), or food (edibles). It should be recognized that there are many consequences that are positive reinforcers for a child and what is a positive reinforcer for one may not be for another. Attention (even in the form of reprimands), objects (e.g., toys, food, electronic devices), and specific events (e.g., seeing a show, going for a walk) can be positive reinforcers when they increase the behavior that preceded it.

Reinforcement may also be produced by engaging in the behavior itself without any mediation by others, termed **AUTOMATIC POSITIVE REINFORCEMENT**. For instance, the individual might be engaging in excessive finger tapping as a function of the sensory stimulation produced by that behavior. Likewise, thumb sucking may occur because of the sensations it produces on the skin.

Another major function of challenging behavior is negative reinforcement (Lancioni, Singh, O'Reilly, Sigafoos, & Didden, 2012). **NEGATIVE REINFORCEMENT** refers to stimuli or events that when removed or avoided immediately after a behavior increase its rate in similar situations (Martin & Pear, 2011). A **NEGATIVE REINFORCER** is an object or event that when it is immediately removed (*escape conditioning*) or prevented (*avoidance conditioning*) following a behavior results in that behavior being more likely to occur in similar situations. For example, a child at the dinner table may scream at the top of her lungs leading to the parent sending the child to her room. If that child screams at dinnertime more often, then negative reinforcement, in the form of "escaping" from the dinner table, may be occurring. As another example, a child who is having difficulty with his homework talks to nearby classmates to avoid completing the work. See the Table 3 below for additional examples of challenging behaviors maintained by positive and negative reinforcement.

Table 3

Examples of Challenging Behaviors Maintained by Positive and Negative Reinforcement

Possible Environmental Causes Of Challenging Behavior: Positive Reinforcement	Possible Environmental Causes Of Challenging Behavior: Negative Reinforcement
The individual may receive one of the following after the behavior resulting in its increase:	One of the following may be removed or avoided after the behavior resulting in its increase:
Attention (e.g., reprimands given after a child screams) Tangible (e.g., hitting another child to get a toy, grabbing someone's food) Automatic (nonsocial sensory-based) (e.g., sucking fingers due to the sensation it produces, regurgitation to stimulate the esophagus, screaming because of the sound produced, rocking due to inner ear stimulation)	Demands/tasks (e.g., tantrums result in unpleasant task or situation being removed) Attention (e.g., running away to remove undesired attention) Automatic (nonsocial sensory-based) (e.g., hitting head to relieve pain, being aggressive to remove noise or get out of a crowd)

As is the case with positive reinforcers, a stimulus that is a negative reinforcer for one individual may not be so for another. The best way to determine if something is a negative reinforcer is to test whether the rate of a behavior increases when certain events are removed immediately after that behavior compared to a condition in which no consequences are delivered following the behavior. To ensure consistency in the results and rule out confounding factors, this test should be replicated or repeated in an A-B-A-B fashion where A = no consequence and B = a consequence for behavior is provided.

A history of reinforcement for the occurrence of challenging behavior in addition to the presence of certain antecedent stimuli or conditions that “set the stage” or increase the likelihood for the behavior (e.g., difficult work assignment, certain person) should be identified. The purpose of assessment is to identify the reason or function for the individual's challenging behavior. An analysis of the function of behavior entails breaking the situation into smaller units to allow a clearer understanding and determination of the behavioral principle (positive reinforcement or negative reinforcement) involved in controlling the individual's behavior (Martin & Pear, 2011). The motivational condition, antecedent stimulus, behavior, immediate consequence, and long term effects should be identified to reveal the behavioral principle that is involved, as illustrated in the box below. A **MOTIVATIONAL OPERATION** refers to a temporary state or condition that changes the value of the reinforcer and the probability of behavior that leads to that reinforcer (Michael, 2000). For instance, after not drinking water for several hours while out in hot weather, the value of a drink as a positive reinforcer will increase and there is a greater likelihood of the individual asking for something to drink. Additional examples of how the individual's situation can be broken down, and thereby better understood by analyzing the motivational condition, antecedent stimulus, behavior, and immediate consequence is shown in the Table 4 below.

Table 4

Examples of a behavioral analysis of the situation in terms of the motivating conditions, antecedents, and consequences for behavior

Motivational Condition	Antecedent Stimulus/Situation	Behavior	Immediate Consequence	Long Term Effect	Behavioral Principle
Hunger	Middle of night	Adolescent gets up and screams and yells	Provided with pudding	More likely to scream and yell in future similar situations	Tangible positive reinforcement
Lonely or no social interaction for hours	Presence of staff member	Young adult in wheel chair grabs staff member	Staff member says, "No, don't do that!"	More likely to grab staff members in similar situations	Attention positive reinforcement
Difficult assignment	Teacher says, "Complete this assignment"	Child gets out of seat and socializes with neighbor	Gets out of doing assignment	More likely to get out of seat and socialize when given difficult assignments next time	Escape negative reinforcement
Low levels of stimulation	Light switch present	Repeatedly flicks light on and off	Sensory stimulation of light flickering	More likely to flick lights when in a similar situation	Automatic positive reinforcement

Determining the function of an individual's challenging behavior can, at times, be difficult. For a small percentage of cases, the individual's behavior may be controlled by multiple functions or be unable to be specified (Beavers & Iwata, 2011; Mueller, Nkosi, & Hine, 2011). The challenging behaviors of 521 participants reviewed by Beavers and Iwata (2011), showed only 16.9% had multiple functions with most behaviors involving multiple response topographies. In a small percent of cases (roughly 4-12%), the individual's challenging behavior may be maintained by idiosyncratic variables or, particular antecedents or consequences specific to that case (Schlichenmeyer, Roscoe, Rooker, Wheeler, & Dube, 2013). As Schlichenmeyer et al. (2013) note in their review of the research literature, idiosyncratic variables such as preferred conversation (Roscoe et al., 2010), instructional style (Borrero et al., 2004), or the therapist leaving the room (Edwards et al., 2002) may be involved in setting the context for increased likelihood of the occurrence of the individual's challenging behavior. These idiosyncratic variables may be difficult to pinpoint unless assessment procedures are tailored to the individual's circumstances. Additional factors that may contribute to the individual's challenging behavior can be seen in Table 5 below.

Table 5

Possible relevant factors that may be related to the occurrence of challenging behavior

<i>Organismic</i> • Motivational state (e.g., hungry, thirsty) • Temporary bodily states (e.g., fatigue, menstrual cramps) • Emotional state (e.g., jealousy, frustration) and other conditioned emotional responses (fear, anger, anxiety) • State of health (e.g., flu, headache, allergies) • Medication effects and side effects (e.g., lethargic) <i>Familial</i> • Abuse, neglect, nutrition, poverty, loss of work, death in family, socioeconomic factors, ethnicity <i>School-related</i> • Size of room, number of people, teacher proximity, temperature, noise, lighting, unclear directions, unpredictability, inadequate help, unclear expectations • Events, holidays, certain activities (e.g., dances), visitors
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Special Education Perspective

Many children with behavior disabilities (BD) including challenging behaviors are served in general education classroom settings. Approximately 25% of all school age children identified with a disability are labeled as having a behavior disability (Vaughn & Bos, 2009). Twice as many males as females are labeled as having BD and more children who are African American are labeled than any other ethnicity (Vaughn & Bos, 2009).

School districts and agencies often lack personnel trained in the professional decision making process to handle these difficult situations and so must hire experts to provide training at high financial cost (Hall & Hall, 2003). It is of critical importance to develop partnerships between schools that lack the expertise and colleges and universities that can train teachers to manage challenging behaviors (Johns & Carr, 1995).

The movement for **INCLUSION** of students with disabilities in public schools has had a major impact on the way teachers are trained to work with all students and on the way students learn in the classroom setting (Mastropieri & Scruggs, 2010). The inclusion movement, which began in the early 1990's after decades of integration of students with disabilities into the least restrictive environments (LRE) for learning, redefines the philosophy of teaching and learning so that all learners, regardless of abilities, have the opportunity to work on their academic and social skills alongside of their peers. Inclusion is the process of teaching so all students can process and understand the material in whatever way is best for them. Inclusive education is a core belief and set of teaching practices that supports the tenet that all students should be full members of the community (Shapon-Shevin, 2007, p. xii). However, students with challenging behaviors are often found to be segregated due to those behaviors. Professionals and families must work together to ensure

that the effects of challenging behavior are addressed in inclusive educational settings that provide heterogynous groupings for students.

As inclusive classrooms across the United States continue to evolve according to legal mandates, teachers' beliefs and practices are still being challenged by the changes in the students who make up their classroom communities (Shapon-Shevin, 2007). As new, pre-service level teachers enter the field of education with training, they must demonstrate the dispositions, knowledge, and skills to work with all students. The instructional demands for teachers are staggering; many classes have students for whom English is not their primary language, students who have experienced trauma, students who are years behind their classmates, and students who lack basic experiences for understanding their world. For teachers, the demands are to assist students and their families in the identification and remediation of challenging behaviors that prevent full inclusion placements. However, the movement may not be successful especially for those students with significant behavioral needs if educators cannot find a way to identify, assess, and intervene in these significant behavioral challenges in classrooms. A strong need exists for effective methods to decrease the challenging behaviors of individuals with developmental disabilities.

Summary

Individuals with developmental disabilities may display a broad array of challenging behaviors and lack the social and adaptive behaviors that are necessary for functioning in everyday life. However, students with disabilities have the right to be educated in settings that are heterogeneous. Inclusion has been used to describe the education of students with disabilities in general education settings or inclusive settings with peers who can act as role models. Co-occurring conditions for the individual may be present and increase the difficulty and complexity of that case for the professional addressing the individual's needs. The first step when attempting to help the individual is to behaviorally define that person's challenging and desired behaviors, which can assist in its measurement, assessment, and treatment. Environmental factors, such as positive reinforcement and negative reinforcement, are major reasons for the occurrence of challenging behaviors and must be addressed in on-going assessment and treatment procedures. Applied behavior analysis is an empirically-based approach that can be used to teach adaptive and desirable behaviors and decrease the challenging behaviors observed in various settings with this population. Chapter 2 will review FA methods as a means to identify the function of individual's challenging behaviors.

Discussion Questions

1. What challenging behaviors are most important to address? What considerations are important when prioritizing which of several challenging behaviors should be targeted?
2. Discuss whether risk factors are likely to cause challenging behaviors. Explain why it is difficult to know what the cause of challenging behaviors is (hint: draw from your knowledge of research methods).
3. Why is it important to understand the function of an individual's challenging behavior?

Exercise 1: Behavior Definition

1. What are the characteristics of a well-defined behavior?

2. Are each of the following definitions of behavior adequate? If not, then revise the definition to improve it.
 - a. Non compliance = a child does not complete the instruction delivered by the experimenter within 6 s of presentation of the instruction

 - b. Stereotypy = flapping hands or arms, rocking torso, jumping and turning in circles, waving, mouthing

 - c. Aggression = firmly grabbing and pulling on the experimenter or cursing

3. Read the following behavioral definitions and determine if you think the problem behavior in bold is well-defined. If your answer is “no,” change the problem behavior by defining it appropriately.
 - a. Tomika is very **disrespectful** in that she sasses her teachers when she does not want to do what they ask.

b. Paula engages in **inappropriate interactions** with her peers by being quiet and disagreeable.

c. **Inappropriate vocalizations** that Ternia says include loud or high-pitched statements such as “No!” and “I want to go home.”

4. Define teasing.

Exercise 2: Identifying, Defining, and Measuring Behavior

With a partner, go to a public location (e.g., cafeteria, library, building hallway or courtyard) and identify a behavior that one or many individuals are displaying. Be sure that the behavior occurs fairly frequently (e.g., at least once per min).

1. Behaviorally define the behavior.
2. Indicate how to measure it (e.g., frequency, duration, latency, permanent product). Select a data sheet from Chapter 7 templates.
3. You and your partner should independently measure it.

4. Compare your data with your partner's. Did you agree on all occurrences of the behavior? Why or why not? How could you improve your definition of the behavior?

Exercise 3: Practice in Identifying Behavioral Principles

Next, determine for each of the following if this is an example of positive or negative reinforcement.

1. Sally receives a point on her score card for making a perfect shot in basketball. She is shooting baskets better than ever.

Positive Reinforcement

Negative Reinforcement

2. A child is in the dentist's seat and when the dentist goes to insert a tool in his mouth, the child shakes his head and says, "No!" The dentist removes the tool and moves away from the child. The dentist always has a hard time with this little fellow.

Positive Reinforcement

Negative Reinforcement

3. Frederick is a teenager with an obesity problem who joins the gym, and regularly works out. His best friend works out with him and repeatedly tells him how he is getting stronger and fitter right after each session. Frederick goes to the gym more often.

Positive Reinforcement

Negative Reinforcement

4. Whenever a teacher places a worksheet on the student's desk, the student then gets up and sharpens an already sharp pencil to get out of doing the work.

Positive Reinforcement

Negative Reinforcement

5. In school art class, Almero made some paper cut-out flowers to give to his mom, which resulted in many hugs and kisses from his mom. He does this more often now.

Positive Reinforcement

Negative Reinforcement

Exercise 4: Analysis of Challenging Behavior

Exercise

1. Think of someone you know who engages in a challenging behavior.
2. Behaviorally define the individual's challenging behavior so that it might be reliably observed and measured.
3. Speculate on the possible environmental reason for it by completing the following chart.

Motivating Condition	Antecedent	Behavior	Immediate Consequence	Long Term Effect	Behavioral Principle

Chapter 2

The Methodology of Functional Assessment: Process and Products^{*}

Focus Questions:

- *What is functional assessment?*
- *What are the three main functional assessment approaches and how are they used?*
- *What are the advantages and disadvantages of each approach?*
- *What ethical considerations are necessary when implementing functional assessment?*

What is Functional Assessment?

Functional assessment (FA) refers to a variety of approaches, including indirect, observational, and experimental/functional analysis procedures (Hanley, Iwata, & McCord, 2003; Hagopian, Rooker, Jessel, & DeLeon, 2013; Iwata, Dorsey, Slifer, Bauman, & Richman, 1994; Mueller, Nkosi, & Hine, 2011). FA has been found to be useful with a wide range of behaviors and populations, such as feeding disorders (Gale, Eikeseth, & Rudrud, 2011; LaRue et al., 2011), chronic hand mouthing (Roscoe, Iwata, & Zhou, 2013), off task behavior of children in the classroom (Meyer, 1999), social avoidance (Harper, Iwata, & Camp, 2013), aggression and self-injurious behaviors (Fritz, Iwata, Hammond, Bloom, 2013), elopement (Tarbox, Wallace, & Williams, 2003), hand flapping of children (Mueller, Sterling-Turner, & Scattone, 2001), hair twirling (Deaver, Miltenberger, & Stricker, 2001), and rumination (Lyons et al., 2007). The spring 2013 issue of the *Journal of Applied Behavior Analysis* is devoted to FA-related research reflecting the strong empirical foundation that has contributed to the development of this approach. Furthermore, FA is a relatively versatile approach that, following instruction, has been implemented by parents (Gale, Eikeseth,

^{*} Please note that FA and treatment procedures should be performed only by well-trained and experienced individuals or under the supervision of a qualified individual (e.g., a Board Certified Behavior Analyst®)

& Rudrud, 2011; Shayne & Miltenberger, 2013), students (Iwata et al., 2000), teachers (Wallace, Doney, Mintz-Resudek, & Tarbox, 2004), and staff (Moore & Fisher, 2007).

The main reason for conducting a FA is to identify the possible causes of an individual's challenging behavior so that an effective treatment can be designed (Chander & Dahlquist, 2010). Identification of the variables maintaining the challenging behavior prior to designing treatment is necessary since certain treatments can be contra-indicated or ineffective, depending on the function of the behavior (Iwata, Pace, Cowdery, & Miltenberger, 1994; Newcomer & Lewis, 2004).

Other reasons for using a FA include that it:

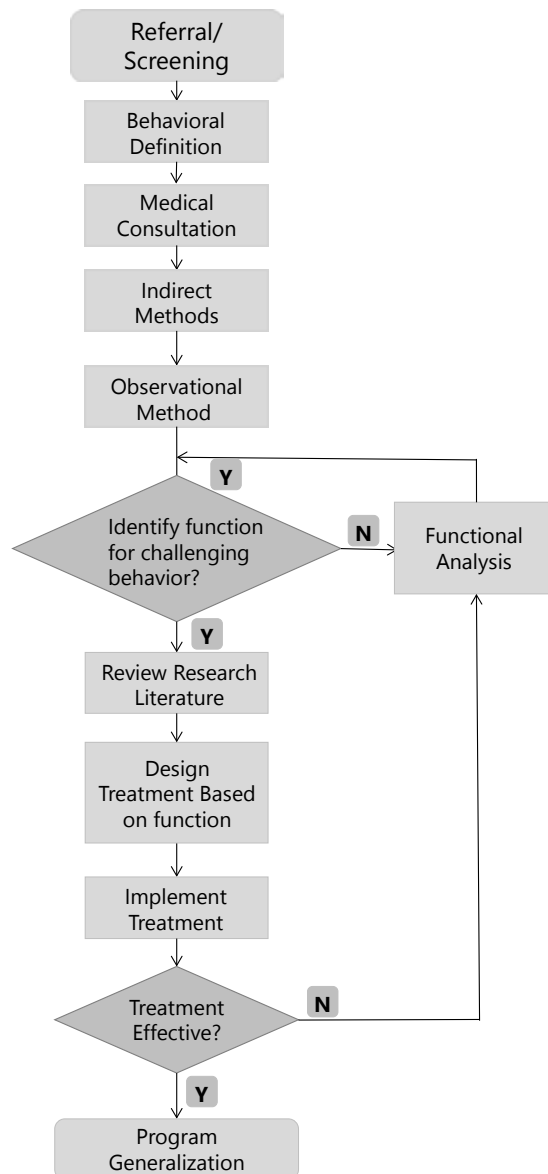
- Is required by federal law (IDEIA, 2004)
- May provide convincing evidence for treatment team decision-making and provide accountability
- May result in less use of a punishment procedure (Pelios, Morren, Tesch, & Axelrod, 1999)
- Is recommended by professional associations (National American School Psychologists)

A FA approach is used to gather data regarding why the individual's challenging behavior is occurring. Challenging behaviors may serve a purpose or function for the individual and are often a function of environmental conditions (Hanley, 2012). After the reinforcers maintaining the individual's challenging behavior are clearly identified, it should be possible to predict the circumstances under which the behavior is likely to happen and what is causing it to recur. The motivating conditions and antecedents for the individual's challenging behavior may be altered to decrease that behavior. For example, if Mary cries and hits herself due to fatigue when her bedtime approaches, then an earlier bedtime can be arranged. Similarly, Darrell's hitting and screaming for candy at the grocery store may be prevented by bringing some of his favorite snack on the shopping trip and keeping the trip short. Additionally, more appropriate behaviors that achieve the same result may be taught, called **FUNCTIONAL REPLACEMENT BEHAVIOR**. For example, Nija's crying when she wants her doll can be decreased by teaching her to make the sign for doll in situations where she cried to get it in the past. To decrease the likelihood that Caden runs out of the classroom when reading class begins (a difficult skill for Caden), his teacher provides additional one-on-one instruction to establish his reading skills.

FA Methodology

There are three main categories of functional assessment approaches—indirect (e.g., questionnaires, rating scales), observational, and experimental/functional analysis. Gathering information about the conditions surrounding the behavior, asking relevant individuals questions about the behavior are initial steps. If the results of indirect and observational assessment are unclear, testing the possible maintaining variables for the individual's challenging behavior would next be performed. See Figure 1 of the FA process for an outline of this overall way to proceed when addressing the individual's challenging behavior.

Figure 1
The Functional Assessment Process



Indirect Functional Assessments

An **INDIRECT FUNCTIONAL ASSESSMENT** is a procedure in which information about the challenging behavior is gathered from persons who are closest to the individual, such as parent(s), teachers, service providers, and aides. Rating scales, questionnaires, and interviews are used to gather information on potential factors that contribute to the individual's challenging behavior (e.g., O'Neill et al., 1997). One example of an indirect assessment method is the Functional Analysis Screening Tool (FAST). The FAST is a 16-item questionnaire that can be administered to individuals who know the person with challenging

behavior well to identify antecedents and consequences correlated with the behavior (Iwata, DeLeon, & Roscoe, 2013).

When using an open-ended FA interview, persons who are the closest to the individual with challenging behaviors are asked to describe in detail the circumstances occurring before and after the challenging behavior, the conditions under which it occurs most and least, its characteristics, and more (Hanley, 2012; O'Neill et al., 1997). Correlated variables noted from the information gathered during the interview can then be further examined with other types of FA. Additionally, an indirect functional assessment may be helpful with initially defining the challenging behavior since the relevant individuals are asked to describe exactly what the individual does when performing the challenging behavior.

There are limitations of using an indirect FA. Since the type of data gathered with indirect methods is not based on objective direct observation, it may be laced with differing perspectives and subjective viewpoints and be prone to memory errors. For example, interview data can provide much information, but can also be biased. A parent may relay during an interview that her child's challenging behavior only "occurs when his dad is taking care of him." In this example, the parent seems to identify the father as part of the problem. In a recent study, Iwata et al. (2013) found that reliability, or the agreement between raters, using the FAST was 71.5%. The validity of the FAST, or an outcome comparison of FAST to an experimental analysis of behavior, was found to be 63.8% across 69 cases. These results suggest that although indirect methods, such as the FAST, can be a quick means of obtaining preliminary information about the nature of the individual's challenging behavior, additional corroborating evidence about the function of the behavior is necessary. This additional evidence may be obtained by the therapist or teacher conducting an observational FA.

Observational Functional Assessment

In an **OBSERVATIONAL FUNCTIONAL ASSESSMENT**, the professional directly and unobtrusively observes the individual's challenging behavior in the natural environment, and records the circumstances surrounding the behavior (Lalli, Browder, Mace, & Brown, 1993). One method of collecting observational assessment information is to use a **TIME CHART**, where a mark is made in the appropriate cell to indicate the time period and day in which a particular behavior was observed (Touchette, MacDonald, & Langer, 1985). From this information, certain activities, events or people correlated with the occurrence of the challenging behavior can be identified as possible causes of that behavior. For example, as seen in Table 6 below, if it is found that Sally consistently runs around and screams at 10 am, then the activity and conditions that usually occur at that time, say, during spelling, can be explored as somehow being associated with her behavior (e.g., difficult, noisy, boring, peer attention) and possibly contributing to it.

Table 6
Example of Time Chart Data Sheet

	M	T	W	Th	F	S	S
7:00							
8:00							
9:00					X		
10:00	X		X	X			
11:00		X			X		
12:00							
1:00							
2:00							
3:00							
4:00							
5:00							
6:00							
7:00							
8:00							
9:00							
10:00							
X = at least one instance of the behavior							

Data is collected on the antecedents, behavior, and consequences (the **ABCs OF BEHAVIOR**) as they unfold in the situation where the challenging behavior most often occurs. This procedure of writing down in as much detail and objective a manner as possible is called **ABC FUNCTIONAL ASSESSMENT**. An ABC functional assessment often takes place in multiple settings or under different conditions (e.g., during math, language, or physical education instruction) so as to provide similar and contrasting information about the situations where the challenging behaviors are likely to occur. The degree of consistency in co-occurrence of certain antecedents and/or consequences with the challenging behavior across 30–60-min sessions held across 5 or more days is analyzed. These data may also serve as baseline information to compare the effects of later implementation of treatments to decrease the individual's challenging behavior. Teachers, families, or staff may record the circumstances surrounding the individual's challenging behavior. For instance, Annette may scream when adults around her are talking and when she does this, an adult typically asks her to be quiet. Examples of antecedents within the learning environment may include instructional content, teacher proximity, and peer interactions. Positive reinforcers for the challenging behavior may include certain language, gestures, removal of demands, physical touch, or eye contact by teachers or other students. See Table 7 for an example of an ABC recording data sheet.

