Trial Based Functional Analysis in Classroom Settings: An Evaluation of Effectiveness and Exploration of Implications for Implementation

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Abstract

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Challenging behaviors are disruptive, harmful, and persistent and have significant adverse implications for individuals and those close to them. Functional assessment strategies lead to effective, proactive interventions. Despite decades of research supporting the use of functional assessment and relevant intervention, there remains a research to practice gap related to working with challenging behaviors in educational contexts. Trial-based functional analysis (TBFA) is an experimental functional assessment method that is particularly well suited for use in classroom settings, and can be implemented with fidelity by school personnel with varying backgrounds and expertise. The purpose of this mixed-methods research was to evaluate the effectiveness of the TBFA in public school classrooms, while exploring the effect of participation in implementation on educators' perspectives on working with challenging behavior. Results found that the TBFA was effective in identifying the function of challenging behavior for three students, and suggest that educators developed agency in their work with challenging behaviors as they participated in the implementation of the TBFA and subsequent functionally relevant intervention.

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Dedication

To my Edie June.
Your arrival was the catalyst for everything good in my life.

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Chapter 1

Introduction

Challenging behaviors (i.e., problem behaviors, disruptive behaviors, aberrant behaviors, maladaptive behaviors) are those that significantly impact the quality of life for individuals who engage in them, as well as their families and caregivers. Such behaviors represent a variety of topographies, including inappropriate vocalizations, elopement, tantrums, aggression, property destruction and self-injury and can be disruptive, destructive, and potentially dangerous (Sigafoos, Arthur, & O'Reilly, 2003). The persistent and harmful nature of challenging behaviors is especially problematic due to the adverse effect on quality of life, including barriers to participation in educational and community activities (Bambara & Kern, 2005; Matson, Mahan, Hass, Fodstat, & Neal, 2010).

Children who engage in challenging behavior have historically been excluded from general education settings. Teachers responsible for the education of children who engage in challenging behavior consistently express concerns related to their abilities to address such behavior in the school environment (Gartner & Lipsky, 1987; Lohrmann & Bambara, 2006; Westling, 2010). Given the impact of challenging behavior on individuals' quality of life and access to meaningful engagement in educational and community settings, research on assessment and intervention to address challenging behavior in applied settings is essential.

Challenging Behaviors in Schools

Public education is an entitlement that all children in the United States are afforded. While all students benefit from attending school, for many students with disabilities, schools provide the primary context for intervention addressing challenging behaviors, and challenging behaviors should not result in restricted access to academic and social opportunities for these

students. However, challenging behavior, among students with and without disabilities, represents a significant barrier to access to educational settings for children who engage in it.

Teachers report that educating children who engage in challenging behaviors is one of the greatest challenges of their careers and cite the difficulties presented by this population of students as a key reason for leaving the teaching profession (Conroy, Alter, Boyd, & Bettini, 2014; Hemmeter, Fox, Jack, & Broyles, 2007; Lohrmann & Bambara, 2006; Stoiber & Gettinger, 2011). The existing literature suggests that not only is there commonly a lack of necessary resources for teachers who work with students who engage in challenging behavior (i.e. administrative support, resources, staff; Lohrmann & Bambara, 2006), there are also problems resulting from a lack of training for pre-service and in-service teachers who work with this population (e.g., Hemmeter et al., 2007; Hemmeter, Santos, & Ostrosky, 2008; Koegel, Matos-Fredeen, Lang, & Koegel, 2012; Lohrmann & Bambara, 2006; Stoiber & Gettinger, 2011; Westling, 2010). Another concern, that has garnered recent attention in legislation and media, is the overuse of crisis management practices (i.e., restraint and isolation) with students with disabilities in public school settings with students who engage in challenging behaviors. This issue highlights a need for educators to be trained in preventative behavioral strategies, including positive behavior intervention and supports (PBIS), as implementation of such strategies have been demonstrated in recent literature to reduce reliance on crisis management strategies on both an individual level and on an organizational level (e.g., Auld, Belfiore, & Scheeler, 2010; Simonsen, Britton, & Young, 2010; Villani et al., 2012). One such strategy recently identified as a high leverage practice for special educators (i.e., a critical practice that can be used to leverage student learning) is functional behavior assessment (FBA; Council for Exceptional Children, 2016).