Table 7
Example of ABC Recording Data Sheet

Client: Barbara Beam			
Situation: Special education class. Picture naming task with teacher's assistant (TA)			
Observer: Therapist			
People Present: 15 other students, teacher, TA			
Time	Antecedent	Behavior	Consequence
1:30 pm	TA hold up picture & "What's this?"	"hoose"	"Good, Barbara, that's it: horse."
1:45 pm	Picture of flower presented "What's this?"	"hoose"	"No, it's a flower"
	Flower & "What's this?"	No response	"Flower, say flower"
	Flower & "What's this?"	Cry, flap hands	"Quiet, Barbara"
	Flower & "What's this?"	Grab card & rips it while screaming and flapping hands	"Barbara, no!"
1:52 pm		Slowly stops crying, sitting quietly, finger flicking	

A direct observational FA can provide an objective means of gathering information that may help to substantiate indirect assessment findings. The data generated from an ABC recording procedure can be subjected to a **CONDITIONAL PROBABILITY ANALYSIS** of the correlated observed antecedent and consequence events to determine which events are most likely to be associated with the challenging behavior (e.g., frequency of X antecedent co-occurring with behavior divided by the total number of times X occurred multiplied by 100). However, it should be recognized that observational methods are correlational and so causal conclusions are not possible. There may be other factors involved in contributing to the occurrence of the individual's challenging behavior that are involved and have not been identified.

Functional Analysis (FAn)

FUNCTIONAL ANALYSIS involves an experimental test of the different possible functions for the client's problem behavior (e.g., attention positive reinforcement, tangible positive reinforcement, demand/negative reinforcement). FAn has been established as a clinically effective method of identifying the function of challenging behavior and treating it based on several decades of accumulated research (Beavers, Iwata, & Lerman, 2013). Using a standard FAn, attention, demand, tangible, and alone conditions are compared to a play/recreational control condition (e.g., Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994).

The *attention condition* is conducted to determine if the individual's problem behavior is due to attention positive reinforcement. Under conditions of social deprivation and in the presence of one or two adults, eye contact, physical contact, reprimands, and verbal interaction "No, don't do that" or similar comments that typically are given by others in the individual's natural environment are delivered immediately after the individual's challenging behavior. Note that this condition may be tailored to the specific stimuli found to correlate with the occurrence of the individual's challenging behavior based on indirect and observational FA.

The *demand condition* is conducted to determine if the individual's problem behavior is due to escape/avoidance of task demands or activities (i.e., negative reinforcement). The therapist or teacher presents an activity or instruction to complete a task that the individual has in the past (based on interview or observational data) had difficulty in completing even when physically guided to do so. If the individual engages in the challenging behavior at any time, then the therapist immediately turns away from the client for 30 s.

The *tangible condition* is conducted to evaluate whether tangible positive reinforcement is maintaining the individual's challenging behavior. Based on information gathered from other assessments (e.g., indirect, observational), preferred objects are placed out of reach (e.g., on a shelf). When the individual engages in the challenging behavior, that preferred item is delivered for 30 s.

In the *alone condition*, the client is in a room by him/herself with no toys or activities. Note that, as is the case in each of these conditions, all safety concerns should be addressed and appropriate precautions taken. The therapist observes the client's behavior for the purpose of data collection from a one-way mirror or video camera. This condition involves a situation in which low levels of stimulation are present in order to test whether self-stimulation or automatic reinforcement is maintaining the client's problem behavior. The client is placed in the therapy room alone, without any toys or materials that would provide a source of stimulation.

In the *play condition*, toys or activities are presented and the therapist interacts socially with the client. This condition serves as a comparison or control condition to rule out confounding variables such as the challenging behavior due to variables present in the attention, tangible, or demand conditions (e.g., the presence of the therapist, materials, social interaction). The therapist and client are in a room with a variety of toys or leisure activities present. The therapist provides social praise and brief physical contact contingent on the client's appropriate behavior at least once every 30 s.

Evidence regarding the function of that behavior is provided when levels of the challenging behavior are higher in one condition compared to the other conditions. For instance, if the level of client's behavior is consistently (e.g., across 5 sessions or more) greater in the demand condition than that in the other conditions, the function of the challenging behavior would be negative reinforcement. See Chapter 6 for additional information about FAn and a description of the conditions.

Research Design & Functional Analysis

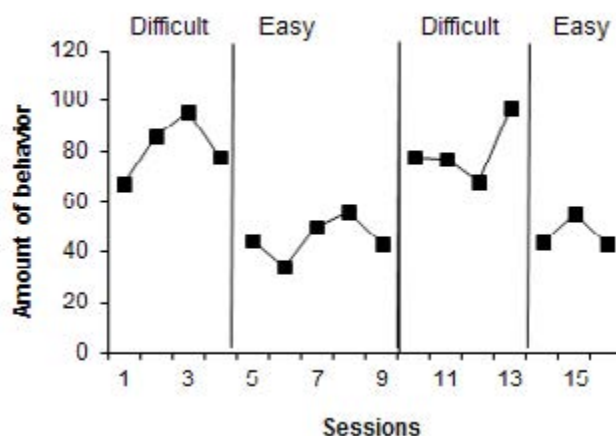
A FAn compares the effects of various conditions using single participant experimental research designs. Commonly used research designs when conducting FAn include multielement and ABAB designs as defined below. The duration of presentation of each condition is typically at least 5 min with a brief (e.g., 5-min) break between conditions if several are presented on one day.

When implementing an **ABAB RESEARCH DESIGN**, or a reversal-replication research design, the first step involves measuring the dependent variable (the individual's challenging behavior) during the baseline phase (A), when no treatment is applied (Martin & Pear, 2011). Once stability of the behavior has been achieved, the treatment or the independent variable (B) is applied and its effect on behavior is observed. Lastly, these two phases are repeated or replicated. A convincing demonstration of the effect of the independent variable on the dependent variable is provided if the behavior changes only when treatment is present and not when it is absent. In other variations of this design different treatment conditions can be compared as opposed to including a baseline comparison.

In the graphed data presented in Figure 2 below, the use of an ABAB research design in a FAn to test the effects of easy versus difficult school work on the off-task behavior of a child in the classroom is illustrated. The levels of off-task behavior are greater when difficult school work is presented compared to when easy school work is presented. Intervention can be designed to provide the child with greater assistance or teach the child to ask for assistance when difficult school work is given.

Figure 2

An example of an ABAB research design to test the effects of easy versus difficult school work on the off-task behavior with one child



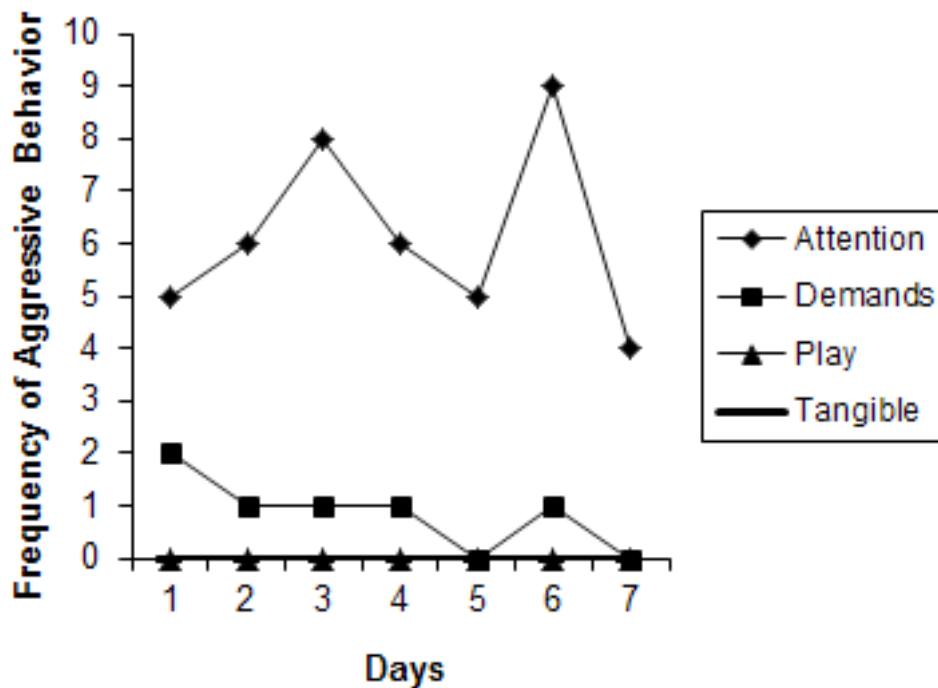
An example of use of an ABAB research design to test the effects of easy versus difficult school work on the off-task behavior with one child.

With a **MULTIELEMENT RESEARCH DESIGN** two or more conditions or treatments (i.e., independent variable) are alternated rapidly (e.g., treatments A and B are conducted in

one day or during the same hour). This design is also known as alternating treatment or simultaneous treatment research design (Martin & Pear, 2011). The conditions are alternated across days (e.g., Day 1: attention, demands, alone, play; Day 2: demands, alone, play, attention, etc.) to reduce the confounding effects of order. Like an ABAB research design, the purpose of the multielement research design is to determine which of several conditions or treatments produce a change in the behavior of interest. The difference in levels of the challenging behavior between conditions is evaluated to determine which condition affects the behavior most. In the following graphical presentation of FAn seen in Figure 3, the frequency of aggressive behavior is highest in the attention condition compared to the other conditions providing experimental evidence that attention positive reinforcement is maintaining the individual's aggressive behavior.

Figure 3

An example of a multielement research design to determine the effects of attention, demands, play, and tangible conditions on an individual's frequency of aggressive behavior



The following is an example of the steps involved in conducting

Example of a functional analysis procedure using a multielement research design:

- Define the problem behavior.
- In a controlled setting, present 10 min where the attention condition is in effect and instances of the problem behavior are recorded.
- 5 min break.
- Present 10 min of the demand condition
- 5 min break
- Present 10 min play condition
- 5 min break

- Present 10 min of alone condition
- On day 2, repeat above with randomized order of conditions.
- Repeat for 3 more days or more depending on the stability of the data

Data Analysis

At least five data points are collected for each condition so that trends, levels of the problem behavior, and non-overlapping data points across conditions can be compared. Graphed data are examined to identify differential levels of the individual's behavior across conditions. The data patterns are analyzed by examining stability, trends, overlapping data points, and magnitude of effect observed for the test conditions compared to the control (play/recreation) condition (Martin & Pear, 2011). If variability in the data pattern and/or overlapping data patterns are observed, then additional sessions may need to be conducted until stability and differentiation of the levels of behavior in each condition is reached to allow an interpretation of the results (see Bourret & Pietras, 2013 for more).

Advantages and Disadvantages of FAn

Like the other FA methods, there can be advantages and disadvantages to using a functional analysis approach. The major advantage of FAn is that it provides the most accurate information about the function of the individual's behavior (Floyd, Phaneuf, & Wilcynski, 2005; Iwata et al., 2013). FAn is the only method that yields a "cause and effect" interpretation of the findings. Since this approach uses an experimental method that involves manipulating conditions (attention, alone, demand, or demand conditions) while controlling or holding constant other potentially confounding factors (play condition), the results from a FAn can be used to identify the specific factors maintaining the problem behavior. In a comparison of indirect, observational, and FAn methods to identify the function of the challenging behavior of seven children with autism, Tarbox et al. (2009) found that indirect and FAn methods produced more conclusive findings for all seven children than an observational method did. In contrast, Alter, Conroy, Mancil, and Haydon (2008) found one-to-one correspondence between FA observational methods and FAn and less correspondence with indirect FAn methods when identifying the function of challenging behavior with four young males. Additionally, in Taylor and Romanczyk's (1994) study, the functions of students' challenging behavior based on observations of teachers' interaction with their students in the classroom predicted experimentally verified functions of those behaviors.

There are notable limitations to using a FAn. When the problem is multiply determined or low rates of occurrence of the challenging behavior exist, then interpretation of the results of a functional analysis may be difficult. Another disadvantage is that the function of the challenging behavior may not always be readily identified using the standard functional analysis conditions (i.e., attention, tangible, demand, control). In which case, tailoring the conditions used in a functional analysis to the individual's circumstances may be necessary. Hapopian et al. (2013) describe how the maintaining variables for over

90% of 176 inpatient cases of individuals with intellectual disability and severe challenging behaviors were identified as a result of conducting a series of more individually-tailored or idiosyncratic FAn.

Researchers have attempted to address the difficulties with conducting FAn, such as the ethical issues when targeting harmful behaviors (Hanley, 2012). As one approach, procedures may be modified to reduce the threat of harm to the individual due to provocation of the challenging behavior during the assessment conditions. For instance, conditions may be a single trial (rather than 5-min sessions) and embedded in naturally-occurring ongoing activities in the individual's environment (Bloom et al., 2011; Bloom, Lambert, Dayton, & Samaha, 2013). Other approaches entail measuring precursor behaviors instead of the actual challenging behavior (Fritz et al., 2013) or latency to engage in the challenging behavior (Neidert et al., 2013). A summary of the different types of FA and their advantages and disadvantages can be seen in the Table 8 below.

Table 8
A summary of the different types of FA and their advantages and disadvantages

Types of FA	Description	Advantages	Disadvantages
Indirect	Interviews, rating scales, surveys	A lot of information, quick	Bias Memory Not causal information Not as accurate as FAn
Observational	ABC observations; Time charts	Possible causes identified; observing behavior may generate ideas about functions of behavior	Correlational information Not as accurate as FAn May miss important variables Low rate behaviors may be difficult to observe
Functional Analysis (FAn)	Experimentally testing relevant conditions (play, demands, attention, tangible, alone)	Clear cause of behavior may be identified	Can be unethical to conduct if the behavior is severe and harm may occur May not discover cause if multiple variables exist Must be extended across days if low frequency behaviors Multiple treatment interference or carry over effects with multielement designs The data may be incorrectly interpreted May neglect other relevant variables (physiological, idiosyncratic variables)

Family Contribution to Assessment of the Individual's Challenging Behavior

Families play an essential role in providing necessary information for early detection and diagnosis, assessment, and are often involved in implementing interventions (Friend & Cook, 2007). Early detection followed by intervention provides the best chance of long-term beneficial outcomes for children with challenging behaviors (Shapiro & Batshaw, 2013). Understanding the family and their **CULTURE** is necessary when assessing an individual's challenging behavior. Cultural differences may involve any combination of age, race/ethnicity, social class, sex, language, religion, sexual orientation, ableness (special needs), regionality, and nationality. For instance, a family may come from cultural contexts with very different viewpoints about education and appropriate child behaviors and this may be involved with the occurrence of the individual's challenging behaviors. The more different the cultural background of the family, the more likely that the individuals involved will face cultural conflicts resulting from those differences (Brown, 2010). This is especially true when sensitive topics or cultural incidents occur. Understanding the family and the cultural context of the family is critical to a comprehensive assessment and treatment. Professionals must ensure that families are part of the process and strive to build a positive, strong partnership with the family.

Ethical Considerations

A number of ethical issues should be considered before undertaking an FA. Ethical principles or procedures refer to rules that professions or organizations have specified to ensure survival of the culture (Skinner, 1953). Abiding by ethical considerations protects the client and others and can contribute to high quality care for the person. The overarching ethical considerations are: do no harm, right to privacy, and **INFORMED CONSENT**. Several federal laws mandate assessment, evaluation, and interventions with persons with disabilities, including Individuals with Disabilities Education Act, Americans with Disabilities Act, the Buckley Amendment of Families Equal Right to Privacy Act (FERPA) and other state and local policies. Professionals should be well-versed about these laws and policies and act accordingly. Other ethical factors specific to the FA process include: informed consent from the individual and family to perform FA and determine acceptability of treatment procedures, competence of the professional, adequate and appropriate behavior measures of baseline, treatment, and post-treatment to allow objective and fair evaluation of treatment effectiveness, the choice of a least restrictive alternative or intervention path, and the right to effective treatment based on research based intervention practices. Table 9 lists professional organizations in psychology and education that describe ethical guidelines, principles, and procedures.

Table 9

Ethical guidelines, principles, and procedures by organizations or associations

Psychology:

American Psychological Association <http://www.apa.org/ethics/code/index.aspx>

Behavior Analyst Certification Board (2010) *Guidelines for Responsible Conduct for Behavior Analysts*. <http://www.bacb.com/index.php?page=57>

Education:

CEC 2001 Content Standards, Standard 3 Council for Exceptional Children. (2009). *What every special educator must know: Ethics, standards, and guidelines* (6th ed.). Retrieved on August 22, 2009 from <http://www.cec.sped.org/Content/NavigationMenu/ProfessionalDevelopment/ProfessionalStandards/RedBook-6thEditionWebVersion.pdf>.

According to Friend and Cook (2007), all assessment procedures must meet the following ethical guidelines:

- Must be nondiscriminatory on a racial, cultural, and linguistic basis.
- Instruments must be valid and reliable.
- Administration is by trained professionals.
- Testing format must take into account possible impact of the suspected disability.
- Testing must be in the language with which child is most comfortable.
- Include a variety of assessment tools and techniques.

Discussion Questions

1. What are the basic tenets of an FA approach?
2. What are the three ways in which FA can be conducted? What are their advantages and disadvantages? When would you use one or the other types of FA?

3. Speculate about the possible difficulties involved in evaluating challenging behavior.
4. How can competency in performing FAs be established with college students who are entering professions where they may work with individuals with challenging behavior?
5. What are important ethical considerations when assessing and treating the challenging behaviors of individuals with developmental disabilities?

Exercise 1: Case Study Simulation

Jimmy is a fifth grade student who has been in and out of five foster homes over the course of his life. Jimmy does not have many friends, due in part to his frequent transitions to new schools and homes. Jimmy is currently placed with a loving older couple who want to stabilize his daily life. Jimmy is very quiet and shy, often described as sullen by previous teachers. He participates in noxious behaviors, such as vomiting and spitting, when asked to complete a task that he doesn't like or want to do. Using the approaches described in this chapter, evaluate Jimmy's problem behavior by answering the following questions:

1. Propose a behavioral definition for Jimmy's challenging behaviors. Ad lib as needed.

2. How would you begin to investigate the reasons for this behavior?
3. What indirect methods of FA could be used to evaluate this problem behavior?
4. What questions would you ask of the adults who are most significant in Jimmy's life?
5. What might be a plausible maintaining variable for Jimmy's challenging behavior?
6. Plan how you would conduct a FAn to determine if your hypothesis for the function of Jimmy's challenging behavior is correct. Draw a graph that depicts the results of a FAn that illustrates that function.

7. Which type of FA method would provide you with the best evidence concerning the function of Jimmy's challenging behavior?

8. What ethical issues are involved with assessment and treatment of Jimmy's behavior?

Exercise 2: Interpreting Functional Analysis

Search for a research article in the library's databases that involves use of functional analysis and treatment effectiveness evaluation and complete the following:

1. Write an APA-style reference

2. Describe the client and general background

3. Behaviorally define the target behavior

4. Summarize the functional analysis conditions

5. Describe the functional analysis graphed results
6. Identify the maintaining variable for the individual's problem behavior
7. Identify effective treatments and explain how knowledge of functional analysis led to that design.
8. Summarize what ethical procedures were used in the study.

Chapter 3

Treatment Implications Based on the Functional Assessment

Focus Questions:

- *What treatment approaches challenging behaviors and increase appropriate behaviors?*
- *Explain how knowledge of the function of problem behaviors can impact treatment decisions.*

Treatment choices to decrease an individual's challenging behavior are based on many factors, such as the function of behavior, empirically-based practices, ethical considerations, likelihood of the desired behavior being supported long-term by others in the natural environment, and the particulars for the case in question (e.g., context, quality of the environment, severity of the problem behavior, people present, resources available, setting, level of functioning, communication skills, etc.) (Spencer, Detrich, & Slocum, 2012). The severity and persistence of the individual's challenging behavior may influence treatment decisions in terms of number of components in a treatment program, reinforcer magnitude or frequency, and staff/teacher training.

A primary factor considered in the design of effective treatments is the function of the challenging behavior (Kurtz et al., 2003; Repp, Felce, & Barton, 1988; Lancioni, Singh, O'Reilly, Sigafoos, & Didden, 2012; Matson, Neal, & Kozlowski, 2012; Mueller, Kosi, & Hine, 2011). Treatments based on the function of behavior, as analyzed from FA data, are more effective than non-function-based approaches to decrease individual's challenging behavior (Carr & Durand, 1985). Incorrect selection of a treatment or design of a program based on an uninformed or faulty function of behavior may not help the individual learn new desired behaviors and/or may even make the problem worse, in some cases (Iwata, Pace, Cowdery, & Miltenberger, 1994). Thus, an ethical responsibility exists for the professional to make an informed decision based on all available assessment and background information, and a review of empirically-based intervention strategies.

Based on over a half century of research conducted since ABA was initiated, many empirically-based interventions have been developed and evaluated. Major treatment components for a well-designed **BEHAVIOR INTERVENTION PLAN (BIP)**, or a written treatment document to address the individual's challenging behavior include:

- A. Preventative efforts or **ANTECEDENT-BASED TREATMENT**
- B. Actively increasing or teaching functionally equivalent replacement and other desirable behaviors
- C. Reactive procedures or, what to do when the challenging behavior occurs

These treatment components should be tailored to the specific function of the individual's challenging behavior (e.g., tangible positive reinforcement, automatic reinforcement, negative reinforcement, attention positive reinforcement), consider contextual factors (e.g., available assistance, history factors, etc.), and ethical considerations. Specific procedures related to these treatment components will be briefly reviewed below and then more specific functionally-related treatments will be noted. This review only highlights the main treatment possibilities that have received a fairly extensive empirical support and is not exhaustive of the various treatment possibilities available. Also note that to be competent in delivering treatment, additional knowledge and experience is needed (see the Behavior Analyst Certification Board® for more at <http://www.bacb.com/>)

A. Prevention Efforts or Antecedent-based Treatment

The individual's situation can be altered in ways that will eventually reduce the challenging behavior, potentially avoiding the need for reactive strategies. Prevention efforts can entail reducing the individual's motivation for engaging in the challenging behavior and changing antecedent stimuli in the individual's natural environment.

NONCONTINGENT REINFORCEMENT (NCR) is a procedure to reduce the individual's motivation for engaging in the challenging behaviors whereby the reinforcers for that behavior are provided freely according to a set time (e.g., every 5 min) *before* the individual engages in that behavior (Marcus & Vollmer, 1996; Vollmer, Marcus, & Ringdahl, 1995). NCR is an empirically validated approach for decreasing challenging behavior (Carr, Severtson, & Lepper, 2009) and may be one of the most frequently used reinforcement-based procedures (Matson et al., 2011). For example, if a student is acting out in the classroom to gain the attention of his classmates then, at the beginning of class before he acts out, give him a classroom job that garners a lot of attention to foster his desirable behavior (e.g., passing out handouts). This approach may reduce the individual's motivation to engage in the undesired behavior and thereby make it less likely to occur. When using NCR, initially the reinforcer that is controlling the challenging behavior is delivered continuously or more frequently than the average baseline occurrence of the challenging behavior. Once the challenging behavior is reduced, then the frequency of presentation of the reinforcer can be gradually decreased to typically occurring levels (Tucker, Sigafos, & Bushell, 1998).

Table 10
Summary of NCR Procedure

1. Identify the reinforcers currently maintaining the individual's challenging behavior (e.g., positive reinforcement, negative reinforcement) by conducting a functional assessment
2. Schedule a frequent delivery of reinforcer according to time alone or independent of behavior
3. Include an extinction component for when the problem behavior occurs
4. Initially use a rich schedule of reinforcement and adjust it to lean as the challenging behavior decreases

Changing Antecedent Stimuli in the Natural Environment

A quick method of preventing the individual's challenging behavior is to manipulate antecedent stimuli that control behavior (i.e., prompts). Antecedent stimuli include events, objects, or people that are present before the individual's challenging behavior occurs. Stimuli in the environment that consistently precede the behavior can either be eliminated or changed to affect the likelihood of the behavior (Martin & Pear, 2011). For example, if the individual typically resists doing chores or is noncompliant then providing a choice of a variety of different chores for that person to choose from may be an effective solution (Call, Wacker, Ringdahl, Cooper-Brown, & Boelter, 2004). If the individual is escaping from difficult work or material because the reading level is too difficult (i.e., negative reinforcement), then provide more assistance or better instruction, or make the work easier (Sanford & Horner, 2013). Also for escape-maintained behavior, the demands or requests could be delivered less frequently (e.g., presenting demands once an hour instead of 20 times) and then, as the levels of the challenging behaviors remain low, gradually returned to typical levels (Lalli, Casey, & Kates, 1995). There is research to support the effectiveness of this procedure for decreasing the number of requests, known as **DEMAND FADING**, for escape-maintained challenging behaviors (see Pace, Iwata, Cowdery, Adree, & McIntyre, 1993; Penrod, Gardella, & Fernand, 2012).

Another strategy is to add stimuli into the situation in which the challenging behavior occurs to prompt or cue the individual's desirable behaviors. For example, the likelihood of the desired behavior occurring may be increased by presenting preferred curricular activities (Foster-Johnson, Ferro, & Dunlap, 1994), background music (Desrochers, Oshlag, & Kennelly, 2014), activity choices (Rispoli et al., 2013), or models demonstrating desired behavior (Stokes & Kennedy, 1980).

Another method to change the antecedent stimuli involves an overall improvement of the quality of the individual's environment, known as **ENVIRONMENTAL ENRICHMENT** (EE). EE entails increasing individuals' access to preferred activities, people, or objects and providing a variety of choices available in their everyday environment. One of the earliest demonstrations of how EE can decrease problem behavior was conducted by Horner (1980). More recently, in a controlled randomized experiment, it has been shown that increasing sensorimotor experiences can have a beneficial effect on children with autism

(Woo & Leon, 2013). Moreover, Ringdahl, Vollmer, Marcus, and Roane (1997) showed how three children with developmental disabilities chose an enriched environment over the opportunity to engage in self-injurious behavior when able to do either. Table 11 below illustrates how antecedent-based treatments can be geared to the function of the individual's challenging behavior.

Table 11

Examples of basing antecedent treatments on the function of the individual's challenging behavior

Challenging Behavior	Function Of The Challenging Behavior	Preventative Efforts Or Antecedent-Based Treatments
Screaming	Gets attention: "No, don't scream" (Attention Positive Reinforcement)	Provide frequent attention before the challenging behavior occurs
Hitting another child	Gets toy (Tangible Positive Reinforcement)	Provide free access to many toys
Spinning and rocking	Sensory consequences (Automatic Reinforcement)	Provide access to a swing
Pushing work away	Gets out of work (Negative Reinforcement)	Provide choices, give assistance, or provide work for less time

B. Actively increasing or teaching functionally equivalent replacement and other desirable behaviors

A main component of any treatment plan involves reinforcing a desirable behavior that serves the same purpose as the challenging behavior, called **FUNCTIONALLY EQUIVALENT REPLACEMENT BEHAVIOR**. For instance, an individual's vocal stereotypy that is maintained by sound may be decreased by encouraging play with auditory toys, a functionally equivalent replacement behavior (Rapp, 2007). An important consideration when selecting the functionally equivalent behavior is to ensure that the individual's social community will support it or the individual is able to recruit reinforcement from others in his or her natural environment. **FUNCTIONAL COMMUNICATION TRAINING (FCT)** is an empirically validated treatment approach (Kurtz, Boelter, Jarmolowicz, Chin, & Hagopian, 2011) that involves teaching the individual to ask for stimuli, events, or people that serve the same function as the problem behavior (Carr & Durand, 1985; Falcomata, Wacker, Ringdahl, Vinnquist, & Dutt, 2013). Teaching the individual to request the item that typically was delivered followed his or her challenging behavior in the past can be an effective strategy to decrease that behavior (Kurtz et al.; O'Reilly et al., 2012). The form of the verbal behavior should be tailored to the individual and easy to perform, with possibilities including vocal, sign, picture-card,

gesture, or use of assistive technology devices (Mancil & Boman, 2010). For example, the individual may be taught to say “Stop” instead of engaging in self-injury during nonpreferred grooming activities (Steege et al., 1990). More examples of how a communication replacement behavior can be taught can be seen in the Table 12 below.

Table 12

Examples of communication responses related to the function of the individual’s challenging behavior being taught

Problem Behavior	Screaming For Attention	Hitting Others To Be Sent To Another Room	Grabbing Food	Finger Flicking For Visual Stimulation
Replacement behavior that results in the same reinforcer	Asking for attention	Asking to go to another room	Asking for food	Clicking on a computer screen for an engaging video display

Consequence-based interventions work to decrease problem behavior by manipulating events and/or stimuli that occur immediately after particular behaviors. Since every treatment program should include positive reinforcement, the procedures used to identify positive reinforcers will be described. Then, commonly used practices schedules to administer reinforcement and extinction procedures to decrease challenging behavior will be reviewed.

Identification of Effective Reinforcers

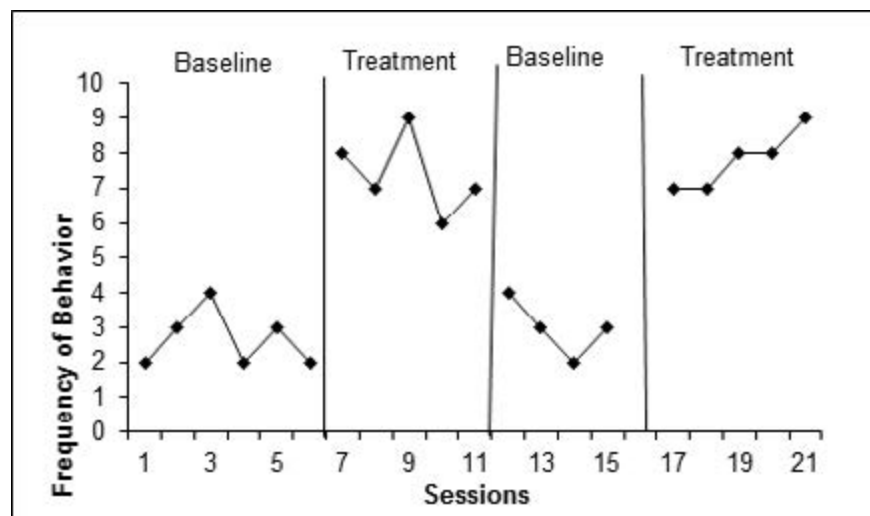
The main ingredient for an effective behavior change program is positive reinforcement. A positive reinforcer is an object or event that increases the behavior it follows. As reviewed in Chapter 1, the principle of positive reinforcement states that when a positive reinforcer is delivered immediately after a behavior, that behavior is more likely to occur in future similar situations (Martin & Pear, 2011). Without consideration of positive reinforcement, the factors responsible for the individual’s challenging behavior may still maintain it, despite efforts to curtail that behavior. Additionally, programming reinforcers to increase the individual’s desirable behavior may result in the challenging behaviors being ‘supplanted’ or over-ridden since increasing one behavior will naturally eliminate the likelihood of engaging in other behaviors that are reinforced less or cannot occur at the same time. Application of a positive reinforcement procedure is not only an effective practice but also an ethically sound step to include in any intervention program. There are several considerations when using a reinforcement procedure, including: (a) incorporating knowledge of the function for the individual’s challenging behavior into treatment design; (b) validating that the consequence is indeed a reinforcer (be-it positive reinforcer or negative reinforcer); and (c) maximizing the individual’s motivation for that reinforcer.

It is important to demonstrate that the consequence you believe acts as a reinforcer does indeed do so. The most accurate way to ensure that you have identified an effective

positive reinforcer is to conduct a **REINFORCER TEST**. A reinforcer test involves experimentally comparing levels of the behavior in phases where the item being evaluated is delivered immediately after the behavior to that in another phase where the consequence is provided just according to a set time such as every 5 s or noncontingently (Cooper et al., 2007). This test may entail using an ABAB research design (Martin & Pear, 2011) where the A phase consists of a series of sessions where noncontingent delivery of the item being tested occurs and in B phase consists of a series of sessions where the consequence is provided following each occurrence of that behavior. These phases are alternated in an ABAB fashion to rule out confounding variables or alternative explanations for the findings. If levels of the behavior are higher when the item is delivered contingently (phase B) compared to when it is not (phase A), then that item has been demonstrated to function as a positive reinforcer. See the Table 13 below for an example of how the effectiveness of treatment can be evaluated using an ABAB research design.

Table 13

Example of graphed data with an ABAB research design demonstrating that the reinforcer delivered immediately after the behavior during the treatment or B phase increases that behavior as compared to the noncontingent delivery condition or baseline phase.



A **PREFERENCE ASSESSMENT** is an efficient method to identify a potential reinforcer by evaluating the individual's choice for a variety of objects, events, or stimuli (Cooper et al., 2007). One type of preference assessment is a paired-stimulus assessment (Fisher et al., 1992). A paired-stimulus assessment involves identifying the stimulus the individual chooses most when pairs of stimuli are presented across trials (See the Table below for the preference assessment procedure).

Table 14

Example of a preference assessment procedure

1. Identify 5-8 items that you think the individual might prefer based on interviews with that person or people in that person's life or from observations of activities that the individual engages in most frequently.
2. Design a data sheet that lists all possible pairs of the items and alternate the sides that each item is presented on to counterbalance side preferences the individual might display e.g., A B and B A
3. Sitting at a desk or table, present each pair of items approximately 2 ft apart from each other and 1 ft in front of the person, making sure the person's hands are not near either item so that a clear test of what the person selects can be made.
4. Wait 5 s for the person to pick one. Do not provide any praise because this may affect the person's choice on subsequent trials. Allow 5 s to manipulate the item.
5. Once all pairs have been presented, calculate the percent each item was selected by counting the number of times each item was selected by the person and dividing by the total number of times it was presented and multiplying by 100.
6. Rank order the items from most to least preferred and use the most preferred items for training purposes.

Note: If the person has never had the item before, allow the person to 'sample' the item before the preference assessment is conducted.

Note: Preferences will vary from time to time and so conducting a brief preference assessment before every training session will ensure that your preference-based procedures are maximally effective.

Reinforcers may vary in their effectiveness in increasing desired behavior depending on whether the individual has had recent access to them (North & Iwata, 2005; McGinnis, Houchins-Juárez, McDaniel, & Kennedy, 2010). Motivating conditions, such as **SATIATION** (having too much of something) or **DEPRIVATION** (having too little of something), can alter the probability of behavior that leads to that reinforcer (Michael, 2000). For example, you really liked a particular song when it first came out and used to change the station to locate it, but now that it has been playing on the radio for several weeks, you no longer enjoy listening to it. Instead, you turn to another station to avoid having to listen to it one more time. Likewise, if a child, who typically is disruptive in a certain class to garner the attention of his peers is provided with ample social interaction with peers prior to that class, he may not engage in the disruptive behavior to achieve the same ends.

Through use of an FA approach, the reinforcer maintaining the challenging behavior can be identified. Once it is known what that reinforcer is, it can be incorporated into a behavior intervention program to increase desired behavior. However, as Carter (2010) found with an adult male being treated for escape maintained noncompliance, a highly preferred positive reinforcer may also reduce that behavior even without the use of extinction (no longer providing the negative reinforcer).

DIFFERENTIAL REINFORCEMENT procedures can be used to eliminate or decrease the individual's challenging behavior. This type of reinforcement schedule, or rule when to provide reinforcement, consists of the application of both positive reinforcement and extinction

procedures. Extinction refers to the removal of the usual reinforcer following the behavior, which decreases future occurrences of that behavior (Martin & Pear, 2011). **DIFFERENTIAL REINFORCEMENT OF ZERO RATES (DRO)** involves providing a reinforcer when no instances of the challenging behavior occur during a period of time. For instance, to decrease thumb sucking, every 10 min when the child does not engage in thumb sucking, he gets his favorite toy. **DIFFERENTIAL REINFORCEMENT OF INCOMPATIBLE BEHAVIOR (DRI)** involves reinforcing a desired behavior that cannot occur at the same time as the challenging behavior (Martin & Pear, 2011). For instance, the therapist can provide a reinforcer when the person speaks in normal conversation level and does not scream. If a specific incompatible behavior that the individual performs cannot be readily identified, **DIFFERENTIAL REINFORCEMENT OF ALTERNATIVE BEHAVIOR (DRA)** may be used where a desirable behavior displayed by the individual is reinforced. For example, turning pages of a magazine could be reinforced to decrease the likelihood of an individual engaging in self-injury by hitting her head with her hand. Both turning pages and self-injury could be done at the same time, but that is unlikely to occur.

There are also differential reinforcement schedules to reduce, but not necessarily completely eliminate a behavior altogether, that can be used when some amount of behavior is alright. **DIFFERENTIAL REINFORCEMENT OF LOW RATES—SPACED RESPONDING (DRL—spaced responding)** entails providing the reinforcer after a period of time when no instances of the challenging behavior have occurred and then the behavior occurs. For instance, to slow down someone's rate of eating, she could be allowed to take a bite after 3 s of the previous bite of food. **DIFFERENTIAL REINFORCEMENT OF LOW RATES—LIMITED (DRL—limited)** is when the challenging behavior is less than a specified amount following a set time period (Martin & Pear, 2011). A child in the classroom may excessively raise her hand to ask to use the restroom every half hour where instead, once after two hours of not asking is reinforced.

Table 15

A summary of schedules of reinforcement to decrease challenging behaviors

Schedule	Procedure
Noncontingent Reinforcement (NCR)	Noncontingent delivery of reinforcer e.g., delivering positive attention every 5 min when no instances of attention-maintained challenging behavior have occurred.
Differential Reinforcement of Zero Responding (DRO)	Reinforcer is provided only if the behavior has not occurred within a specific period. e.g., delivering a reinforcer if no instances of aggression occur during the hour.
Differential Reinforcement of Incompatible Responding (DRI)	Reinforcer is provided for a behavior that is incompatible, or that cannot occur at the same time as the behavior to be decreased. e.g., reinforcing in-seat behavior to decrease out-of-seat
Differential Reinforcement of Alternative Behavior (DRA)	Reinforcer is provided for a desirable behavior that is not necessarily incompatible with the behavior to be decreased. e.g., reinforcing completion of puzzle to reduce head hitting.

Spaced Responding DRL	Following an interval in which the behavior does not occur, and instance of the behavior is required for reinforcement. e.g., making cookies once a week since more frequently would neither be healthy nor desirable.
DRL—Limited	Reinforcer is delivered provided that the # of behaviors that occurred was < some maximum #. e.g., delivering a reinforcer when five or less instances of throat clearing occur in an hour.

Differential reinforcement has been shown to be a highly useful treatment choice. Differential reinforcement may be just as effective as NCR in decreasing challenging behavior (Allison et al., 2012) and can be applied in the classroom (LeGray, Dufrene, Mercer, Olmi, & Sterling, 2013). Differential reinforcement, in conjunction with other treatments, has been effectively used to decrease a variety of behaviors, such as sensory reinforced eye brow plucking (Nuernberger, Vargo, & Ringdahl, 2013) and pica, or the ingestion of nonedible substances (Hagopian, González, Rivet, Triggs, & Clark, 2011). Differential reinforcement has been shown to be as effective as a punishment procedure (response cost) in reducing tics of children with Tourette syndrome and, as such, would ethically be the preferred treatment (Capriotti, Brandt, Rickfts, Espii, & Woods, 2012). See the Table 16 below for the steps involved in conducting a differential reinforcement procedure.

Table 16
Steps to conduct a differential reinforcement procedure

Steps: 1. Define the problem behavior 2. Conduct baseline assessment to measure levels of the challenging behavior 3. Identify the function of the problem behavior through functional assessment 4. Identify reinforcer 5. Select type of differential reinforcement (DRO, DRI, DRA, DRL) 6. Define the behavior to be reinforced 7. Set reinforcement schedule based on baseline rate of the problem behavior to ensure a high rate of reinforcement 8. Set criterion to fade reinforcement or regress to previous steps 9. Wean the individual from the program by gradually removing the procedures See http://autismpdc.fpg.unc.edu/sites/autismpdc.fpg.unc.edu/files/DifferentialReinforcement_Steps_0.pdf for more information

C. Reactive procedures or what to do when the challenging behavior occurs

An **EXTINCTION** procedure involves no longer providing the reinforcer maintaining the challenging behavior such that the behavior is less likely in future similar situations (Martin & Pear, 2011). The reinforcer maintaining the individual's challenging behavior must be identified and no longer provided. Thus, when the individual's challenging behavior is being maintained by attention then attention extinction should be used. For escape-maintained behavior, escape extinction, or not removing the task or demand (and, possibly, using guided assistance for the individual to engage in the task) is employed. An FA to determine what is maintaining the individual's challenging behavior is essential to be able to accurately remove the reinforcer maintaining the challenging behavior and thereby effectively use an extinction procedure. Iwata, Pace, Cowdery, and Miltenberger (1994) describe how not correctly removing the reinforcer maintaining the individual's challenging behavior can actually worsen it.

A known phenomenon that occurs when implementing an extinction procedure is **EXTINCTION BURST** whereby the behavior being extinguished gets "worse before it gets better." That is, emotional behaviors and aggression, in addition to an increase in severity of the challenging behavior may occur (Martin & Pear, 2011). It is important to inform others about this phenomenon to ensure that they continue implementing the program and do not inadvertently reinforce the individual's problem behavior and make it worse (i.e., **TREATMENT INTEGRITY** is maintained).

An effective and ethical approach is to combine extinction with positive intervention strategies (e.g., differential reinforcement). Out of a sample of 42 cases of treatment for individuals with challenging behavior, Lerman, Iwata, and Wallace (1999) counted the number in which an extinction burst was identified and examined whether positive procedures included in the treatment package lessened the likelihood of extinction bursts. The researchers found substantially fewer cases of extinction burst (i.e., 15%) when positive procedures were incorporated as compared to when only an extinction procedure was used (i.e., 62%).

Although there are ethical concerns with using any decelerative procedure, sometimes extinction must be used to effectively decrease the individual's problem behavior. In a study by Patal et al. (2002) two types of differential reinforcement procedures were not effective until escape extinction was added with three children receiving treatment for feeding disorders. See Table 17 below for methods to increase the effectiveness of an extinction procedure.

Table 17

Steps to increase the effectiveness of an extinction procedure

1. Assess the function of the problem behavior and do not provide that reinforcer following the problem behavior.
2. Combine extinction with a differential reinforcement procedure and use the reinforcer that was maintaining the problem behavior to increase a desirable behavior.
3. Inform others involved in the program about the possibility of extinction burst and how not to provide a reinforcer following the behavior.

Table 18 summarizes in example format the three main treatment approaches used for each main environmental reason for challenging behavior.

Table 18

Summary of treatment strategies based on function of behavior

	Tangible Positive Reinforcement	Attention Positive Reinforcement	Automatic Positive Reinforcement	Negative Social Reinforcement	Automatic Negative Reinforcement
Example of Problem Behavior	Grabbing other's food at mealtimes	Running away at school such that teachers try to catch	Thumb sucking	Spitting at others when they come too close	Too much noise
Reinforcement for Desired Behavior	Use tangible reinforcers e.g., preferred food	Use attention reinforcers e.g., praise	Use sensory reinforcers e.g., soft fur to touch	Use escape reinforcer	Use escape reinforcer
Functional Replacement Behavior	"Give me ____" or signing more	"Look at me!" or waving hello	"I like touching this" or thumbs up	"Go away" or shaking head	"Please take it away" or making a pushing motion
Prevention	Enriched env, NCR	Enriched env., NCR, rules	Increase stimulation/ NCR, Enriched env	Task choice, high prob. task, demand fading	Reduce aversiveness
Instruction	Teach desirable behavior, differential reinforcement, functional communication training	Teach desirable behavior, differential reinforcement, functional communication training	Teach desirable behavior, differential reinforcement, functional communication training	Teach desirable behavior, differential reinforcement, functional communication training	Teach desirable behavior, differential reinforcement, functional communication training
Reactive	Tangible extinction	Attention extinction	Automatic extinction, response blocking	Escape extinction	Escape extinction, response blocking

Generalization & Maintenance of Treatment Effects

GENERALIZATION and **MAINTENANCE** of treatment effects is an essential component to address once: (a) the individual's desired behavior is occurring at desired levels; (b) the problem has been reduced; and (c) treatment has been removed. There are three important types of generalization or spill-over effects that occur once treatment or training has ended (Martin & Pear, 2011). **STIMULUS GENERALIZATION** is the extent to which the desired behaviors occur across stimuli, setting, and people. For example, after successfully learning how to ask for help when faced with a difficult task at work, the individual is now able to do likewise when at home. Response generalization is the extent to which behaviors other than the taught behavior occur. For example, after the resident of a group home has been taught to greet visitors with a "Hello" and a handshake (instead of a hug), she also has begun appropriately asking visitors to enter the house and to sit in the living room. Lastly, response maintenance is when the desired behaviors taught occur long after the training has been completed (e.g., weeks, months, or years).

Stokes and Baer (1977) wrote their pivotal review of the published research examining generalization and concluded that generalization needs to be planned for during intervention to ensure that it occurs. Although much research on ways to promote generalization of treatment gains has occurred over the years, more remains to be done (Falcomata & Wacker, 2013). A review of methods to promote generalization is beyond the scope of this book. The reader is encouraged to consult other sources such as Baer (1981) or Goldstein and Martens (2000) for more information.

Evaluation of Treatment Effectiveness

A comprehensive evaluation of the effectiveness of treatment for a particular client/student case should include the following:

- Client/student's behavior change in the desired direction compared to baseline
- An increase in reinforcers or enriched experiences for the individual, such as more community experiences and a less restrictive environment for the individual
- Generalization of desired behaviors and continued reduction of challenging behaviors across time (response maintenance)
- **SOCIAL VALIDITY** or the treatment is acceptable to the individual and significant others in terms of goals, procedures, and outcome (Wolf, 1978)
- Cost-effectiveness or whether the benefits associated with treatment implementation outweigh the costs

Designing a Behavior Intervention Plan (BIP)

To “put it all together,” it is useful to carefully consider the components of a complete behavior intervention plan. Cautilli, Riley-Tillman, and Thomas (2001) detail the characteristics and content for a well-written, high-quality behavior intervention plan and describe many of the following as essential components:

1. A statement of the objectives and goals of the program
2. Behavior definition of the challenging behavior and any desired behavior that will be specifically reinforced
3. Assessment procedures used (e.g., functional assessment, assessment of adaptive behaviors, reinforcer or preference assessments) with a brief description of the findings
4. Data collection and analysis procedures (e.g., the behavior recording and sampling procedures used and graphical analyses included)
5. Functional hypothesis or maintaining variable(s) for the challenging behavior should be described with the following noted:
6. Antecedent & setting events for the problem behavior
7. Maintaining variables for the challenging behavior (e.g., attention positive reinforcement, escape from demands)
8. Functional replacement behavior defined and procedures used to increase or teach it
9. A step-by-step plan of how and when the following procedures will be performed and by whom:
10. Antecedent-based interventions
11. Consequence-based interventions (e.g., differential reinforcement of incompatible behavior/alternative behavior/other behavior)
12. Generalization & maintenance
13. Emergency procedures specified
14. Plan revision information
15. Treatment integrity checks or procedures used to ensure the behavior intervention plan or BIP is being implemented as intended and to provide reinforcer to those individual who are implementing it correctly.
16. Training procedures (how staff/teachers/parents will be taught to implement the BIP)
17. Informed consent from the parent/guardian and the individual (or assent)
18. Cautilli et al. (2001) also recommend that the BIP should be written at a 9th grade level to ensure that it is understood by all involved.

Table 19

*Example of a Behavior Intervention Plan (BIP)***Student:** Tobin**Date:** January, 2014

Background: The problem concerns the high rate of off-task behavior of a 12-year-old male with autism spectrum disorder. No previous BIP. Teacher made the referral. Challenging behavior has been occurring for past 6 months. This challenging behavior interferes with Tobin's learning and that of other children in the classroom.