Functional Assessment

Information gathered through functional assessment typically leads to the formulation of a behavioral hypothesis, which identifies the function (i.e., purpose) of the target behavior. In other words, these behaviors serve a communicative purpose by allowing the individual to control (i.e. access or escape) elements in their environment. (e.g., Carr, 1977; Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). The idea that challenging behavior often serves as a means to gain access to various outcomes such as access to preferred interactions or activities and escape from aversive interactions or activities is evident through contributions to both theoretical literature (e.g., Carr, 1977; Carr & Durand, 1985; Durand, 1986; Cipani, 1990; Reichle, 1997; Wickstom-Kane & Goldstein, 1999) and applied research in assessment (i.e., Donnellan, Mirenda, Mesaros, & Fassbender, 1984; Iwata et al., 1982/1994; Reichle & Yoder, 1979; Wickstom-Kane & Goldstein, 1999) and intervention (e.g., Doss & Reichle, 1989; Reichle & Yoder, 1979; Durand & Carr, 1985; Reichle, 1997; Durand & Merges, 2001) addressing challenging behaviors across educational and community settings.

Functional assessment involves the thorough observation of events in the environment that surround occurrences of challenging behavior. Typically, assessment processes are concerned with antecedents (i.e., events that occur immediately preceding the behavior) and consequences (i.e., events that occur immediately following the behavior). Other important factors to consider that may not be observable within the intervention, but affect the occurrence of challenging behavior include motivating operations, which influence the value of reinforcement and the frequency of behaviors that have previously accessed that reinforcement (Laraway, Snycerski, Michael, & Poling, 2003).

Functional assessment is conducted through the use of indirect, direct, and experimental methods alone or in conjunction with one another (Crone, Hawken, & Horner, 2015). That said, there does not appear to be clear professional recommendations that advise 'best practice' related to functional behavior assessment in applied settings. While some experts in functional assessment suggest that experimental methods (i.e., functional analysis) are an essential element of the process (e.g., Hanley et al., 2012), others have challenged the necessity of this strategy for all challenging behaviors that occur within educational settings (e.g., Anderson & St. Peter, 2013). Related to functional assessment in schools, Scott and colleagues (2008) differentiated between efficient and formal functional assessment models based on ease of implementation and time requirements. The efficient functional behavior assessment (FBA) relies on indirect methods (i.e., interview) and the formal FBA relies on direct methods (i.e., observation of students as they engage in the challenging behavior, experimental manipulation of environmental events surrounding challenging behavior).

Indirect functional assessment typically relies on the use of interviews (e.g., Functional Assessment Interview [FAI]; O'Neill, Horner, Albin, & Sprague, 1997) and checklists (e.g., the Motivation Assessment Scale [MAS]; Durand & Crimmins, 1987) that require caregivers to provide information about disruptive behaviors. While these assessment strategies are useful in gaining information about the behavior that can inform more robust assessment methods (i.e., observation and experimental analysis), the reliability and validity of such methods are questionable (e.g., Floyd, Phaneuf, & Wilczynski, 2005; Hanley, 2012).

Direct functional assessment methods involve observation of the individual engaging in the behavior of interest within his or her natural context (e.g., classroom, home, or community based routines). This strategy is commonly achieved through scatterplots (Touchette,

MacDonald, & Langer, 1985) and through an anecdotal data collection method known as A-B-C recording (Bijou, Peterson, & Ault, 1968), in which each behavior is recorded with information about the surrounding contingencies (i.e., antecedents and consequences) that may maintain that behavior. In contrast to the indirect methods described above, direct methods' reliance on observation increases the validity of the data collected in these strategies. However, existing research suggests that descriptive assessments lack validity and result in false positive identification of function due to inevitable reactions to behaviors in context, such as crying out when experiencing pain resulting from aggression (e.g., Thompson & Iwata, 2007).