Past strategies: Teacher talked to him about his behavior, sending him to the principal, separating him from other students—all of these were ineffective at decreasing Tobin's problem behavior.

Behavioral Definition: Off-task behavior defined as talking with peers, walking around room, or engaging in activities other than those that have been assigned (e.g., singing instead of reading, playing with objects in his desk when he should be completing a written assignment).

Behavioral Objective: To increase on-task behavior to 90% of intervals during academic periods (e.g., reading, math, social studies) for 7 consecutive days.

Assessments

Baseline Data: Observations occurred during two 30-min observations in the classroom where during every 30 s, the presence or absence of the challenging behavior is noted (known as an interval recording procedure). Tobin engaged in on-task behavior during 20% and 27% of observed intervals, respectively.

Function of the Behavior: During classroom instruction and individual assignments, Tobin engages in off-task behavior to gain peer attention (attention positive reinforcement) and escape task demands (negative reinforcement—activity).

Past Research: Differential reinforcement procedures has been successfully used to increase desirable behavior for children in the classroom (Kodak, Miltenberger, & Romaniuk, 2003; Neidert, Iwata, & Dozier, 2005; Vance, Gresham, & Dart, 2012).

Intervention Procedure: The intervention procedures for Tobin will consist of changing the antecedent conditions by providing Tobin with positive reinforcement for on-task behavior and attention extinction for off-task behavior.

Preventative:

1. Tobin will be moved further from the group of students with whom he usually socializes during class.
2. When he enters the classroom, Tobin's teacher will remind him of the consequences of staying on-task.
3. Tobin's teacher and teacher's aide will provide attention (e.g., "Wow, you are sitting nice") every 2 min (noncontingent reinforcement).

Positive reinforcement for on-task behavior (replacement behavior):

1. Tobin and his teacher will prepare a written plan (known as a behavior contract) specifying that Toby will earn 5 extra min to interact with peers when his on-task behavior during a class period is at or above 80% of observed intervals.
2. When Tobin is on-task, Tobin's teacher will provide verbal praise (quietly and unobtrusively) at least four times during each class session (DRI)

Reactive: When Tobin is off-task, he will have no access to socializing with peers during individual assignments, and he will be redirected to complete his assignments (attention extinction and escape extinction).

Planning for Generalization: Once Tobin meets the behavioral objective, the reinforcement schedule will be weaned by successively increasing the requirement to 85% and then 90%, of intervals of on-task behavior. Reminders will also be delivered less and less.

Evaluation of Effectiveness: Tobin's percent on-task behavior during intervention was 85% of the intervals compared to 27% during baseline.

Resources & References for Procedures in this BIP:

- Kodak, T., Miltenberger, R. G., & Romaniuk, C. (2003). A comparison of differential reinforcement and noncontingent reinforcement for the treatment of a child's multiply controlled problem behavior. *Behavioral Interventions*, 18(4), 267-278. doi:10.1002/bin.143
- Neidert, P. L., Iwata, B. A., & Dozier, C. L. (2005). Treatment of multiply controlled problem behavior with procedural variations of differential reinforcement. *Exceptionality*, 13(1), 45-53. doi:10.1207/s15327035ex1301_6
- Vance, M. J., Gresham, F. M., & Dart, E. H. (2012). Relative effectiveness of DRO and self-monitoring in a general education classroom. *Journal Of Applied School Psychology*, 28(1), 89-109. doi:10.1080/15377903.2012.643758

A best practice when designing a behavior intervention plan to address an individual's challenging behavior is to use current research-based assessment practices and interventions to guide the approach selected. The **INDIVIDUALS WITH DISABILITIES EDUCATION IMPROVEMENT ACT** (IDEIA, 2004) and ethical practices require that professionals who work with students with disabilities maintain currency with empirically-based assessments and interventions. As the field progresses new and more effective procedures are discovered and revealed to better care for the needs of individuals with developmental disabilities. As one resource to consult, the "What Works Clearinghouse" serves as an online review of evidence-based interventions in education as evaluated by the Institute of Education Science (<http://ies.ed.gov/ncee/wwc/news.aspx?sid=8>). In this resource, published research concerning common intervention approaches are reviewed according to a standard and report outcomes (e.g., effect size) in relation to the scientific strength of the evidence so that informed selections about treatment practices can be made.

Special Education Perspective: Positive Behavioral Support and Response to Intervention

POSITIVE BEHAVIOR SUPPORT (PBS) is generally the first and most appropriate choice at a school-wide level for intervention in schools for children with challenging behaviors. PBS has long been recognized as a prevention approach to undesirable behaviors (Vaughn & Bos, 2009). PBS is often taught in teacher education training programs as the preferred treatment approach in public school classrooms, rather than the use of punishment. Quite simply, PBS is a focus on the desired behavior, rather than focusing on the undesirable or challenging behavior. PBS requires the teacher and other related professionals to systematically look for positive behavior. This is generally accomplished with the use of social, tangible, or verbal reinforcers specific to the desired behavior, such as saying when Mary has her head down and is quietly reading the passage, “Thank you for your attention to the task, Mary.” Teachers in the classroom can use such positive reinforcers to encourage positive behavior and to focus attention on a model of appropriate behavior. As another example, a **TOKEN ECONOMY** in the classroom can be employed where children can accumulate points or tickets for desirable behavior that can be turned in for free time, a special lunch with a friend, a free pass on one homework assignment, or other positive reinforcers. Other prevention approaches include teaching children conflict resolution and interpersonal problem solving. Some curricula include aspects of character education and principles for teaching social skills (Vaughn & Bos, 2009).

Within recent years, professionals in public school settings have also used an approach called **RESPONSE TO INTERVENTION (RTI)**. RTI was mandated by federal law (IDEIA, 2004) as a means of not allowing children to fail either behaviorally or academically without access to a variety of research-based interventions individualized for that particular child. RTI requires all professionals to monitor academic and social skills on an ongoing basis, collecting data on performance of every child, and reviewing that data with a team of related professionals. The intent of RTI is to prevent problems or to quickly intervene before a child loses skills. Monitoring occurs at three levels or tiers. Those tiers are:

Tier 1: screen for behavior problems, introduce interventions, convey expectations

Tier 2: provide supports and feedback for students with similar behavior problems

Tier 3: provide more specific and intense interventions for students whose behavior has not improved (Vaughn & Bos, 2009)

PBS and RTI work in conjunction with one another and the focus of both approaches is on prevention of problems or preventing the severity of a problem existing without research based responses individualized to the child.

Completing an FA will assist in identifying the function of the student’s challenging behavior resulting in the design of the best treatment for that situation. The knowledge gained by implementing an FA will provide the basis for an effective behavior intervention plan which is an essential component of the student’s **INDIVIDUALIZED EDUCATION PROGRAM**

(IEP). The Individualized Education Program (IEP) serves as the foundation of the educational plan for each student with disabilities. The IEP is a strategic planning document that should be far reaching in its educational impact. An IEP identifies a student's unique strengths and needs and how the school will strategically address those needs (New York State Department of Education, 2010, p.3). It is a legal document, designed and agreed upon by all members of the educational team, including the family of the student with disabilities. The key components of the IEP rest upon the concept of individualization. As stated in the COUNCIL FOR EXCEPTIONAL CHILDREN (CEC) professional standards:

...special educators are active and resourceful in seeking to understand how primary language, culture, and familial backgrounds interact with the individual's exceptional condition to impact the individual's academic and social abilities, attitudes, values, interests, and career options. The understanding of these learning differences and their possible interactions provide the foundation upon which special educators individualize instruction to provide meaningful and challenging learning for individuals with exceptional learning needs. *CEC, 2011, Content Standards, Standard 3*

One essential component of the IEP is listing the positive behavioral supports needed by the child. A careful FA analysis is critical to identifying those positive behavioral supports that will help guide the professional to developing the child's desirable behaviors in the classroom, clinics, in social environments, and at home.

Summary

The design of effective intervention is based on identification of the maintaining variables for the individual's problem behavior as gathered from a FA. The core of a treatment package should include preventative measures, teaching a replacement behavior that serves the same function as the challenging behavior, reinforcing desirable behavior, and a procedure in place for when that behavior does occur. A behavior intervention plan provides a written form of the treatment for others in the individual's natural environment to follow to assist the individual with learning desirable behaviors.

Discussion Questions

1. What factors must be considered when designing an effective intervention?

2. Explain how treatment is designed based on the function of the challenging behavior. Give examples for how treatments will differ when an individual's challenging behavior is maintained by attention positive reinforcement versus negative reinforcement.
3. What are five ways to determine if intervention is effective?

Exercise: Complete the Behavior Intervention Plan (BIP)

Instructions: Read the teacher's referral below and complete a BIP based on the information. You can add details as needed to fully address the components of the BIP. Speculate on the function of Juan's challenging behavior and design a plausible treatment based on that function.

Teacher Referral Report: Juan is a 13-year-old boy with cerebral palsy and intellectual disability. He is in an 8 to 1 classroom. His communication skills are very basic. When he does talk, he whispers. Almost all of his speech repeats what was just said to him (echolalia). Even when he engages in echolalia his intelligibility is poor because he whispers. Occasionally he will kick me or other adults at a table (during groups), but it is lightly and infrequent. He will sometimes also throw things but this has only happened about three times this year. I am most concerned about his lack of any participation in any class activities or conversations. When he is asked to do something he will often just sit there and, less often, he will sometimes rock and hum during the morning meeting when it is his turn to come to the front of the class to review the day, he will come to the front of the classroom, but will then just stand there.

Student:	Date:
Background:	
Past strategies:	
Behavioral Definition:	
Behavioral Objective:	
Assessments	
Baseline Data:	

Function of the Behavior:
Past Research:
Intervention Procedure:
Preventative:
Positive reinforcer:
Reactive:
Planning for Generalization:
Evaluation of Effectiveness:
Resources & References for Procedures in this BIP:

Chapter 4

Teaching Functional Assessment Content and Process

Focus Questions:

- *How can knowledge of functional assessment (FA) best be taught?*
- *How can the decision-making involved in completing a FA process best be taught?*

The complex repertoire involved in using FA when designing interventions to decrease challenging behaviors of individuals with developmental disabilities requires knowledge and skills across diverse topic areas. Learning goals, objectives, desired behaviors, and criteria must be specified to pave the way for identification of appropriate instructional methodology and assessment approaches (Hendrix & Tieman, 1971; Vargas, 2009). An instructional analysis should clearly identify the requisite subareas and the prerequisite knowledge and skills to attain those learning goals and objectives (Dick, Carey, & Carey, 2009).

Sources for the Content Domains for Assessing and Treating Challenging Behaviors

A solid grasp of basic behavioral principles and procedures is essential to understanding the underpinning of challenging behaviors and the ways in which they can be modified. Since the individual's behavior and environment are being manipulated, ethically, the college student must have a well-established knowledge-base of both the theoretical basis for behavioral approaches and how to correctly implement effective practices. Important topics for college students to know include behavioral principles and procedures, behavioral definitions, ethics, methods of recording behavior, analyzing graphs, single participant research designs, functional assessment, intervention strategies, and evaluating treatment effective-

ness, to name a few. Additionally, selection of effective interventions by professionals must occur in response to varying client characteristics and situations and so programming for generalization must be included in the curriculum. These topics were briefly reviewed in Chapters 2 and 3.

Well-established, defined content in the area of FA that reflect **APPLIED BEHAVIOR ANALYSIS** (ABA) and how to use it to teach others socially significant behaviors can be found in multiple sources including textbooks, research articles, and professional body's resources. Essential topics can be gleaned from a review of the table of contents of the many textbooks available in the area (e.g., Cooper et al., 2007; Fisher, Piazza, & Roane, 2011; Martin & Pear, 2011; Miltenberger, 2012; see Chapter 7 for more). Likewise, training programs have carved out relevant topics to teach direct-care staff members that cover the gamut of ABA and how to apply it in various contexts to teach individuals desirable skills and decrease challenging behaviors (Luiselli, Bass, & Whitcomb, 2010). Common topics include characteristics of ABA, a history of its development and philosophical roots, defining behavior and measuring it, positive reinforcement, negative reinforcement, prompting and fading, shaping, chaining, stimulus control, single participant research designs, ethics, schedules of reinforcement to increase and decrease behavior, designing programs, self-control strategies, and more.

Assessment of Professionals' Competency in Assessing and Treating Challenging Behaviors

The Behavior Analyst Certification Board®, Inc. (BACB®) provides standardized assessment of applicants' knowledge of the requisite topics to determine if a professional is competent to deliver ABA assessment and treatment procedures to those who need it. The BACB® is a nonprofit organization founded in 1998 to evaluate whether professionals have the appropriate coursework, knowledge, and experience to meet the high standards needed to provide quality care to the students/clients whom they serve (see www.bacb.com for more). For example, to obtain certification at the Master's level, or become a board certified behavior analyst (BCBA), current requirements include a Master's degree in a relevant discipline (e.g., psychology, special education), 225 hours of approved coursework, 1500 hours of supervised experience, and successfully passing a standardized exam. The BACB® Task List, now in its 4th edition, was created by content area experts and Job Task List surveys of representative certificants to guide BACB® course development, exam content, and application preparation (see http://www.bacb.com/newsletter/BACB_Newsletter_05_2011.pdf for more). Thus, a clearly specified content task list and assessment procedure exists to evaluate whether an applicant demonstrates knowledge of the relevant information.

Instruction in Assessing and Treating Challenging Behavior

To teach someone the complex repertoire involved with addressing an individuals' challenging behaviors involves a variety of instructional methods (e.g., readings, cooperative group activities, case presentation) to achieve the desired learning outcomes (e.g., factual knowledge, synthesis, application, problem-solving in verbal or written forms). There are a variety of instructional approaches available including traditional instructional methods, course systems, and simulations.

Traditional Instructional Approaches

Instruction in ABA content, including FA, to provide the basic background knowledge can be delivered by textbooks, courses, and programs (see Chapter 7 for a resource list). There are also many undergraduate and graduate programs offered by universities with curriculum that meet approval from the BACB® based on a review of their content and experience requirements (<http://www.bacb.com/index.php?page=100358>). Institutions of higher education around the world are increasingly offering this certificate program (Shook, 2005; Shook & Neisworth, 2005). The current list of BACB® approved programs can be found at <http://www.bacb.com/index.php?page=100358>.

Course Instructional Systems

To ensure that college students become proficient in behavioral principles and procedures, effective instruction may involve clearly stated objectives, competent models, frequent responding opportunities, immediate feedback, self-pacing, and mastery-based learning (Fredrick & Hummel, 2004). Two course systems that incorporate these components and are empirically-supported are WebCAPSI and Interteaching.

Computer-Aided Personalized System of Instruction (CAPSI) uses a Keller's Personalized System of Instruction to interactively generate a high rate of student responding and review of course material (Pear & Crone-Todd, 1999; Pear & Kinsner, 1988). The instructor divides course material into small, manageable units (e.g., approximately 10-15 units for a typical college course) and creates short answer study questions that tap into a full range of difficulty level (factual, synthesis, analysis, application). After the student studies a unit of material and answers the study questions regarding it, he or she is able to take the quiz. Sitting in front of a computer, the CAPSI software presents the student with three randomly assigned questions and the student types answers to each into designated boxes on the computer screen (Pear & Crone-Todd, 1999). After submission of the completed quiz, the instructor and/or two students randomly assigned by CAPSI to be peer proctors provide typed feedback concerning the quality of the test-taker's answers, typically within 24 hours. Each short answer question is provided with feedback on accuracy and completeness, and the quiz is assigned a pass or restudy by the proctor. If the student's quiz is designated

a restudy then the student receives another set of randomly assigned questions for that unit when the student retakes that unit quiz after a 24 hour period to allow for additional studying. A pass designation on a quiz by a proctor allows the student to take the quiz for the next unit. In addition to immediate feedback, another important feature of this system is that the student can progress through the material at his or her own rate, taking quizzes once prepared to do so. Mastery learning of written answers to questions and repeated exposure to the material is the heart and soul of this approach. Learning the material well before the student proceeds to the next unit ensures a solid knowledge-base to draw from when learning advanced concepts. Teaching critical thinking in a nonpunitive social environment allows students to acquire pivotal skills that will help them in other situations (e.g., reading carefully, critical thinking, formulating arguments). Past research supports the instructional effectiveness of the CAPSI approach for use with college students (Pear, Schnersch, Silva, Svenningsen, Lambert, 2011; Svenningsen & Pear, 2011) and also may be useful for teaching how to use applied procedures (Oliveria, Goyos, & Pear, 2012). See <http://home.cc.umanitoba.ca/~capsi/index.html> for more.

Interteaching is another method that involves immediate feedback and frequent testing to increase college/university students' acquisition of course content (Saville, Lambert, & Robertson, 2011). Like CAPSI, a study guide with a range of question difficulty and covering small amounts of material is completed by students. During half of each class, students come to class prepared to discuss the answers to these unit questions in small groups and earn quality points for their effort. Students also evaluate the quality of their own session and note any difficulty with the material which is addressed by the instructor at the start of the next class. Single participant research evaluating interteaching has found greater active student responding compared to traditional class instruction with a class of 24 master's level special education students (Mason, 2012). Moreover, Saville, Pope, Truelove, and Williams (2012) found higher exam scores when interteaching was used compared to lectures when the two methods were alternated across classes.

Teaching the Clinical Decision-making Underlying Functional Assessment

The FA process requires many decision-making steps such as: What characteristics of the individual's challenging behavior best define and describe it? Which types of FA should be used to gather information about the function of the challenging behavior? How can the FA data be analyzed and interpreted to arrive at a functional hypothesis for the individual's challenging behavior? What is the quality of the evidence, based on the advantages and disadvantages of each assessment method and the degree of corroborating assessment outcomes? Which treatments are best for the client's circumstances (e.g., characteristics, situation, significant others) given the results of the FA?

Simulation is one method of programming educational experiences that may help to bridge the gap between classroom or online instruction and the application of relevant clinical knowledge, decision-making, and skills in the target environment (Vyas, Ottic, & Caligiuri, 2011). Simulations involve the life-like presentation of the relevant variables found in a complex situation to allow the learner to manipulate, problem solve, actively

engage in, and experience the consequences typical of those actions in the real-world (Brown, 1999). Simulations may be an effective approach for teaching the decision-making skills associated with using the results of functional assessment to select effective treatments.

Simulations have been used to teach medical procedures (Stather, Mac Eachern, Chee, Dumoulin, & Tremblay, 2012), pharmaceutical skills (Vyas, Ottis, & Caligiuri, 2011), functional assessment (Desrochers, Clemmons, Grady, & Justice, 2000; Desrochers, Crone-Todd, & Conheady, 2006; Desrochers, House, & Seth, 2001) and social work skills (Smokowski & Hartung, 2003), among others. Simulations have been effectively used to teach staff complex skills such as **DISCRETE TRIAL TRAINING (DTT)**, which is a one-on-one method of teaching new skills to individuals with developmental disabilities (Eldevik et al., 2013). In Eldevik et al.'s computerized training system an interactive virtual child with autism provides both assessment and training in declarative and procedural knowledge of DTT. As another example, *Second Life*, an online multi-layer game was utilized to provide education students with practice using the decision-making required to respond to disruptive students in a simulated classroom (Mahon, Bryant, Brown, & Kim, 2010). Preliminary subjective evaluations by 16 undergraduate teacher education students were generally favorable regarding the effectiveness of the simulated classroom experience in providing experience in how to engage in classroom management. No information was collected on whether these students could implement these skills in actual classroom situations.

Simulations in Developmental Disabilities: SIDD is an example of a multimedia computer program designed to provide students and staff with the opportunity to acquire and practice the clinical decision-making skills to decrease clients/students' challenging behaviors. During the computer simulation, the student assumes the role of a clinician whose professional duties involve use of functional assessment and treatment of the severe problem behavior (i.e., aggressive, self-injurious, or disruptive behaviors) displayed by an individual with developmental disabilities. The college student proceeds through referral, problem definition, assessment, functional hypothesis, and treatment stages. The results of experimental studies suggest that *SIDD* can be an effective method of providing students with practice in the decision-making involved with FA (Desrochers, Clemmons, Grady, & Justice, 2000; Desrochers, House, & Seth, 2001).

Advantages to using simulations include that it can be cost-effective, safe, and ethical compared to real world field experiences. Simulations can also be structured to expose the student to the full range of real-life possibilities in a relatively short time to maximize learning. When using simulations, students are actively involved in completing the training task and engaged in clinical decision-making. Moreover, some research indicates that high fidelity human simulation assessment may be related to critical thinking (Fero et al., 2010).

Direct and specific instruction is necessary to ensure that the teacher/therapist is proficient in engaging in the skills that lead to the individual's behavior change (Neef, 1995). How to teach someone to conduct a functional analysis is the focus of Chapter 5.

Discussion Questions

1. What are the characteristics of effective instructional methods to teach FA content? Defend your points.
2. Critically evaluate use of a simulation approach compared to traditional classroom instruction as a method of teaching FA.

Exercise: Case Simulations

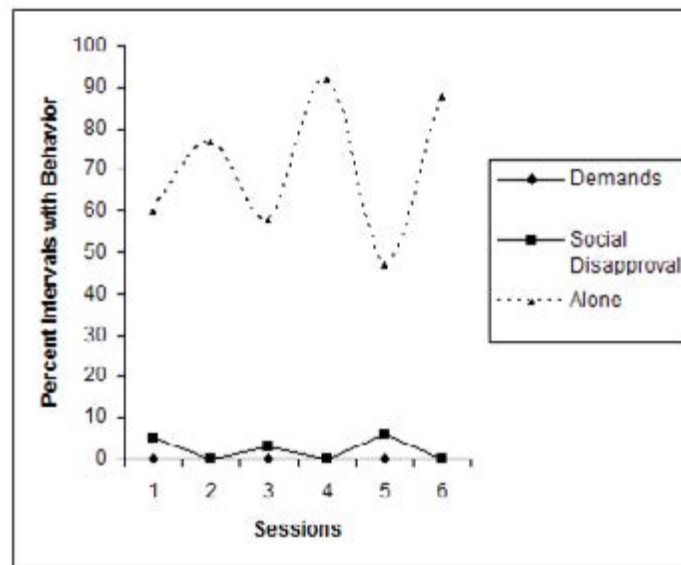
Client Case Simulation #1

Instructions: The following material represents information for a particular client case. Please review the referral form and functional analysis data and answer the questions on the work sheet on page 66.

Referral Form

Referring Agent: School Nursing staff
Client: Andrew McGaff
Age: 12 years
Diagnosis: Profound intellectual disability, communication skills deficits, nonambulatory or wheelchair-bound
What is the problem? Andrew spits on the floor, causing germs to be spread. A lot of the kids crawl around on the floor and then put their hands in their mouth. It is nasty stuff.
How long has the problem been occurring? He has been doing this ever since I can remember.
How severe would you consider the problem behavior? Because of how colds and other illnesses spread, I think that this is a real big problem.
What are your present methods of dealing with it? We constantly tell him not to do this and wipe his mouth so that no spit is available but somehow he always gets it out and it soon goes onto the floor.

The following FA data were collected. Three conditions, as described below, were tested to determine the maintaining variable(s) for Andrew McGaff's challenging behavior.



Demand condition: Andrew and the teacher are seated at a table in the therapy room. Andrew is presented with educational tasks from his Individualized Education Plan (IEP). These tasks should be those that Andrew has not learned. The teacher presents the task materials and an instruction for Andrew to perform the task (e.g., placed a ball and cup in front of Andrew and says, “Point to the ball.”). If Andrew fails to respond or responds incorrectly then the therapist removes the task materials, turns away for 6 s, re-presents the task, and provides successive degrees of assistance until a correct response is made (e.g., gestures, modeling, and physical guidance to provide Andrew with the cues to perform the correct responses). After prompted or unprompted correct responses, the teacher delivers social praise. After an occurrence of the problem behavior the teacher turns away, removes the materials, and ignores Andrew for 30 s.

Social disapproval condition: Andrew and teacher are in the therapy room together. Andrew is provided with a variety of activities. The teacher sits several feet away from Andrew and pretends to be busy at work. After each occurrence of Andrew’s challenging behavior, the teacher presents a negative comment (e.g., “You shouldn’t spit, good boys don’t do that,” “Please don’t do that!”). The teacher ignores any other behavior displayed by Andrew.

Alone condition: Andrew is placed in the therapy room alone without any reinforcers.

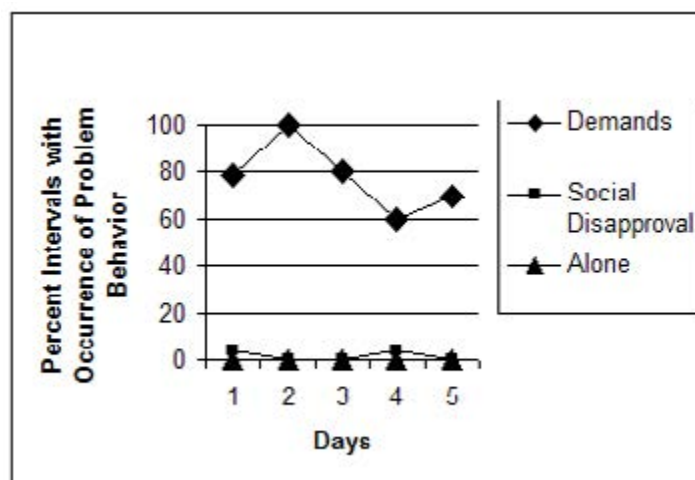
Client Case Simulation #2

Instructions: The following material represents information for a particular client case. Please review the referral form and functional analysis data and answer the questions on the work sheet on page 66.

Referral Form

Referring Agent: Teacher
Client: Laurie Anne Harish
Age: 15 years
Diagnosis: Profound intellectual disability, communication skills deficits, autism spectrum disorder
What is the problem? Laurie Anne is very difficult to work with. Whenever I give her a sorting task, which she can do when she wants to, she throws a fit! I cannot get her to do a lick of work.
How long has the problem been occurring? She has been doing this for the past 3 months and it has been steadily getting worse.
How severe would you consider the problem behavior? Well, she is not meeting her goals for the week and I end up having to work with the other kids since she is not getting anywhere.
What are your present methods of dealing with it? I tell her at the start of the day what we will be doing, but then once we get at our work station she immediately builds up for her typical fit of hollering and fussing and I can't get anything done with her. I end up just letting the session go because her behavior is just too bad to work with and I don't want anyone getting hurt.

The following FA data were collected. Three conditions, as described below, were tested to determine the maintaining variable(s) for Laurie Anne Harish's problem behavior.



Demand condition: Laurie and the therapist are seated at a table in the therapy room. Laurie is presented with educational tasks from her Individualized Education Plan (IEP). These tasks should be those that Laurie has not learned. The therapist presents the task materials and an instruction for Laurie to perform the task (e.g., placed a ball and cup

in front of Laurie and says, “Point to the ball.”). If Laurie fails to respond or responds incorrectly then the therapist removes the task materials, turns away for 6 s, re-presents the task, and provides successive degrees of assistance until a correct response is made (e.g., gestures, modeling, and physical guidance to provide the client with the cues to perform the correct responses). After prompted or unprompted correct responses by Laurie, the therapist delivered social praise. After an occurrence of the problem behavior the therapist turns away and ignores Laurie for 30 s.

Social disapproval condition: Laurie and therapist are in the therapy room together. Laurie is provided with a variety of preferred activities. The therapist sits several feet away from Laurie and pretends to be busy at work. After each occurrence of the challenging behavior by Laurie, the therapist presents a negative comment (e.g., “You shouldn’t do that” “Please don’t do that!”). The therapist ignores any other behavior displayed by Laurie.

Alone condition: Laurie is placed in the therapy room alone without activities or other reinforcers.

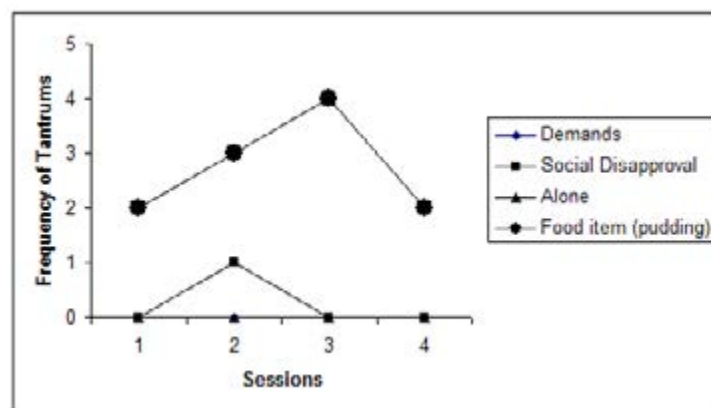
Client Case Simulation #3

Instructions: The following material represents information for a particular client case. Please review the referral form and functional analysis data and answer the questions on the work sheet on page 66.

Referral Form

Referring Agent: Evening staff
Client: Andy Smith
Age: 18 years
Diagnosis: Profound intellectual disability, communication skills deficits, visual impairment
What is the problem? In the middle of the night, at about 2:00 a.m., Andy comes out of his room and begins hollering. He can't be quieted very easily. Sometimes he flops on the floor and bangs his head on the floor in a temper tantrum.
How long has the problem been occurring? He has been doing this for the past 6 months and it has been steadily getting worse.
How severe would you consider the problem behavior? These fits wake up the other residents. Andy sometimes breaks open the skin on his head and hurts himself. So I believe it is very severe.
What are your present methods of dealing with it? I generally call the supervisor who comes to the residence. He can often stop his fits by giving him pudding. It seems to really calm him down.

The following FA data were collected. Three conditions, as described below, were tested to determine the maintaining variable(s) for Andrew McGaff's challenging behavior. The following FA data were collected by your assistant. Three conditions, as described below, were tested to determine the maintaining variable(s) for Andy Smith's challenging behavior.



Demand condition: Andy and the therapist are seated at a table in the therapy room. Andy is presented with educational tasks from his Individualized Education Plan (IEP). These tasks should be those that Andy has not learned. The therapist presents the task materials and an instruction for Andy to perform the task (e.g., placed a ball and cup in front of Andy and says, "Point to the ball."). If Andy fails to respond or responds incorrectly then the therapist removes the task materials, turns away for 6 s, re-presents the task, and

provides successive degrees of assistance until a correct response is made (e.g., gestures, modeling, and physical guidance to provide Andy with the cues to perform the correct responses). After prompted or unprompted correct responses by Andy, the therapist delivers social praise. After an occurrence of the challenging behavior the therapist turns away and ignores Andy for 30 s.

Social disapproval condition: Andy and therapist are in the therapy room together. Andy is provided with a variety of preferred leisure items. The therapist sits several feet away from Andy and pretends to be busy at work. After each occurrence of the challenging behavior by Andy, the therapist presents a negative comment (e.g., “You shouldn’t tantrum, don’t do that,” “Please don’t do that!”). The therapist ignores any other behavior displayed by Andy.

Alone condition: Andy is placed in the therapy room alone without activities or other reinforcers.

Tangible condition: A preferred item (in this case pudding) is placed out of reach in the room where Andy is located. When an instance of the challenging behavior occurs, the preferred item is delivered to Andy for several seconds and then placed out of reach again.

Case Simulation Worksheet

Therapist Name:

Client:

Date:

A client has been referred to you for treatment. Carefully read the information provided about the client and answer the following questions in the space provided under each question regarding this case. Use additional space if needed to write your answer.

Behaviorally define the client's challenging behavior (note that you may add information to define the behavior as completely as possible):

Name and describe the types of assessments you would conduct to collect information about the client's problem behavior. What relevant factors in the individual's environment would you examine during an assessment of an individual's problem behavior? What ethical considerations are present?

On the basis of the graphed data provided to you, speculate about the possible causes of the client's challenging behavior. Provide a rationale for your hypothesis.

Name and describe the possible treatments for this client's challenging behavior. Indicate as many treatments as you feel are applicable.

What replacement behavior will you reinforce?

How will you identify and implement reinforcers for desirable behaviors and any important characteristics they should have?

What antecedent-based interventions will you use?

What consequence-based interventions will you use?

How will you program for generalization and maintenance?

What ethical procedures will you use?

Developed by M. Desrochers (2004). The College of Charleston

Chapter 5

Teaching Functional Analysis

Focus Questions:

- *What are empirically-based methods to teach college students the skills involved with conducting functional analysis?*
- *How can generalization of functional assessment skills be promoted?*

To implement functional analysis (FAn) and treatment procedures specific, well-defined skills are required by the college student to deliver antecedents and consequences for the client's behavior accurately and reliably. Although college students may be able to describe a procedure in verbal or written form, that does not mean they can do it (Iwata et al., 2000; Wallace, Doney, Mintz-Resudek, & Tarbox, 2004). Role play and performance-based teaching are two strategies to establish the necessary skills.

Role Play

A **ROLE PLAY** strategy is a more physically active manner of participation in the learning situation than computer simulation. Role play teaches procedural behaviors by the individual reenacting the situation while assuming another person's identity. For instance, Jones and Eimers (1975) taught two teachers to use a behavior management approach to decrease the disruptive behavior of children in their classroom. Disruptive behaviors including talking to neighbors, out-of-seat behaviors, and inappropriate talk were behaviorally defined. A single participant research design was used to evaluate the effectiveness of the classroom behavior management procedure on students' disruptive behaviors. In this multi-component training package, the teacher training procedures entailed a combination of role playing student and effective teacher behaviors, feedback, self-reflection on what went well or not, group discussion, until mastery learning. The results of this teacher training approach led to less student disruptive behavior and higher student academic performance.

Gardner (1972) compared role play versus lecture instructional methods to teach paraprofessionals behavioral skills. Using a simple experimental research pre-test, post-test

design, 20 staff members were randomly assigned to either role play or lecture instructional methods. The results suggest that a role-play method improved proficiency scores more than lectures when teaching positive reinforcement, shaping, and stimulus control procedures. However, proficiency was assessed by a paper-and-pencil, 30-item test rather than observations of staff implementation of procedures or effects of training procedures on clients' behaviors.

Wallace, Doney, Mintz-Resudek, and Tarbox (2004) demonstrated that a high degree of accuracy in implementing FAn may also be achieved using just role play in a workshop format. One of the three teachers participating in this study needed additional feedback on specific steps performed incorrectly. One teacher in this study was able to use FAn in the classroom with a student 12 weeks after the workshop, demonstrating both stimulus generalization and maintenance of learning. Although role play is useful for the learner to engage in the desired behavior, additional instructional elements may be needed to promote students' correct responding and shape the desired behavior.

Performance-Based Training to Teach Functional Analysis

PERFORMANCE-BASED TRAINING is a strategy that systematically teaches the individual to engage in specific desired behaviors to a mastery criterion by the learner practicing or rehearsing skills with modeling and feedback provided by the teacher (McGimsey, Greene, & Lutzker, 1995). Prior to training, the task to be taught is operationally defined, broken down into smaller, specific steps (called a **TASK ANALYSIS**), and a learning criteria is set. A baseline measure of the learner's current level of proficiency is gathered from multiple assessment sessions. Next, training is designed to focus on the areas that the learner has not mastered. During performance-based training, the trainer completes the following phases with the learner: (a) trainer describes the learner's skills in verbal and textual form; (b) trainer models the behaviors to be performed or a video presentation of the desired skills is provided; (c) learner role plays or rehearses the skills; and (d) trainer provides immediate feedback provided to the learner until a mastery criterion is attained (Seiverling, Williams, Sturmey, & Hart, 2012). Generalization of skills across situations, materials, people, and time (maintenance) should be assessed and, if not present, additional training is provided to ensure the occurrence of the behavior in the desired circumstances.

Some research has demonstrated that receiving didactic instruction (e.g., lecture, reading material, and/or video/live modeling) and demonstrating mastery on a knowledge test was insufficient for students to be able to implement the antecedent and consequence procedures involved in conducting FAn with a high degree of accuracy (Erbas, Tekin-Iftar, & Yucesoy, 2006; Iwata et al., 2000; Moore & Fisher, 2007; Wallace, Doney, Mintz-Resudek, & Tarbox, 2004). Only after immediate feedback was provided for learners carrying out functional analysis procedures to mastery criterion were students able to *perform* the traditional FAn conditions (e.g., demand, attention, play, alone) to a high degree of accuracy, demonstrating that performance-based training with role play can effectively be used to teach FAn (Iwata et al., 2000; Wallace et al., 2004). Iwata et al. (2000) demonstrated that FAn procedures could be taught to a high degree of proficiency to inexperienced undergraduate psychology

students who had previously completed only one applied behavior analysis course. Following review of written and video-taped model presentations descriptions of the FAn conditions and passing a knowledge test, students did not correctly perform the FAn steps when presented with simulated clients. The next phase entailed the researcher providing feedback with video-taped review of errors and, within 10-30 min, near perfect accuracy in conducting the procedures involved in the FAn conditions was achieved. The results of Iwata et al.'s study are revealing and help to quell arguments that FAn is difficult to perform and unable to be taught to novices as the participants were college students enrolled in their first ABA course. Generalization to real-life situations and retention measures were needed in this study but other researchers have now examined these areas.

Performance-based training can be used to teach teachers to conduct FAn with children in their classroom. For example, Moore et al. (2002) replicated the Iwata et al. (2000) study with teachers who, after training, applied FAn with students in the classroom. Moore et al. (2002) demonstrated that performance-based training led three teachers to correctly perform the steps involved in conducting a FAn to a greater degree compared to that when only reading the procedures and demonstrating mastery of that knowledge on a test. In another extension of this instructional approach, teachers conducted the FAn conditions with children in their classrooms during part of the training phase and then performance-based training while reviewing those video-taped sessions with the researcher was provided (Erbas, Tekin-Iftar, & Yucesoy, 2006).

In another demonstration of use of performance-based training to establish skills, Noell et al. (2000) taught teachers to use a peer tutoring program with their students. Despite being given information on the program and knowing what needed to be done, the five classroom teachers in this single participant research design study did not fully implement the procedures until performance-based training and brief meetings were provided. The researchers measured the teachers' students reading scores and found concurrent improvement in those scores as the teachers' implementation of the procedures increased.

Performance-based training has been demonstrated to be an effective method to teach people how to implement other training skills as well (Coddington, Feinberg, Dunn, & Pace, 2005; Gardner, 1972; Ducharme & Feldman, 1992; Hundert & Hopkins, 1992; Jones & Eimers, 1975; Nigro-Bruzzi & Sturmey, 2010). This method can lead to changes in behavior that are not just due to the learner being observed, but as a function of the instruction provided (Coddington, Livanis, Pace, & Vaca, 2008). Isaacs, Embry, and Baer (1982) experimentally demonstrated the effectiveness of performance-based training for therapists to learn how to train parents to increase task compliance with their child. Even when other methods, such as video modeling are first used to teach a new skill, performance feedback can be used to effectively "top off" skill acquisition (DiGennaro Reed, Coddington, Catania, & Maguire, 2010).

A combination of strategies may be used to enhance training. Procedural checklists, role play and performance-based training have been used by six supervisors to teach nine residential staff members to conduct trial-based FAn (Lambert, Bloom, Kunnavatana, Collins, & Clay, 2013). A single participant experimental research design demonstrated that the training procedures were effective, although periodic feedback was required to maintain skills following the original training sessions.

Typically performance-based training is conducted in a face-to-face format (e.g., Ryan, & Ilemmes, & Sturmey, 2004), although there have been efforts to evaluate the potential of online instruction with webcams and communication software (Desrochers & DiCesare, 2013). Initially, the learner's training typically occurs with the instructor during role play simulations and once a mastery criterion has been met, skill training with the learner working with the client may occur. Advantages to structured role play are that a wider array of contextual possibilities (e.g., various client characteristics, functions, settings, etc.) can be presented to enhance the learner's acquisition and generalization of skills. See the Table 20 below for an example of a performance-based training data sheet.

Table 20

An example of a performance-based training data sheet

Trainer: Mrs. Smith Child: Siana Situation: Playtime Date: 1/20/2014 Skill being taught: Effective use of positive reinforcement Description of Skill: See steps below Goal: Correct use of positive reinforcement Training criteria: 100% correct on all steps for 3 consecutive sessions					
Step	On Each Trial Record: √ X Ø				Comments
Uses contingent reinforcement—delivered immediately (within 3-5 s) following correct response	1√	2√	3√	4√	
	5	6	7	8	
	9	10	11	12	
Provides a descriptive praise statement mentioning the behavior e.g., “Nice sitting!”	1√	2√	3√	4√	
	5	6	7	8	
	9	10	11	12	
Provides enthusiastic praise in terms of voice intonation	1√	2√	3√	4√	
	5	6	7	8	
	9	10	11	12	
Delivers preferred item, as appropriate	1√	2 X	3 X	4 X	
	5	6	7	8	
	9	10	11	12	
Steps performed well:					
Steps that need correction:					

The type of consequences for correct implementation of procedures taught using performance-based training may be important. DiGennaro, Martens, and Kleinmann (2005) conducted a study in which classroom teachers were taught procedures to decrease the problem behavior of their students. These researchers compared goal setting and daily written feedback delivered to teachers to another condition in which teachers were provided with performance feedback and could avoid a consultation meeting (i.e., a negative reinforcement) if all of the procedural steps were performed correctly. The latter condition resulted

in more accurate implementation of the treatment procedure by the teachers and improved outcomes for their corresponding students. In general, the reinforcer delivered to increase someone's behavior should be tailored to the individual; that is, holding meetings may be a reinforcer to some while avoiding meetings may be reinforcing to others. The feedback delivered by the instructor should occur immediately after the learner's performance and include praise given regarding multiple specific areas that the learner performed well and then corrective feedback concerning areas to improve. Initially, during the early instruction sessions, feedback should be immediately delivered after the learner's performance; however, later in training, feedback should be delivered in a more delayed fashion to increase generalization to real-world situations where delayed feedback is typically the case (Lee & Belfiore, 1997).

Generalization of FA Skills to the Natural Environment

GENERALIZATION refers to whether the desired skills occur across non-training behaviors, setting, time (or maintenance), and people as mentioned in Chapter 3 (Stokes & Baer, 1977). Generalization of learners' skills across these various domains may not automatically occur (Finn, Patten, & McLachlan, 2010), so strategies to promote it may need to be programmed into the instructional approach. The occurrence of professionals' assessment and intervention skills across different contexts (e.g., different individuals, topography of problem behavior, maintaining variables) and long-term maintenance of those skills are important.

A major approach to facilitate stimulus generalization is to incorporate into the training situation stimuli or events that are comparable to that in the natural environment (Ducharme & Feldman, 1992). For example, Finn, Patten, and McLachlan (2010) compared test scores for 82 medical students when they wore scrubs versus no scrubs following learning gross anatomy (which involved dissection and wearing scrubs in both conditions). Higher test scores occurred when the students were tested in a similar context (with scrubs) compared to dissimilar context (no scrubs) to training. These results suggest that incorporating common stimuli in the training situation may aid in transfer of knowledge. For example, professionals working in inclusion settings may generalize these results by arranging events in which students act as scientists using tools and equipment so students act as if they are performing scientific tests.

CASE-BASED LEARNING, also known as guided inquiry approach, involves presentation of a real-world problem for students to define and solve during instruction. The trainer/teacher provides a supportive role guiding the student down the correct path, delivering feedback, and probing for additional information (Srinivasan, Wilkes, Stevenson, Nguyen, & Slavin, 2007). Srinivasan et al. (2007) compared case-based learning to problem-based learning, which is a less structured approach, and found that medical students preferred case-based learning. Cifuentes, Mercer, Alvarez, and Bettati (2010) describe how presenting problems for students to solve provides a meaningful learning experience likely to be encountered in future job settings. This method of instruction is versatile, and has even been effectively used in large university classes of 100 students working in groups of

5 or 6 to address a problem situation (Nicholl & Lou, 2012). There is also some research to suggest that gradually transferring instructional approaches from lecture to case-based learning may be more effective than using case-based learning alone (Baeten, Dochy, & Struyven, 2013). Additionally, providing structure (i.e., comparison of cases, prompts) to promote students' focus on underlying principles related to the material presented may facilitate their learning (Harkrider et al., 2013). When teaching students to employ a FA method including multiple case exemplars of clients exhibiting a variety of challenging behaviors in various situations is important.

In a more extensive manner of programming common stimuli, **GENERAL CASE STRATEGY** can be an effective method of programming for generalization or increase students' learning occurring in new situations (Ducharme & Feldman, 1992). General case strategy entails carefully identifying the relevant aspects of a situation and including a representative sample of those characteristics in a training program.

To promote generalization of skills, Bolton and Mayer (2008) evaluated a staff training procedure involving performance feedback training with general case strategy and programming common stimuli. The general case strategy used in this study involved participants' review of 10 examples of the implementation of the skills taught and training materials used that were similar to that found in the field. All three paraprofessionals who participated in the experiment generalized the instructional skills taught with different children. Applying these strategies (general case strategy and programming common stimuli) when teaching college students to use a functional assessment approach would entail presenting a broad range of client cases with characteristics and examples of challenging behavior likely to be encountered in the professional situation.

Similarly, the necessary therapist behaviors involved with conducting FAn (e.g., what the therapist should do following a client's correct versus incorrect response during the demand condition) must be represented when designing instruction for college students. Should all therapist behaviors be depicted or can only a sample be shown for optimal student learning? Moore and Fisher (2007) addressed this research question by comparing complete video modeling versus partial video modeling procedures that differed in the number and range of therapist's behaviors presented to teach FAn. The staff members who participated in this study performed FAn steps best following the complete video modeling condition (all possible therapist behaviors were presented) under simulated conditions compared to partial modeling (half of the possible therapist's behaviors were presented) and lecture training conditions. Moreover, generalization of procedural skills following the complete video modeling condition by the three participants occurred when working with actual clients during follow-up probe measures.

Field experiences, internships, or practicum courses are often offered as a feature of university curricula in mental health professions to develop and hone students' procedural and practical decision-making skills common in professional settings. Moreover, supervised experience is one part of the requirements to be eligible for board certification as a behavior analyst. These hands-on experiences allow students to practice skills and increase their likelihood of transferring the training to other situations. Given that such instruction entails work with actual individuals who are often in need of services, ethical constraints exist, the leeway for errors is small, and the breadth of exposure to different experiences (e.g., clients/students, problem behaviors, etc.) may be limited. Grey, Honan, McClean, and Daly (2005)

provided 90 hours of classroom instruction and supervision to teachers working with a child with autism. Desirable changes in the children's behavior and positive evaluations of the program by teachers and parents were found in this descriptive study.

Summary

Realistic case examples need to be presented to provide the context for learning how to use FA and to design treatment implemented in the target situation. Multiple examples of a wide variety of cases involving children and adults displaying various problem behaviors in different settings may increase college students' generalization of the skills acquired. Instructional methods to present cases in the college classroom under controlled and ethically safe conditions include simulations, role play, case-based learning, and general case strategy and may be used prior to supervised field experiences.

The instructor's method of instruction should be geared to the type of behavior targeted for training. Different instructional approaches are required for establishing students' knowledge versus skills. Performance-based training can be used to teach and refine the skills needed to conduct FA. Additionally, promoting the generalization of college students' acquisition of the procedural and decision-making skills involved in FA may be facilitated by use of case-based learning and general case strategy to expose students to a variety of situations and client cases representative of that found in a professional setting. Moreover, these procedures can be acquired in a relatively short period of time and generalize to real-life situations even though role play under simulated conditions typically is used during training. Another necessity involves teaching the broader array of steps in the FA process (e.g., decision-making, hypothesis identification, data analysis, treatment selections) to ensure adequate preparation of a professional who will be working in the field, which is the focus of Chapter 6.