Finally, experimental analysis involves the systematic manipulation of environmental contingencies to evaluate the effects of temporally relevant events (i.e., antecedents and consequences) on the target behavior. The most commonly cited application of experimental functional assessment is functional analysis (FA; Iwata et al., 1982/1994), a method that is considered consistently reliable in accurately identified the function of the target behavior. With over 30 years of research supporting its efficacy, FA has emerged as the "gold standard" assessment for experimentally identifying the function of challenging behavior.

Functional Analysis

Functional Analysis (FA) provides an approach to behavioral assessment in which antecedent and consequence stimuli surrounding the behavior of interest are systematically manipulated to identify the contingencies that maintain the behavior of concern (i.e., identify the function that the behavior serves for the individual). Once the function of the behavior is identified, a functionally relevant treatment is developed to reduce the level of the challenging behavior and increase more appropriate behaviors that achieve the same outcomes for the individual. While FAs are effective in determining the function of challenging behavior, and thus

lead to successful interventions to ameliorate such behavior, practical, methodological, and ethical concerns remain.

Traditional analogue FA methods (i.e., those based in methods described by Iwata and colleagues, 1982/1994) are time-consuming, require advanced theoretical and practical training and the ability to fluently engage in data-based decision making throughout the course of the assessment. Additionally, this assessment requires artificial control of environmental contingencies, requiring that the assessment be conducted outside of the natural setting where the behavior occurs. This raises questions about the contextual relevance of assessment results and potentially creates challenges with implementation, as behaviors that occur in natural environments may interact with contingencies that are not replicable in a highly controlled environment due to complexity or to stimuli that are environment specific (e.g., Lydon, Healy, O'Reilly, & Lang, 2012; Matson & Minshawi, 2007).

In addition to these practical concerns associated with FA, there is significant ethical concern surrounding the frequent and repeated provision of reinforcement contingent upon the occurrence of challenging behaviors (i.e., consequence manipulation) that occurs throughout the assessment due to the fact that reinforcement, by definition, increases the future frequency of behavior. While it can be argued that the efficiency and accuracy of the FA methodology outweighs the problems surrounding this frequent contact between challenging behaviors and reinforcement, ethical concerns (e.g., potential for increased levels of challenging behavior due to reinforcement) remain.

Much of the existing research focused on FA methodology is devoted to the development and evaluation of variations on the procedures described by Iwata and colleagues, including (a) reducing the time necessary to complete the procedures by using brief and latency-based

analyses (e.g., Northup et al., 1991; Thomason-Sassi, Iwata, Neidert, & Roscoe, 2011), (b) implementation by novice assessors (e.g., Cooper, Wacker, Sasso, Reimers, & Donn, 1990; Arndorfer, Miltenberger, Woster, Rortvedt, & Gaffaney, 1994), and (c) evaluating the applicability of assessment results to individuals' natural context (e.g., Carr, 1994; Lang, Sigafoos, Lancioni, Didden, & Rispoli, 2010).

One recent example of research focused on modifications to traditional FA methods aimed to increase contextual relevance is the development of the Interview Informed, Synthesized Contingency Analysis (IISCA; Hanley et al., 2014). Characteristics of the IISCA include the use of a single test condition rather than multiple conditions, combined reinforcers, idiosyncratic establishing operations and reinforcers determined by open-ended interviewing with key stakeholders, reinforcing multiple topographies of challenging behavior, and reinforcement contingent upon precursors to target behaviors. Implementation begins with an open-ended interview (Hanley, 2012) that is used to design a test condition that is specific to the contingencies that maintain the challenging behavior in the individual's natural environment. An additional potential practical benefit of the IISCA as compared to the traditional FA procedures is that it is typically brief, with sessions alternating between control (i.e., free play) sessions and highly specific test conditions (Slaton, Hanley, & Rafferty, 2017). While the IISCA represents a promising modification to traditional FA methods, its usefulness in educational contexts has not yet been established.