Discussion Questions

1. Discuss how teaching skills differs from teaching content.
2. Name and describe four methods to teach skills.
3. Describe how you would specifically teach another professional or family member how to use positive reinforcement to increase a child's desired behavior.

Exercise: Case Study

Carly is a new teacher's aide in an elementary school classroom who has been assigned to work with Allen. Allen is a 6 year-old boy with autism who frequently tantrums in the classroom. His treatment program includes administration of differential reinforcement of zero rates 5 min (DRO-5 min) and attention extinction. Carly must be taught how to employ this behavior intervention plan to reduce Allen's tantrums, which are occurring at high rates throughout the day (i.e., 20-40 times per day on average).

1. Behaviorally define tantrum.

2. How could you teach Carly to conduct a functional analysis to identify the function of the tantrum behavior?
3. How would you teach Carly to implement a DRO procedure?
4. Describe the steps you would use to teach Carly to correctly implement DRO and attention extinction.
5. How could you promote Carly's generalization of decision-making skills to new situations and client cases?
6. What ethical considerations are necessary in this case?

Chapter 6

Functional Analysis Case Training/FACT

Focus Questions:

- *How can functional analysis best be taught?*
- *What are the components that need to be taught in the functional assessment process as a whole?*
- *What is FACT and how does it differ from previous approaches to teaching functional assessment?*

A Plan to Teach the Process of Performing a Functional Assessment

FA is a complex subject that requires an extensive knowledge-base, clinical decision-making skills, and performance components. In Chapter 2 the different types of FAs were described. In Chapter 3 treatment procedures were covered. Chapter 4 reviewed instructional approaches to establish students' knowledge and clinical decision-making skills. Lastly, Chapter 5 addressed how performance-based training could be used to teach the skills involved with conducting functional analysis. The focus of this chapter is to provide a method to practice the process of FA and the multiple steps that comprise it. See Table 21 below for a list of the steps involved in conducting a FA.

Table 21
Steps involved in conducting a FA

To conduct a functional assessment the professional must: 1. Behaviorally define the client's challenging behavior 2. Review referral form and records 3. Conduct indirect and/or observational functional assessments 4. Evaluate the reliability and validity of the data 5. Develop a functional hypothesis regarding the maintaining variable for the problem behavior 6. Design a functional analysis; indicate advantages and disadvantages of this approach 7. State the ethical issues and considerations for assessment 8. Test hypothesis by implementing functional analysis conditions, and collecting data 9. Graph the data collected, and interpret findings 10. Determine function of the individual's challenging behavior 11. Design behavior intervention plan based on function of the individual's problem behavior and other factors (e.g., context, quality of the environment, severity of the problem behavior, people present, resources available, setting, etc.) 12. Select a functionally-equivalent replacement behavior, prevention approaches, active teaching procedures; and reactive procedures for when the problem behavior occurs 13. State the ethical principles and procedures involved in the treatment phase
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Comprehensively Teaching the Functional Assessment Process

Descriptions in the research literature of efforts to teach a *comprehensive set* of practitioner skills have been few. One early demonstration of a comprehensive training program to teach undergraduate psychology students to provide clinical or in-home consultative services was described by Keeley, Shemberg, and Ferber (1973). This training program involved: (a) content and practice in observing and recording behavior, (b) interventions, and (c) professional and ethical skills. The instructional approach involved lectures, role plays, and problem-solving client cases. The authors report positive results of this program to teach 37 senior-level psychology students how to deliver services to individuals with developmental disabilities and their families; however, no systematic evaluation of the program was performed.

In a more recent research evaluation of a comprehensive therapist training program, Chok, Shlesinger, Studer, and Bird (2012) describe a curriculum that involves teaching four components including: (a) conducting FAn sessions, (b) interpreting graphs, (c) responding to undifferentiated data, and (d) designing treatments. Participants completed assignments

and were provided with feedback for answers along with the other knowledge components until mastery was achieved. Training was tailored to the component taught with performance feedback provided to participants when conducting FAn conditions. The researchers used a concurrent multiple-baseline design across participants to evaluate the training program. Participants acquired the skills at a near-perfect accuracy with generalization across training stimuli and 3 month maintenance occurring. Some limitations noted in this study were that participants' application of procedures to actual client behaviors was not assessed. Additionally, the gamut of clinical skills were not addressed, such as ethical issues, defining target behavior, and identifying a measurement system. Nonetheless, Chok et al.'s (2012) study provides a good example of how a systematic and comprehensive method can be used to teach the complex conglomeration of skills necessary for professionals to apply a FA method.

A New Proposed Instructional Approach: Functional Analysis Case-based Training (FACT)

FUNCTIONAL ANALYSIS CASE-BASED TRAINING (FACT) may be an effective method to teach a comprehensive set of skills required to perform functional analysis (Desrochers, 2012). A FACT method incorporates a case-based learning approach, role play, simulation, and performance-based feedback as major instructional methodologies to establish and hone college students' knowledge-base and skills required to implement a FA process. Students are given brief descriptions of cases described in published research to draw upon for realistic and clinically validated approaches to solving an individual's challenging behavior. Based on primary source material, effective assessment methods and intervention outcomes can be identified and reviewed as a group exercise. Both performing the functional analysis conditions, using role play, and employing the decision-making skills to arrive at an effective behavior intervention plan are practiced by the student in simulated clinically-relevant situations with empirically-validated results.

FACT Components

The major FACT instructional components embedded in this learning activity include students working collaboratively to solve and re-enact problem situations for individuals in clinical/school/home settings. The case examples are drawn from published research to provide realistic characteristics of individuals and their assessment and treatment data.

Team-work

This exercise is a collaborative learning, team-based approach. Working in separate groups of three, college students are asked to assume key roles such as client/student, therapist/teacher, or director. The other groups serve as actively participating audience members during the presentation of each group's case.

Skills that are interpreted, simulated, or acted out in a role play include: (a) behaviorally defining the individual's challenging behavior; (b) identifying the function of the individual's challenging behavior (c) conducting the conditions for a FAn; (d) analyzing graphical presentations of behavior; and (e) identifying function-based treatments for that case. Once the scenarios have been practiced, teams present their case to other students/audience members who must complete the following tasks: (a) behaviorally defining the challenging behavior; (b) determining how to assess and record the challenging behavior during the various functional analysis conditions; (c) analyzing the function of the client's challenging behavior; (d) determining the most effective treatment based on that function of the challenging behavior; and (e) reviewing the ethical issues that may exist in the situation presented. Feedback concerning audience members' answers to questions is provided by the trainer/director presenting the case.

Table 22

Summary of roles and duties of student/client, teacher/therapist, director/trainer, and audience

Role	Duties
Student/Client	Realistic presentation of problem behavior under various conditions to simulate the graphed data
Teacher/Therapist	Accurate presentation of procedures for each functional analysis condition: attention, demand, tangible, alone, play
Director/Trainer	Part I: Provide immediate performance feedback concerning client and therapist behaviors using the behavior integrity checklist Part II: Provide audience with the context for the case (e.g., age of client, setting, etc.) Present questions and provide feedback to the audience to facilitate active engagement in the case, such as: • How would you behaviorally define the challenging behavior? • What recording method and aspect of behavior is measured? • What would a graph of the challenging behavior and its current maintaining variable look like? • What features would you note to analyze the data collected? • What is the function of the challenging behavior? • What are your treatment recommendations in areas of prevention, active training, and reactive? • What ethical issues are present in this situation? • What types of generalization are applicable in this case (stimulus generalization, response generalization, maintenance)? How would you program for generalization to occur? • What information would you include in a BIP?

Audience	Be able to: • Behaviorally define the challenging behavior • Identify recording method and aspect of behavior measured • Observe and record the problem behavior • Analyze data collected • Identify function of the challenging behavior • Make treatment recommendations • State the ethical issues present in this situation • Program for generalization • Write a BIP
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In this role play situation the audience is actively involved and practicing many of the decision-making skills involved in the FA process. The audience is asked by the director of the performing group to respond to key features of the case by: (a) defining the challenging behavior; (b) determining the measurement approach (i.e., frequency, duration, etc.); (c) recording levels of the problem behavior in various conditions (attention, demands, tangible, alone, play); (d) identifying the maintaining variable for the individual's challenging behavior; and (e) designing effective interventions to decrease the challenging behavior based on the function of the challenging behavior and ethical considerations. The director provides immediate feedback for the audience's answers in each of these topic areas.

Programming for Generalization of Functional Assessment Knowledge and Skills

This interactive exercise allows students to practice performing most of the steps involved in completing the FAn (see Chapter 2) and the overall FA process such as review of client case, administration of functional analysis, interpretation of data, designing effective intervention. Furthermore, use of multiple case scenarios (based on general case strategy) representing multiple perspectives (e.g., audience, and role playing a therapist, client, or director) may facilitate college students' generalization of skills beyond the boundaries of the training cases presented (Moore & Fisher, 2007).

Summary

The process of FA is complex and so instructional methods to teach it must incorporate multiple strategies to ensure adequate coverage of this topic to thoroughly teach it. A FACT method is one step toward a comprehensive approach to teaching pre-professionals how to effectively assess and treat the challenging behaviors of individuals with developmental disabilities.

FACT Hand-Outs for Students

Purpose of the Activity:

- To provide you with invaluable hands-on experience with an assessment/treatment approach that has been experimentally-validated for use with a variety of populations and problems.
- To provide you with the tools that will be useful to you in your career.
- To provide you with the skills and knowledge that potential employers seek!

Instructions:

1. You and your group members should first carefully read your selected research article and summarize the main points. Pay close attention to the client's behavior, procedure, and results of the functional analysis conditions. Review those areas with your group members once everyone has read the article or its summary.
2. Assign roles (alternate roles so that everyone has an opportunity to perform each role) including client, researcher/practitioner, and trainer.
 - Client Role: Read the participant description section of the article you are assigned and simulate the behaviors that are described. Scrutinize the graphical presentations of the data and be prepared to approximately portray those levels of the client's behavior in each condition (e.g., demands, alone, attention, etc.).
 - Teacher/Therapist Role: Read and review the procedure for each functional analysis condition. You will be implementing that procedure with your simulated client and collecting data on that person's behavior.
 - Director/Trainer Role: Your duties are to describe the client to your "audience," announce conditions, score the researcher's behavior and provide performance-based feedback to your researcher/practitioner evaluating his/her completion of the steps involved in completing each FAn condition.
3. Practice conducting the functional assessment with performance-based feedback.
 - Director/Trainer introduces the problem situation and describes the client and the setting.
 - Teacher/Therapist conducts the brief sessions and collects data on the client's behavior.
 - Director/Trainer announces the condition and collects data regarding researcher's/practitioner's performance.
 - For each functional analysis condition (conduct it for only 5 min maximum), the client and Teacher/Therapist simulate the process.
 - Review the procedures to conduct the condition. Conduct the condition. At the end of simulated experience trainer provides constructive feedback to Teacher/Therapist (i.e., praise aspects of the procedure done well and indicate areas needing improvement). If needed (<80% correct procedural performance), rehearse again.

- Reflect and evaluate your performance as to whether you engaged in all steps required to conduct FA. Some research suggests that self-reflection can enhance one's performance (Fallon, Ackley, & Brown, 2003).

For instructional purposes, perform the functional analysis live in-class or video-taped for your classmates! Your audience will be required to “collect data” as you perform the conditions using the checklist for determining treatment fidelity (see below) and so be sure to make the conditions in keeping with the data and as realistic as possible.

Activity developed by M. Desrochers (2010). The College at Brockport-SUNY

Experimental Functional Analysis Procedural Description and Reliability Checklist

A functional analysis is performed to experimentally identify the maintaining variable for the individual's problem behavior. This exercise is designed to maximize your acquisition of how to perform this assessment approach.

1. Behaviorally define the problem/target behavior:
2. Identify the recording procedure used to measure the client's problem behavior:
3. Indicate the ethical issues that may be present when conducting a functional analysis and state how each issue will be addressed.

A FAn is typically conducted using a multielement research design (i.e., alternating treatment design), involving concurrently presenting two or more conditions on the same day (Martin & Pear, 2011). All conditions are presented for at least 5 min on an assessment day, with a brief 5-min break between them. The order of conditions is alternated across days (e.g., Day 1: attention, demands, alone, play; Day 2: demands, alone, play, attention, etc.). At least 4–5 data points are collected so that trends and levels of the problem behavior across conditions can be determined. Graphed data are examined to identify differential levels of the individual's behavior across conditions.

For the purposes of this role play simply demonstrating a single session for each condition will suffice. Inform your audience that this session is representative of the client's average responses that occurred across multiple sessions.

Review the description, purpose, and procedure for each functional analysis condition described. Then, in your small group: (a) review the client case together; (b) assign roles (i.e., client, therapist, director); (c) plan how to represent the case; and (d) practice performing the conditions that simulate the client's level of problem behavior as depicted in the graph until mastery performance is achieved in conducting the functional analysis conditions.

Activity developed by M. Desrochers (2010). The College at Brockport–SUNY

Attention Condition

These are the standard experimental functional analysis conditions as described by Iwata, et al., 1994/1982, JABA, 27, 197-209 and Iwata et al., 2000.

Description & Rationale:

The purpose of this condition is to determine if the individual's problem behavior is due to attention positive reinforcement. Under conditions of social deprivation and in the presence of one or two adults, eye contact, physical contact, reprimands, or verbal interaction may be contributing to the individual's problem behavior. The therapist presents verbal statements, such as "No, don't do that" or similar comments that typically are given by others in the individual's natural environment immediately after the individual's problem behavior. Although it may seem counter-intuitive, even telling the individual not to do something may increase the likelihood that the behavior occurs or serves as a positive reinforcer! Note that this condition may be tailored to the specific stimuli found to correlate with the occurrence of the individual's problem behavior based on descriptive and observational functional assessments. Attention positive reinforcement is when social reinforcers are delivered (e.g., verbal, eye contact, gestures) immediately after the behavior and the behavior is more likely to occur in similar future situations (Martin & Pear, 2011).

If the individual's problem behavior is worse under the attention condition compared to other conditions or the control conditions then this result suggests that attention positive reinforcement is maintaining their behavior.

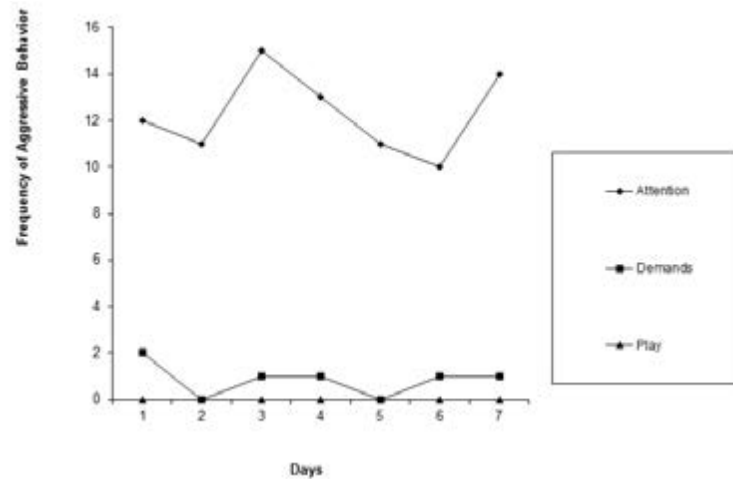
Procedure:

Set the timer and begin. The therapist tells the client to play with toys and then ignores the child (i.e., no verbal interaction, eye contact, nor any other consistent reaction to the child's behavior). The therapist ignores the child's appropriate behavior or inappropriate behavior that is not the target behavior. The therapist can be reading a magazine or talking to another adult. If the child engages in the problem behavior, then the therapist provides attention (e.g., eye contact and "Please do not do that, you are going to hurt yourself") and physical contact (e.g., hand on shoulder) for 3 s. All occurrences of the client's behavior are recorded by the therapist.

Purpose	Summary Of Attention Condition	
Social positive reinforcement	2 adults talking/ Adult reading magazine	R+ -> Ø R- -> Attention

Note: R+ = desirable behavior; R- = problem behavior; Ø = no response

An example of what the client's graphed levels of the problem behavior that is being maintained by attention positive reinforcement is as follows:



As can be seen in the graph, frequency of the client's aggressive behavior is greater in the attention condition compared to the demands and play conditions. This provides experimental evidence that the client's problem behavior is being maintained by attention positive reinforcement.

Treatment Integrity Checklist—Attention Condition

Instructions: This checklist may be used for training purposes and for determining treatment fidelity in implementation of the attention functional analysis condition. Place a √ in the box beside the relevant procedural step if the therapist performed it correctly; an X if incorrect; or an (an omission or no response) if the procedural step did not occur at all when it should have.

Client:

Therapist:

Date:

Session time began:

Ended:

Problem behavior defined:

While the therapist is reading a magazine or talking with another adult, was the following done?

Client told to play with toys or engage in some activity

Client's appropriate behavior ignored

Client's inappropriate behavior ignored

Social attention and physical contact delivered to client when target behavior occurred

Behavior outcome recorded on the data sheet

5 min duration of session

Notes:

Performance-based feedback

Steps performed well:

Steps that need correction:

Demand (Escape) Condition

These are the standard experimental functional analysis conditions as described by Iwata, et al., 1994/1982, JABA, 27, 197-209 and Iwata et al., 2000.

Description and Rationale:

The purpose of the demand condition is to determine if the individual's problem behavior is due to escape/avoidance of task demands or activities (AKA negative reinforcement). A negative reinforcer (escape) is when an unpleasant stimulus is present and an instance of the problem behavior removes that stimulus (Martin & Pear, 2011). The probability of an individual's behavior that results in a negative reinforcer increases in similar future situations. Avoidance is when a threat of presentation of an aversive stimulus is present and an instance of the behavior removes that threat. Across the functional analysis conditions, if the individual's problem behavior is worse when the demand condition is in effect compared to that in the other conditions then the problem behavior may be maintained by negative reinforcement.

Procedure:

Set timer and begin. The therapist, on repeated trials throughout the 5-min session, presents an activity or instruction to complete a task that the individual has in the past (based on interview or observational data) had difficulty in completing even when physically guided to do so.

Specifically, the therapist and client are seated at a table and the therapist presents an instruction to complete a task. The therapist waits for 5 s for the client to initiate a response.

If no response occurs to this first instruction then the therapist: (a) repeats the instruction; (b) models or demonstrates the correct response; and (c) waits 5 s for a response by the client = LEVEL 1 PROMPT

If no response occurs after the second instruction, then the therapist: (a) repeats the instruction; (b) physically guides the client through the response using the least amount of guidance required = LEVEL 2 PROMPT

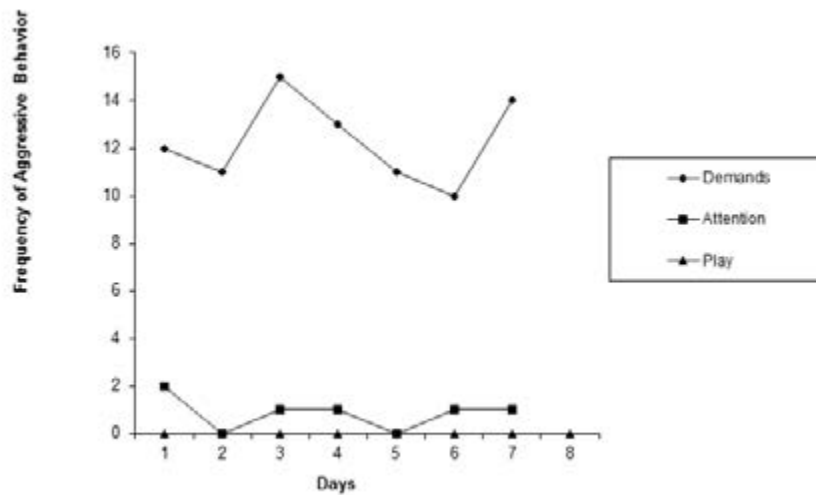
If the client emits a correct response, prompted or unprompted, the therapist provides praise ("Nice work").

If the client engages in the problem behavior at any time, then the therapist immediately turns away from the client for 30 s, with additional 30 s for any repeated instances of the problem behavior.

Purpose	Summary Of Demand Condition	
Negative reinforcement	Present requests to complete a task	R+ = praise X/Ø = prompt, level 1 & 2 prompts R- = removal of task

Note: R+ = desirable behavior; R- = problem behavior; Ø = no response, X = incorrect

An example of what the client's graphed levels of the problem behavior that is being maintained by negative reinforcement (specifically, escape from task demands) is as follows:



As can be seen in the graph, frequency of the client's aggressive behavior is higher in the demands condition compared to the attention and play conditions. This provides experimental evidence that the client's problem behavior is being maintained by negative reinforcement.

Treatment Integrity Checklist—Demand Condition

Instructions: This checklist may be used for training purposes and for determining treatment fidelity in implementation of functional analysis conditions. Place a $\checkmark$ beside the relevant procedural step if correct; an X if incorrect; or an $\emptyset$ (an omission or no response) if it did not occur at all when it should have.

Client:

Therapist:

Date:

Session time began:

Ended:

Instruction presented:

Problem behavior defined:

Instruction by therapist presented correctly.

If $\checkmark$:

Praise delivered following client's correct response, prompted or unprompted.

If X/ $\emptyset$:

Training trials continued (i.e., no pause) when client emits any other behavior than target after instruction.

Therapist presents 2nd level prompt (repeat instruction and demonstrate) following client's X/ $\emptyset$ response.

Therapist presents 3rd level prompt (repeat instruction and physical guidance) following client's X/ $\emptyset$ response.

Praise delivered after client's $\checkmark$ response.

If problem behavior:

Therapist ignores or turns away following client's problem behavior for 30 s.

Begin a new trial when the 30-s interval has ended.

Behavior recorded correctly on each trial— $\checkmark$, X/ $\emptyset$, R⁻, P (prompt), U (unprompted).

5 min duration of session.

Notes

Performance-based feedback

Steps performed well:

Steps that need correction:

Play Condition

These are the standard experimental functional analysis conditions as described by Iwata, et al., 1994/1982, JABA, 27, 197-209 and Iwata et al., 2000.

Purpose and Rationale:

In the play condition, toys or activities are presented and the therapist interacts socially with the client. This condition serves as a comparison condition to rule out confounding variables or that the problem behavior is due to variables present in the attention, tangible, or demand conditions (e.g., the presence of the therapist, materials, social interaction). The amount of the client's problem behavior in the play condition is compared to that in the other conditions. For example, if across experimental sessions the client's problem behavior is consistently better in the play condition compared to that in the attention condition, then attention positive reinforcement may be maintaining the client's problem behavior.

Procedure:

The therapist and client are in a room with a variety of toys present. The therapist is within 3-5 ft of the client and occasionally presents toys, with no demands. The therapist provides social praise and brief physical contact contingent on appropriate behavior at least once every 30 s. Any problem behavior is ignored unless the severity is of concern due to physical harm.

Summary

Purpose	Summary Of Play Condition	
Control condition	Therapist + toys	R+ -> Attention R- ->Ignore

Treatment Integrity Checklist—Play Condition

Client:

Therapist:

Date:

Session time began:

Ended:

Problem behavior defined:

Instructions: This checklist may be used for training purposes and for determining treatment fidelity in implementation of functional analysis conditions. Place a $\checkmark$ beside the relevant procedural step if correct; an X if not; or an $\emptyset$ if it did not occur at all when it should have.

Toys presented

Attention provided at least once every 30 s

Social interaction with therapist after appropriate client behavior

No attention after client's inappropriate behavior

Problem behavior recorded

5 min session duration

Notes:

Performance-based feedback

Steps performed well:

Steps that need correction:

Alone Condition

These are the standard experimental functional analysis conditions as described by Iwata, et al., 1994/1982, JABA, 27, 197-209 and Iwata et al., 2000.

Purpose & Rationale:

In the alone condition, the client is in a room by him/herself with no toys or activities (Note all safety concerns should be addressed and appropriate precautions taken). The therapist observes the client's behavior for the purpose of data collection from a one-way mirror or video camera. This condition tests whether self-stimulation or automatic reinforcement is maintaining the client's problem behavior by creating a situation in which low levels of stimulation exist and measuring whether the problem behavior occurs. If levels of the client's problem behavior are worse in the alone condition compared to the other functional analysis conditions or do not differ across all conditions then automatic reinforcement may be maintaining the client's problem behavior.

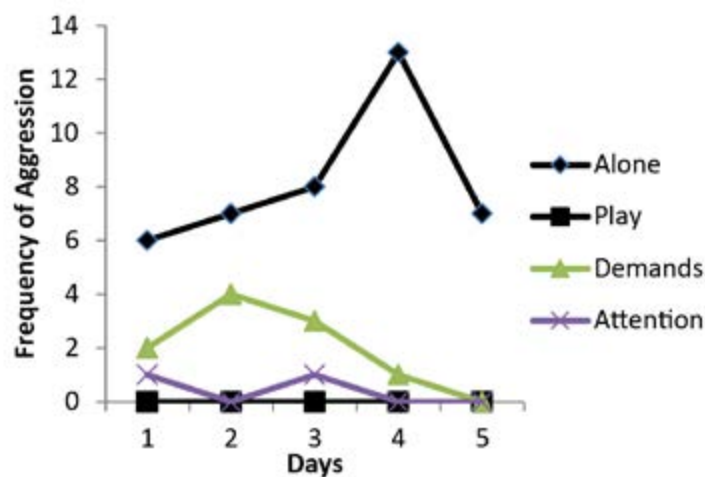
Procedure:

The client is placed in the therapy room alone, without any toys or materials that would provide a source of stimulation. The client's problem behavior is measured.

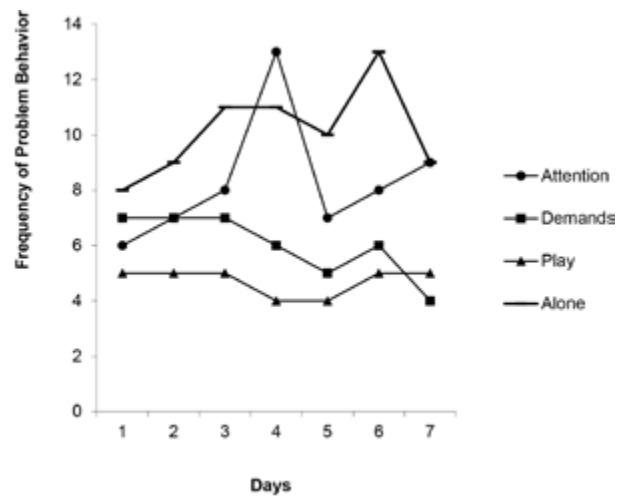
Purpose	Summary Of Condition
Automatic positive reinforcement	Alone, no toys or materials

Examples of client's graphed levels of the problem behavior maintained by automatic positive reinforcement.

A



B



As can be seen in the above graphs, frequency of the client's behavior is either greater in the alone condition compared to the attention, demands, and play conditions (A) or high in all conditions (B). These data configurations provide evidence that the client's problem behavior is being maintained by automatic positive reinforcement.

Treatment Integrity Checklist—Alone Condition

Client:

Therapist:

Date:

Session time began:

Ended:

Problem behavior defined:

Instructions: This checklist may be used for training purposes and for determining treatment fidelity in implementation of functional analysis conditions. Place a √ beside the relevant procedural step if correct; an X if incorrect; or an Ø if it did not occur at all when it should have.

Individual is alone in a room

No toys or materials are present

Problem behavior is recorded

5 min session duration

Notes:

Performance-based feedback

Steps performed well:

Steps that need correction:

FACT Exercises:

The following are 7 cases that can be used as the basis for FACT with students working in groups of 3 to simulate the case and practice performing the functional analysis conditions.

Brief Case Descriptions:

- [The Case of the Cough!](#): A 4-year-old who coughs during meals at home due to attention positive reinforcement
- [The Case of the Delusional Statements](#): A 27-year-old male who engages in delusional statements at his vocational rehabilitation site due to attention positive reinforcement
- [A Case in the Classroom](#): A 9-year-old boy who yells in the classroom due to negative reinforcement
- [The Case of “You Already Said That!”](#): A 24-year-old man with perseverative speech due to attention positive reinforcement
- [The Case of #@&*!](#): An 89-year-old woman with disruptive vocalization due to negative reinforcement
- [The Case of Bye, Bye, I am Gone!](#): A 12-year-old boy who elopes due to attention positive reinforcement
- [The Case of Hair Today, Gone Tomorrow](#): A 19-year-old female who manipulates and pulls her hair due to automatic reinforcement

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The Case of the Cough!

From Watson, T. S., & Sterling, H. E. (1998). Brief functional analysis and treatment of a vocal tic. *Journal of Applied Behavior Analysis*, 31, 471-474.

Client Description & Background: Vivian, a 4-year-old typically developing girl who presented with a 4 month occurrence of a vocal tic in the form of repeated coughing. Just before originally exhibiting the cough, she had a respiratory infection that had since cleared up. She had been seen by her pediatrician who did not find a medical cause for her behavior. Vivian's parents stated that her cough "was 'annoying' and 'intrusive' in their conversations" (Watson & Sterling, 1998, p.471). Her coughing generally only occurred during meals.

Behavioral definition: "loud barking or metallic sound coming from the mouth" (Watson & Sterling, 1998, p. 471).

Parent Interview Questions:

- When does the behavior occur?
- What are your reactions to the coughing behavior?
- What other times or places that the cough occurs?
- Does it occur when you are out? Is it only certain foods?
- Does it occur with one parent or both?
- When she doesn't want to eat?
- Do certain things occur during the day associated with its occurrence or non-occurrence (e.g., school, longer day, daycare, visits)?

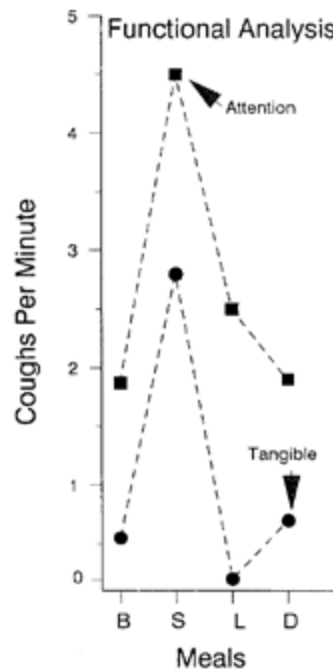
Parent Interview and functional assessment observational data collected by parents on ABCs during meals, snacks, watching TV in bed, at drawing table, suggested that either attention or tangibles (food items) was being delivered immediately after Vivian's cough during mealtimes.

Procedure: Functional analysis was conducted using a multielement research design with both 5-min conditions occurring each meal.

Attention condition: "...one parent made brief comments within 2-5 s after Vivian coughed" (Watson & Sterling, 1998, p. 472).

Tangible condition: "...one of the parents immediately presented Vivian with one small Sweet Tart candy (a preferred item, according to the parents) but made no comment contingent upon coughing..." (Watson & Sterling, 1998, p. 472).

Results:



From Watson, T. S., & Sterling, H. E. (1998). Brief functional analysis and treatment of a vocal tic. Journal of Applied Behavior Analysis, 31, 471-474. Permission was granted to reprint the above Figure from the owner of the copyright, John Wiley & Sons, Inc.

Instructions:

1. Assign your group members one of the following roles: Client, therapist, director (who monitors and provides feedback to the other two performers and queries the audience)
2. Act out the above functional analysis by conducting the procedures for each of the conditions at least once. Reproduce the same outcomes of the effect of the conditions on the client's behavior as depicted in the above graph.
3. What is the maintaining variable for the problem behavior?
4. Given these results, design an intervention plan for this client.

The Case of the Delusional Statements

From Travis, R., & Sturmey, P. (2010). Functional analysis and treatment of the delusional statements of a man with multiple disabilities: A four-year follow-up. *Journal of Applied Behavior Analysis*, 43, 745-749.

Client Description and Background: “Mr. Jones, a 26-year-old man who lived in an inpatient forensic facility who engaged in delusional statements that negatively affected his relationships with peers. His peers teased him daily, both in residence and workplace, and these statements prevented him from participating in several community-based vocational activities” (Travis & Sturmey, 2010, p. 745-746). Following an injury, Mr. Jones was diagnosed with traumatic brain injury for which he received Geodon and Depakote daily. His communications did not include any delusional statements prior to his car accident that occurred when he was 16 years old.

Based on staff and family interviews, delusional statements were defined as utterances, separated from the previous one by 3 s, that were had no relationship to what was currently happening or being discussed (e.g., “Elton John and I are going for coffee”).

Procedure: Functional analysis was conducted using a multielement research design with the following conditions which were 12 min in duration.

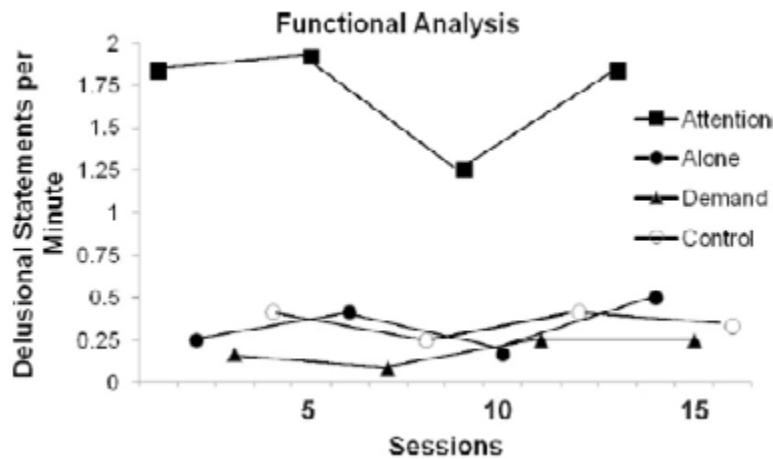
Attention condition: Immediately after a delusional statement by Mr. Jones, the therapist said, “That’s not an appropriate topic right now” or something similarly corrective is said for 10 s.

Demand condition: A vocational task presented that involved sorting similar items, counting them, and placing them in plastic bags. When Mr. Jones engaged in a delusional statement then 10 s of escape from demands was provided. Correct responses, prompted or unprompted, to demands resulted in delivery of praise.

Alone condition: “Mr. Jones was alone in the observation room with no planned reinforcement for delusional statements” (Travis & Sturmey, 2010, p. 746).

Control condition: “...the therapist gave Mr. Jones access to favored reading materials, noncontingent attention every 30 s and no consequences for nondelusional or delusional statements” (Travis & Sturmey, 2010, p. 746).

Results:



From Travis, R., & Sturmey, P. (2010). Functional analysis and treatment of the delusional statements of a man with multiple disabilities: A four-year follow-up. Journal of Applied Behavior Analysis, 43, 745-749. Permission was granted to reprint the above Figure from the owner of the copyright, John Wiley & Sons, Inc.

Instructions:

1. Assign your group members one of the following roles: Client, therapist, director (who monitors and provides feedback to the other two performers and queries the audience)
2. Act out the above functional analysis by conducting the procedures for each of the conditions at least once. Reproduce the same outcomes of the effect of the conditions on the client's behavior as depicted in the above graph.
3. What is the maintaining variable for the problem behavior?
4. Given these results, design an intervention plan for this client.

A Case in the Classroom

From: Moore, J. W., & Edwards, R. P. (2003). An analysis of aversive stimuli in classroom demand contexts. *Journal of Applied Behavior Analysis*, 36, 339-348.

Client Description & Background: “Edgar was a 9-year-old boy who attended a general education fourth-grade classroom with 17 other students. Edgar had been referred for yelling in class. When he attended school in a different state the previous year, Edgar received a special education ruling of severely emotionally disturbed. Edgar’s academic and cognitive abilities fell in the average range of academic functioning, and he received 100% of his academic instruction in a general education classroom” (Moore & Edwards, 2003, p. 340).

“Edgar’s teacher was in her 6th year of teaching. She held a BS degree and an MA degree in elementary education” (Moore & Edwards, 2003, p. 340).

“Yelling was defined as vocal utterances above a normal tone of voice” (Moore & Edwards, 2003, p. 340).

“Task demands were defined as verbal instructions and written academic work delivered by the teacher” (Moore & Edwards, 2003, p. 340).

Procedure: Functional analysis was conducted using a multielement research design with the following conditions which were 10 min in duration.

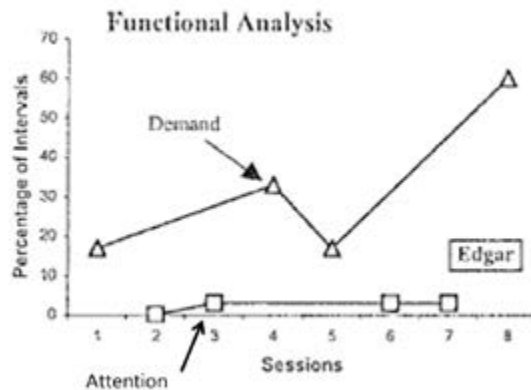
Demand condition:

The teacher presented learning trials to the student every 30 s throughout the session. All demands were presented in worksheet form. A sequential vocal, gestural, and physical (i.e., hand-over-hand) prompting hierarchy was employed to present demand trials. Hand-over-hand prompting included placing the pencil in the student’s hand and positioning the pencil lead on the worksheet. The teacher delivered praise if the student complied with the verbal or gestural prompt, continued the prompting sequence if the student did not comply, and terminated the trial (by removing the worksheet and moving to the other side of the room) if the student engaged in the target problem behavior at any time during the trial. (Moore & Edwards, 2003, p. 341)

Attention condition:

The student was given access to several nonpreferred leisure activities throughout the session. The teacher ignored the child except to deliver attention in the form of a statement of disapproval or concern (e.g., “Stop that; you are disrupting the class”) and brief physical contact (e.g., a pat on the back or touching the arm) following each occurrence of the target problem behavior. All other appropriate and inappropriate behaviors were ignored. (Moore & Edwards, 2003, p. 341)

Results:



From Moore, J. W., & Edwards, R. P. (2003). *An analysis of aversive stimuli in classroom demand contexts*. *Journal of Applied Behavior Analysis*, 36, 339-348. Permission was granted to reprint the above Figure from the owner of the copyright, John Wiley & Sons, Inc.

Instructions:

1. Assign your group members one of the following roles: Client, therapist, director (who monitors and provides feedback to the other two performers and queries the audience)
2. Act out the above functional analysis by conducting the procedures for each of the conditions at least once. Reproduce the same outcomes of the effect of the conditions on the client's behavior as depicted in the above graph.
3. What is the maintaining variable for the problem behavior?
4. Given these results, design an intervention plan for this client.

The Case of “You Already Said That!”

From Rehfeldt and Chambers (2003). Functional analysis and treatment of verbal perseverations displayed by an adult with autism. *JABA*, 36, 259-261.

Client Description & Background: “Vince was a 23-year old man who had been diagnosed with autism and mild mental retardation. He also experienced seizures that were controlled medication” (Rehfeldt & Chambers, 2003, p. 259). Medications that Vince took included Phenytoin, Sertraline, Bisoprolol, and Trazedone. Vince attended a sheltered workshop on a daily basis and this is where the majority of his problem behavior was exhibited. When interacting with others, his conversation included perseveration on specific topics.

Perseverative speech was defined as Vince’s repeated comments. One occurrence of an utterance was distinguished from another of the same if there was no speech for at least 3 s. Common perseverative topics included talk about sirens, alarms, dentist or doctor appointments.

Procedure: A functional analysis was conducted using a multielement research design with the following conditions lasting 10 min in duration.

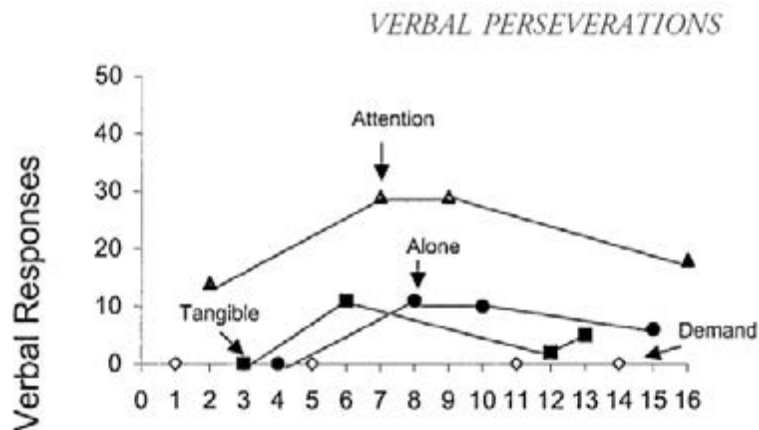
Attention condition: Following verbal perseverations 10 s of attention immediately was given by the therapist. This attention included both acknowledgment statements (e.g., “You sure do like those sirens, don’t you?”) and mild reprimands (e.g., “Don’t talk about sirens. There are none here.”).

Demand condition: A work task such as filing or sorting paper was given to Vince. Following verbal perseveration, the task was immediately removed by the therapist for 30 s who looked away and did not interact with Vince. If an incorrect or no response occurred then the instruction was represented and the therapist modeled the correct behavior. If an incorrect or no response occurred to the level 1, then a level 2 prompt or physical assistance was provided for him to complete the correct response.

Alone condition: Vince was in room alone. The therapist stood outside the door to observe and collect data on Vince’s behavior.

Tangible condition: Immediately following verbal preservation Vince was provided with 30 s of access to preferred activities (writing about sirens, fire drills, etc.).

Results:



From Rehfeldt and Chambers (2003). Functional analysis and treatment of verbal perseverations displayed by an adult with autism. JABA, 36, 259-261. Permission was granted to reprint the above Figure from the owner of the copyright, John Wiley & Sons, Inc.

Instructions:

1. Assign your group members one of the following roles: Client, therapist, director (who monitors and provides feedback to the other two performers and queries the audience)
2. Act out the above functional analysis by conducting the procedures for each of the conditions at least once. Reproduce the same outcomes of the effect of the conditions on the client's behavior as depicted in the above graph.
3. What is the maintaining variable for the problem behavior?
4. Given these results, design an intervention plan for this client.

The Case of #@&*!

From: Dwyer-Moore and Dixon (2007). Functional analysis and treatment of problem behavior of elderly adults in long-term care. *JABA*, 40, 679-683.

Client Description & Background: “Carmen was an 89-year-old woman who had been diagnosed with vascular dementia with mood disturbance; referred for high rates of disruptive vocalization (e.g., obscenities)” (Dwyer-Moore & Dixon, 2007, p. 680). She lived in a large (159-bed) residential care facility.

Procedure: Functional analysis was conducted using a multielement research design with the following conditions lasting 10 min in duration.

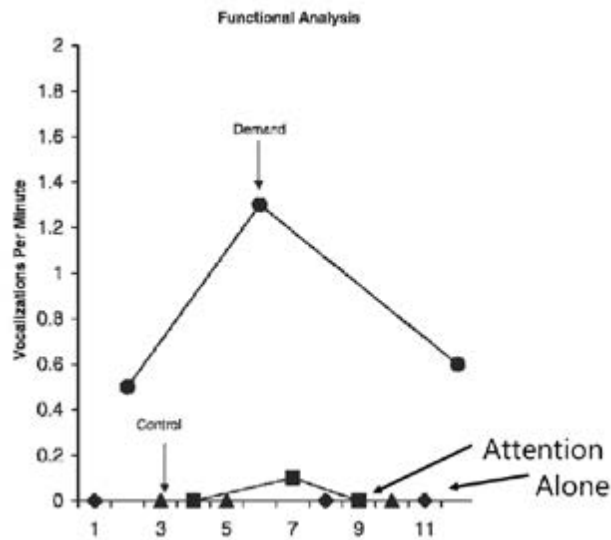
Attention condition: “In the attention condition, the participant was told that the therapist had work to do and would be sitting across the room. No consequences were provided for any behavior other than the identified target behavior, which resulted in the experimenter approaching and providing approximately 5 to 10 s of social attention. Attention was similar to that noted from naturalistic observations of staff-resident interactions (e.g., ‘It’s OK, you’re fine,’ ‘Grandma, don’t say that,’ ‘Derek, tell me about the priesthood,’ ‘How are you doing today?’)” (Dwyer-Moore & Dixon, 2007, p. 680).

Demand condition: “In the demand condition, the experimenter presented demands in the form of questions or gross motor tasks. Carmen was given demands such as clapping, raising their arms in the air, and knocking and lifting their legs these were similar to the gross motor tasks used in the facility’s occupational therapy program... Compliance resulted in approximately 3 to 5 s of praise and presentation of the next demand. No response or incorrect responses resulted in least-to-most prompts. Problem behavior resulted in removal of the demand for 30 s (Dwyer-Moore & Dixon, 2007, p. 680-681).

Alone condition: “In the alone condition, the participant was alone in the family room while the experimenter observed unobtrusively through a 2.5 cm gap in the door. No social consequences were provided, and no leisure items were available” (Dwyer-Moore & Dixon, 2007, p. 681).

Control condition: “In the control condition, various leisure items (e.g., magazines, puzzles, music, television) were continuously available. The experimenter also provided 5 to 10 s of social attention on a fixed-time (FT) 30-s schedule” (Dwyer-Moore & Dixon, 2007, p. 681).

Results:



From Dwyer-Moore and Dixon (2007). Functional analysis and treatment of problem behavior of elderly adults in long-term care. JABA, 40, 679-683. Permission was granted to reprint the above Figure from the owner of the copyright, John Wiley & Sons, Inc.

Instructions:

1. Assign your group members one of the following roles: Client, therapist, and director (who monitors and provides feedback to the other two performers)
2. Act out the above functional analysis by conducting the procedures for each of the conditions at least once. Reproduce the same outcomes of the effect of the conditions on the client's behavior as depicted in the above graph.
3. What is the maintaining variable for the problem behavior?
4. Given these results, design an intervention plan for this client.

The Case of Bye, Bye, I am Gone!

From: Lang, R., Davis, T., O'Reilly, M., Machalicek, W., Rispoli, M., Sigafoos, J., Lancioni, G., & Regeister, A. (2010). Functional analysis and treatment of elopement across two school settings. *Journal of Applied Behavior Analysis*, 43, 113-118.

Client Description & Background: “Joe, a 4-year-old boy who had been diagnosed with Asperger syndrome participated,” (Lang et al., 2010, p. 114) runs out of the classroom 10-20 times per day, no matter the goings-on. John is in a regular classroom with 20 other children 2 teacher’s aides, and 1 teacher.

Problem Behavior: Elopement from the classroom. Define this behavior so that it can be measured and observed reliably:

Procedure: Functional analysis was conducted using a multielement research design with the following 5-min conditions:

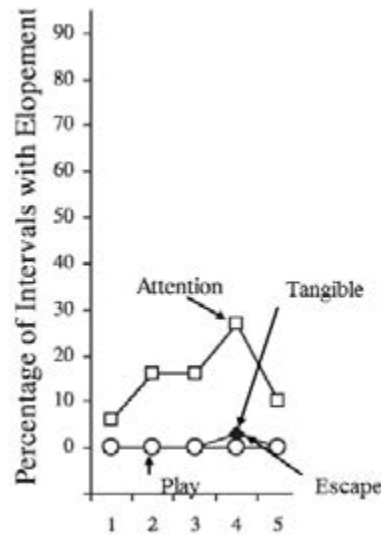
Attention condition: “The therapist sat next to Joe in her chair at the table, assumed the appearance of reading a notebook, and instructed him to play. Joe had free access to toys. If he eloped, the therapist retrieved him and provided verbal and physical attention, which continued for 5 s after the therapist had guided Joe back to the table” (Lang et al., 2010, p. 114).

Escape condition: “The therapist delivered task demands based on Joe’s individualized education plan. If he did not respond to the demand within 5 s, the therapist provided a gestural or model prompt indicating the correct response. If he still did not respond, the therapist used a physical prompt. Following elopement, the therapist retrieved him using a minimal amount of physical contact (e.g., guiding lightly by the arm) and refrained from providing verbal attention. The therapist delayed presentation of the next demand for an additional 5 s once she returned Joe to the table” (Lang et al., 2010, p. 114-115).

Tangible condition: “In the tangible condition, a television and DVD player, which the class used frequently, were present. The therapist played Joe’s preferred DVD for 10 s prior to the session, turned off the TV via remote control to start the session, and turned on the TV with the remote following elopement. After the TV was turned on, Joe would either return to the area or the therapist would retrieve him in the same manner as described for the escape condition” (Lang et al., 2010, p. 115).

Play condition: “Joe had unrestricted access to toys. The therapist did not present task demands, maintained close proximity to Joe, provided verbal praise and physical contact about every 10 s, and ignored elopement” (Lang et al., 2010, p. 115).

Results:



From Lang, R., Davis, T., O'Reilly, M., Machalicek, W., Rispoli, M., Sigafos, J., Lancioni, G., & Regester, A. (2010). Functional analysis and treatment of elopement across two school settings. *Journal of Applied Behavior Analysis*, 43, 113–118. Permission was granted to reprint the above Figure from the owner of the copyright, John Wiley & Sons, Inc.

Note that 2 settings were another variable examined in this study, but for the purposes of demonstration and role play only 1 setting will be considered.

Instructions:

1. Assign your group members one of the following roles: Client, therapist, director (who monitors and provides feedback to the other two performers and queries the audience)
2. Act out the above functional analysis by conducting the procedures for each of the conditions at least once. Reproduce the same outcomes of the effect of the conditions on the client's behavior as depicted in the above graph.
3. What is the maintaining variable for the problem behavior?
4. Given these results, design an intervention plan for this client.

The Case of Hair Today, Gone Tomorrow

From: Rapp, J. T., Miltenberger, R. G., Galensky, T. L., Ellingson, S. A., & Long, E. S. (1999). A functional analysis of hair pulling. *Journal of Applied Behavior Analysis*, 32, 329-337.

Client Description & Background: “Kris was a 19-year-old female with severe mental retardation and mild cerebral palsy. She was able to ambulate, follow simple instructions, and communicate with single words. Due to a childhood stroke, Kris walked with a limp and could not open her left hand. Consequently, she pulled and manipulated her scalp hair with only her right hand. Her mother reported that Kris had pulled scalp hair since approximately age 3 and that the behavior would occasionally remit for periods up to a month. In the past, Kris’ hair pulling was unsuccessfully treated with Trazohone and parental scolding. According to her mother, Kris usually pulled scalp hair while watching television and in bed. After pulling a hair, she rolled it between her thumb and index finger, rubbed the hair on her lips, and then chewed on the hair while pulling it with her fingers. Her mother reported that periods of increased baldness seemed to be correlated with constipation, which may indicate that Kris was ingesting hairs. Kris did not appear to ingest hair during either phase of this investigation. Hair pulling produced an obvious area of baldness 5 cm in diameter on the top of her scalp” (Rapp et al., 1999, p. 331).

“Hair pulling was defined as any contact of the fingers of her right hand with her scalp. Hair manipulation was defined as rolling of pulled hair between any fingers, gazing at pulled hair, and any contact of hair with the lips or mouth. Hair manipulation onset always occurred within 3 s of hair pullong offset” (Rapp et al., 1999, p. 331).

Procedure: Functional analysis was conducted using a multielement research design with the following conditions:

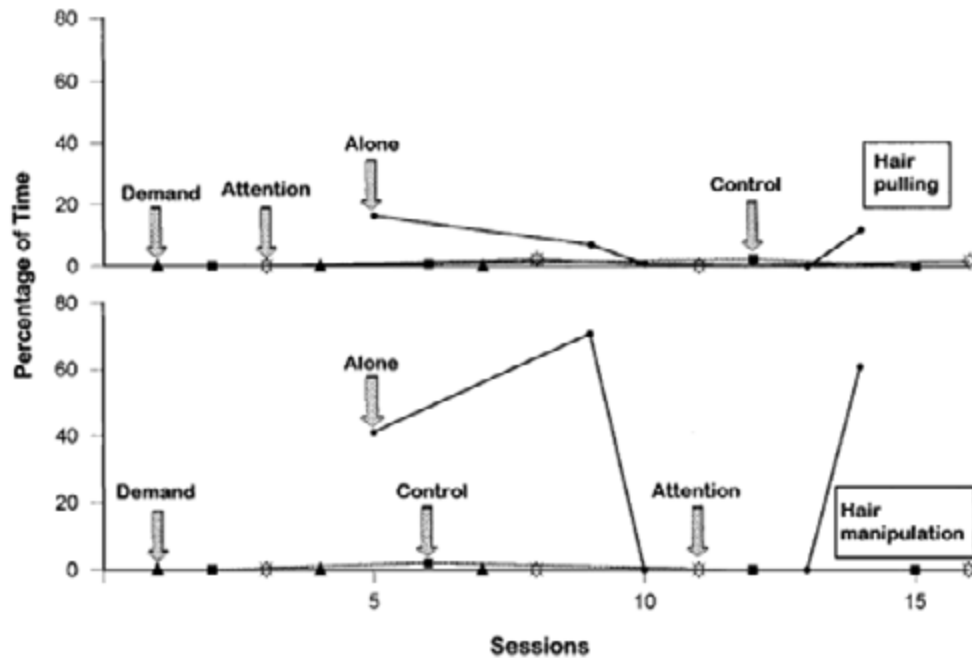
Attention condition: “Kris and a therapist were seated side by side in the room. Kris was given a video to watch on the television while the therapist shuffled papers and wrote in a notebook. No interaction took place between them unless Kris pulled hair. Contingent on hair pulling, the therapist reached over and gently pressed Kris’ arm down from her head and provided disapproving statements (e.g., ‘Don’t pull your hair’)” (Rapp et al., 1999, p. 332).

Demand condition: “During this condition, a therapist stood behind Kris, who was seated at a large table. The therapist presented a task (from her prevocational curriculum) that involved taking single pieces of different colored paper off 4 piles in a sequential order and placing the collated papers into a specified envelope. Kris was shown the correct sequence for the papers and then prompted every 20 to 30 s in a 3-step sequence (verbal prompt; verbal prompt and pointing; verbal prompt, pointing, plus manual guidance) to stack the papers accordingly. Praise was provided for 2 to 3 s contingent upon completing the correct paper sequence and filling the envelope. If hair pulling occurred, the therapist removed the materials and suspended all interactions with Kris for 30 s” (Rapp et al., 1999, p. 332).

Alone condition: “Kris was seated alone in the observation room to watch a video on the television” (Rapp et al., 1999, p. 332).

Control condition: “Kris was seated across from a therapist in the research room and was given continuous access to toys that her mother identified as being preferred. Therapist praise and pats to Kris’ arm were provided at least once every 10 s, and there were no social consequences for hair pulling” (Rapp et al., 1999, p. 332).

Results:



From Rapp, J. T., Miltenberger, R. G., Galensky, T. L., Ellingson, S. A., & Long, E. S. (1999). *A functional analysis of hair pulling*. *Journal of Applied Behavior Analysis*, 32, 329–337. Permission was granted to reprint the above Figure from the owner of the copyright, John Wiley & Sons, Inc.

Instructions:

1. Assign your group members one of the following roles: Client, therapist, director (who monitors and provides feedback to the other two performers and queries the audience)
2. Act out the above functional analysis by conducting the procedures for each of the conditions at least once. Reproduce the same outcomes of the effect of the conditions on the client’s behavior as depicted in the above graph.
3. What is the maintaining variable for the problem behavior?
4. Given these results, design an intervention plan for this client.

Discussion Questions

1. Which FAn condition was most difficult to perform? Why? How can performing that condition be made easier?
2. How would you teach someone to implement treatment procedures?
3. What would you do if the treatment procedure based on a FAn was ineffective?

Chapter 7

Resources

Focus Questions:

- *What templates and resources are available to use when attempting to replicate this skill based approach to learning functional assessment?*

The authors of *Instruction in Functional Assessment* hope that this text will equip learners with the knowledge and skills to perform functional assessment. One of the unique features of this book is the integration of both psychological and educational perspectives embedded into the content and skills of FA. Such an endeavor can be challenging as the two fields utilize different vocabularies and often alternative perspectives in viewing and intervening with students with challenging behaviors. The following Table may help illustrate the vocabulary differences among professionals in psychology and those with educational backgrounds.

General Description	
Behavior is often defined as the way in which one behaves or acts with others. This can be an action or a reaction. Behavior is also a method of controlling yourself, your actions, and your responses.	
Descriptive Words Used in Psychology	Descriptive Words Used in Education
Antecedents and consequences of behavior, negative reinforcement, positive reinforcement, conditions, clinical settings, clients	Attention seeking, conduct, demeanor, deportment, acting out, learning environment, reacting

For the purposes of this book, we have chosen to take an inclusive and interdisciplinary approach. We view challenging behaviors as the focus of professionals' analysis and intervention. Clients or students are not problems, but rather coping as best as possible in their environment. Most often these challenging behaviors serve a communication function. These individuals need interdisciplinary professionals who assist them and their families to effectively learn new desirable behavior. This blended, interdisciplinary approach is person centered and proactively supports the family and the child using effective functional assessment processes and approaches.

The following materials may be helpful either as secondary sources of information for teaching FA, or as performance-based resources that go further in depth in developing students' FA knowledge and skills.

Blank Templates

Functions of Behavior Template

List some examples of challenging behaviors that serve the function indicated in the cells below.

	To Avoid/Escape	To Obtain
Sensory/Automatic		
Social		
Tangibles		

Adapted from Umbreit, J., Ferro, J., Liaupsin, C. J., & Lane, K. L. (2007). Functional behavioral assessment and function-based intervention: An effective, practical approach. Upper Saddle River, NJ: Pearson Press. Figure 5.3, page 84.

Functionally-equivalent replacement behaviors	To Avoid/Escape	To Obtain
Sensory/Automatic		
Social		
Tangibles		

Practicing Observation Systems Template

Frequency: Count the number of times the target behavior occurs during a pre-determined amount of time (i.e. in a 1 min period of time, the student lifted his eyes from the paper and looked out the window 3 times).

Target Behavior:

Start Time:

End Time:

Frequency Count:

Duration Recording: This is the amount of time the target behavior lasts from beginning to end of behavior (i.e., the amount of time a tantrum lasts without interference). This recording is done over a longer period of time (i.e., during all of reading time or over one study period repeating the recording every time the target behavior occurs).

Target Behavior:

Start Time:

End Time:

Total Duration:

Latency Recording: This is the amount of time before a target behavior starts after a cue or prompt to begin is given (i.e., the teacher says "Begin") and the amount of time before a student actually starts working. This recording is done over a longer period of time (i.e., during all of reading time or over one study period), repeating the recording every time the target behavior occurs.

Target Behavior:

Start Time:

End Time:

Total Latency:

Interval Recording: These are preset intervals of time (i.e., 1 min intervals for 15 min). Within each interval, a mark (x) occurs if the behavior happens at any time in the interval.

--	--	--	--	--	--	--	--	--	--

Target Behavior:

Start Time:

End Time:

Developed by M. Fallon (2010) for use in EDI 413, Introduction to Special Education, College at Brockport, State University of New York.

Practice Activity for Written FA Skills

Directions: Complete the following based on an initial observation of a child and his/her behavior in a learning environment.

Current Target Behavior: Johnny will increase by 50% his ability to write in his journal for 10 min each day.

What do you need to know?

What recording system would be best?

Write another sample Target Behavior here:

Current Target Behavior: Suzi will initiate her on topic and spontaneous language in a small or large group setting to a minimum of 3 times per 30-min period.

What do you need to know?

What recording system would be best?

Write another sample Target Behavior here:

Developed by M. Fallon (2010) for use in EDI 413, Introduction to Special Education, College at Brockport, State University of New York.

Interval / Time Sampling Sheet

Name:

Date:

Observer:

Setting:

Time Started:

Time Ended:

Interval Length:

Behavior / Interval	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

1. Target Behaviors	2. Occurrences	3. No. of Intervals Recorded	4. Percentage Occurrence (e.g., $2/3 \times 100 = 67\%$)
A.	A.	A.	A.
B.	B.	B.	B.
C.	C.	C.	C.
D.	D.	D.	D.
E.	E.	E.	E.

Behavior Intervention Plan Data Sheet

Client:

Therapist:

Date:

Background Information and History (e.g., age, diagnosis, previous treatment, etc.):

1. Behavior defined:

2. Type of assessment conducted and summary of results:

3. Functional hypothesis identified:

4. Intervention:

- a. Antecedent-based intervention:
- b. Function-based replacement behavior:
- c. Function-based reinforcement:
- d. Function-based treatment:
- e. Reactive procedures:

5. Rational and justification for the intervention components selected:

Notes:

Performance Feedback Training Data Sheet

Trainer:

Client:

Situation:

Date:

Skill being taught:

Description of Skill:

Model:

Training criteria:

Step	On Each Trial Record $\sqrt{X \emptyset}$				Comments
	1	2	3	4	
	5	6	7	8	
	9	10	11	12	
	1	2	3	4	
	5	6	7	8	
	9	10	11	12	
	1	2	3	4	
	5	6	7	8	
	9	10	11	12	
	1	2	3	4	
	5	6	7	8	
	9	10	11	12	

Functional Assessment Training Materials

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Content Sources

Applied Behavior Analysis Textbooks:

- Alberto, P. A., & Troutman, A. C. (2013). *Applied behavior analysis for teachers*. Boston: Pearson.
- Cooper, J. O., Heron, T. E., & Heward, W. I. (2007). *Applied Behavior Analysis (2nd Ed.)*. Upper Saddle River, N.J.: Columbus, Ohio.
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- Vargas, J. S. (2013). *Behavior analysis for effective teaching*. New York: Routledge.

Applied Behavior Analysis Syllabi

<http://www.abainternational.org/constituents/educators/syllabus-bank/search-by-topic.aspx>

BACB® task list

<http://www.bacb.com/index.php>

Research and Reviews of Research

- Bloom, S. E., Iwata, B. A., Fritz, J. N., Roscoe, E. M., & Carreau, A. B. (2011). Classroom application of a trial-based functional analysis. *Journal of Applied Behavior Analysis*, 44, 19-31.
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Multi-Media Formats to Teach Functional Assessment

DVD/Computer Software

Functional behavioral assessment: An interactive training module (Liaupsin et al., 2006)

Behavior Intervention Planning (Scott et al., 2001)

Functional analysis: A guide for understanding challenging behavior (Balan, Worsdell, & Cuvo, 2005—review by Carr & Fox, 2009)

Simulations in Developmental Disabilities (Desrochers, 2004)

Examples of Possible Research Articles for FACT

Ing, A. D., Roane, H. S., & Veenstra, R. A. (2011). Functional analysis and treatment of coprophagia. *Journal of Applied Behavior Analysis*, 151-155.

Ishuin, T. (2010). Linking brief functional analysis to intervention design in general education settings. *The Behavior Analyst Today*, 10, 47-53.

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The authors of this textbook have based *Instruction in Functional Assessment* on current and seminal research literature. We have made every effort to reference materials to the originators of the primary research. In some cases, we have extended and adapted the research information to be more student-friendly. This means that the audience of college students and pre-professionals may more easily understand how to implement the research into the process of FA and the practice of FA performance skills. It has been our intent throughout the textbook to uphold all aspects of copyright in an ethical and legal manner.

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Glossary

ABAB Research Design

A single participant experiment where the A phase consists of a series of sessions where no consequences following a specific behavior occurs and in B phase consists of a series of sessions where the consequence is provided following each occurrence of that behavior. These phases are alternated in an ABAB fashion to rule out confounding variables or alternative explanations for the findings (Martin & Pear, 2011).

ABCs of behavior

Identifying the antecedents, behavior, and consequences or what precedes and follows a particular behavior in order to understand the function of that behavior

ABC functional assessment

Observing and recording the ongoing antecedents, behavior, and consequences for behavior in a particular situation.

antecedent-based treatment

Methods of addressing challenging behavior where stimuli that occur before the challenging behavior are altered e.g., instructions, noncontingent reinforcement.

applied behavior analysis

An experimentally-based approach involving use of learning principles and procedures to increase individuals' socially significant behaviors.

automatic positive reinforcement

A behavior is maintained by the immediate consequences for that behavior. No social consequences are involved. For example, screaming due to the sound produced; face tapping due to tactile sensation, or regurgitation due to stimulation of the esophagus.

Behavior Intervention Plan

Individualized plans that describe appropriate interventions for individuals' challenging behaviors. These plans include prevention, proactive, and reactive components.

behavioral definition

Defining behavior in observable, specific, and measurable terms.

case-based learning

Involves presentation of a real-world problem for students to define and solve during instruction.

challenging behaviors

Problem behaviors that are pervasive and persistent, which do not respond to usual methods of intervention.

conditional probability analysis

To aide in determining the maintaining variable(s) for an individual's challenging behavior, the degree of correspondence of particular antecedents and consequences with the occurrence of the challenging behavior are calculated.

continuous recording

All occurrences and durations of the individual's behavior are recorded during an observation session.

Council for Exceptional Children

The professional organization for teachers who work with students with disabilities.

culture

Socially transmitted characteristics, patterns, and beliefs of a group of people.

demand fading

To decrease an individual's challenging behavior maintained by escape from demands, demands are initially removed, then, as the challenging behavior remains low, demands are gradually reintroduced.

deprivation

Not having something in a long while. To increase the probability of a behavior that results in a particular reinforcer, conditions of deprivation are increased.

differential reinforcement

Reinforcing desirable behaviors and not other inappropriate behaviors.

differential reinforcement of alternative behavior

A procedure to eliminate an individual's challenging behavior by providing reinforcement following desirable behavior.

differential reinforcement of incompatible behavior

A procedure to eliminate an individual's challenging behavior by providing reinforcement following a behavior that cannot occur at the same time as the challenging behavior e.g., reinforce talking at conversational level instead of shouting.

differential reinforcement of low rates—limited

A procedure to reduce an individual's behavior by providing a reinforcer if the behavior occurs less than a maximum amount within a certain time interval e.g., only if less than 3 talk-outs occur during a class is a token delivered to the child.

differential reinforcement of low rates—spaced responding

A procedure to decrease but not eliminate behavior by providing a reinforcer following an instance of the behavior that occurred after a period of nonoccurrence e.g., to decrease someone who is excessively phone calling, only picking up after an interval when that person did not call.

differential reinforcement of zero rates (DRO)

A procedure to eliminate challenging behavior by delivering a positive reinforcer following an interval of no occurrence of the challenging behavior (e.g., every 5 minutes when Jason does not suck his thumb praise and a candy are given to him). If the challenging behavior occurs then the interval starts over.

discrete trial training

An approach to teaching new behaviors where trials involving presentation of an instruction, waiting for the individual's response, and providing appropriate consequences is performed.

environmental enrichment

Entails enhancing the quality of the individual's natural environment by adding increased access to preferred activities, people, or objects with variety and choices available.

extinction

No longer providing the reinforcer maintaining the problem behavior such that that behavior is less likely in future situations (Martin & Pear, 2011).

extinction burst

Whereby the behavior being extinguished gets 'worse before it gets better.' That is, emotional behaviors and aggression in addition to an increase in severity of the problem behavior may occur.

functionally equivalent replacement behavior

A desirable behavior that serves the same purpose as the challenging behavior.

Functional Analysis

An experimental method used to identify the maintaining variables for an individual's challenging behavior.

Functional analysis case-based training (FACT)

A FACT method incorporates a case-based learning approach, role play, simulation, and performance-based instruction as major instructional methodologies to establish and hone students' knowledge-base and skills required to implement a functional analysis process.

Functional Communication Training (FCT)

Teaching the individual to ask for (mand) stimuli, events, or people that serve the same function as the problem behavior.

functional replacement behavior

A desirable behavior that serves the same purpose as the challenging behavior.

general case strategy

Entails carefully identifying the relevant aspects of a situation and including a representative sample of those characteristics in your training program.

generalization

Transfer of training gains across setting, people, behaviors, and time.

inclusion

The heterogeneous grouping of children for academic and social reasons, including children with disabilities.

indirect functional assessment

Assessment measures used to gather information about a student from people who know the student, such as rating scales, interviews, and questionnaires.

Individualized Education Program (IEP)

A legal document containing an individualized approach to the academic and social education of a student with a disability

Individuals with Disabilities Education Improvement Act

A federal law enacted in 2004 that mandates how educational professionals interact with students with disabilities and their families.

informed consent

Parents and legal guardians must give written permission to professional for access to information, assessment, and treatment procedures.

intellectual disability

A disability which significantly affects the developmental processes, including intelligence and adaptive behaviors.

interobserver reliability

Two independent observers simultaneously record an individual's behavior and the degree to which their observations agree is calculated.

maintenance

Transfer of training gains across time.

motivational operation

Refers to an environmental event or condition that alters the effectiveness of a reinforcer and affects the frequency of behaviors that lead to that reinforcer (Michael, 2000).

multielement research design

A single organism research design that involves the rapid alternation of conditions.

negative reinforcement

A behavioral principle which states that if someone does something and it results in the immediate escape or avoidance of an aversive stimulus then that person is more likely to do the same thing in similar future situations.

negative reinforcer

The removal or avoidance of an aversive stimulus e.g., putting sun glasses on when the sun is blinding.

noncontingent reinforcement

Reinforcers for the problem behavior can be provided freely according to a set time before the individual engages in that behavior to potentially remove the reason for the problem behavior.

observational functional assessment

A method to attempt to determine the maintaining variable(s) by collecting data on the antecedents, behavior, and consequences for the individual's challenging behavior.

performance-based training

An instructional strategy wherein the teacher describes and models the desired behavior, and provides feedback while the learner practices the skill to criterion.

permanent product

The remnants or offshoots of a behavior that can be used to measure the occurrence of the behavior e.g., words on a page to measure writing behavior, crimped dental floss to measure flossing.

Positive Behavior Support (PBS)

A focus on individuals' desired behavior, rather than focusing on the undesirable or challenging behavior. This approach is generally conducted on a school-wide level.

preference assessment

An efficient method to identify a potential reinforcer by assessing the individual's choice in a variety of objects, events, or stimuli.

positive reinforcement

A behavioral principle that states that when a positive reinforcer is delivered immediately following a behavior, that behavior will likely persist or increase.

positive reinforcers

Positive reinforcers refer to objects or events that when delivered immediately after a behavior serve to increase its frequency in future.

reinforcer test

Involves experimentally comparing levels of the behavior in phases where the item being evaluated is delivered immediately after the behavior to that in another phase where the item is provided just according to a set time such as every 5 seconds or noncontingently.

Response to Intervention (RTI)

A procedure whereby professionals monitor the academic and social skills of a child and implement interventions to prevent failure.

role play

A method of teaching procedural behaviors and skills by the individual re-enacting the situation and performing the requisite behaviors.

satiation

Having too much of something. If a reinforcer is delivered too frequently and satiation occurs then that item loses its ability to serve as a reinforcer or no longer increases the behavior after which it occurs.

social validity

Procedures used to determine whether the goals of training, the training procedures, and/or the outcome of training are acceptable to the person and others involved.

stimulus generalization

Transfer of training gains across objects, events, settings, or people.

task analysis

A procedure whereby a complex task is broken down and described in terms of the specific steps needed to complete it.

time chart

A method of collecting data where an occurrence of a particular behavior is noted during briefer (e.g., 30 minutes) intervals of each day. A data sheet with cells for each time periods during the day as rows and days of the week as columns is used.

token economy

A system of promoting desirable behavior where the individual is provided with conditioned reinforcers (e.g., small pieces of cardboard with Velcro backing) for short intervals (2 hours) where desired behaviors and no challenging behaviors occur. After collecting several conditioned reinforcers, they are then exchanged for backup or more substantial reinforcers.

topography

The form of a behavior such as a dance move, gesture, or yoga movement.

treatment integrity

A procedural check performed to ensure that a treatment procedure is implemented as intended.