Additional research has considered ethical implications of FA procedures, specifically surrounding reinforcement of challenging behavior. For example, FAs of precursor behaviors prevent the occurrence of severe challenging behavior and thus reduce the chances that such behaviors access reinforcement (e.g., Smith & Churchill, 2002). Additionally, latency FA models

(e.g., Thomason-Sassi et al., 2011), as well as trial-based models (e.g., Bloom et al., 2011) limit the frequency and duration of reinforcement following challenging behaviors.

The trial based functional analysis (TBFA; Bloom et al., 2011) addresses both practical and ethical issues with traditional FA methods. The TBFA is typically implemented within the natural contexts in which challenging behavior occurs, requires limited time for assessment procedures due to the use of two-minute trials consisting of one minute control and test conditions, and limits the frequency and duration of exposure to reinforcement contingent on the occurrence of challenging behavior due to the brevity of the trials and the fact that they are interspersed throughout routines. These features of the TBFA make it an especially promising strategy for use in applied settings.

Trial Based Functional Analysis

First introduced by Sigafoos and Saggers (1995), the TBFA represents a modification of FA procedures in which assessment conditions are implemented and evaluated within existing routines in an individual's natural environment. Due to its inherent flexibility, this FA method represents a promising tool for assessing challenging behaviors in classroom settings. While TBFA methods have evolved in the 21 years since Sigafoos and Saggers' foundational work, procedures are generally characterized by the implementation of brief (e.g., 2 minute) trials embedded across naturally occurring routines in classroom or community contexts in which an individual typically spends his or her time. Each trial includes a control segment, which functions similarly to the "free play" condition in a traditional FA in that the individual has access to preferred social activities and no demands are placed, and a test segment, in which contextually relevant environmental contingencies are systematically put in place to determine the effect of social reinforcement on the target behavior (i.e., to determine the function of the

behavior). Once several trials of each condition (i.e., attention, tangible, demand) are completed across activities, levels of behavior are compared across and within conditions to determine the function of behavior

Research supporting the use of TBFA has demonstrated the accuracy of TBFA results when measured against those of traditional FA procedures (e.g., Bloom et al., 2011; Hodges et al., 2018; LaRue et al., 2010; Rispoli, Davis, Goodwyn, & Camargo, 2013) and in relation to positive outcomes from functionally relevant intervention (e.g., Austin, Groves, Reynish, & Francis, 2015; Bloom, Lambert, Dayton, & Samaha, 2013; Lambert, Bloom, & Irvin, 2012; Rispoli, Brodhead, Wolfe, & Gregori, 2018; Schmidt, Drasgow, Halle, Martin, & Bliss, 2014). Research has also demonstrated the feasibility of training teachers and classroom staff to implement TBFA with fidelity in educational contexts (e.g., Bloom et al., 2013; Kunnavatana, Bloom, Samaha, & Dayton, 2013; Kunnavatana, Bloom, Samaha, Lignugaris/Kraft et al., 2013; Lambert, Bloom, Kunnavatana, Collins, & Clay, 2013).

The TBFA is typically implemented within the environment where the behavior naturally occurs, which leads to contextually relevant assessment results and effective treatment. Of the 24 studies (see Table 1) that sought to evaluate the TBFA as a functional assessment method, seven were implemented in private centers or clinics (Alnemary, Wallace, Almenary, Gharapetian, & Yassine, 2017; Hodges et al., 2018; Kodak, Fisher, Parden, & Dickes, 2013; Lambert, Finley, & Caruthers, 2017; Larkin, Hawkins, & Collins, 2016; Rispoli et al., 2018; Schmidt et al., 2014), two were implemented in vocational settings (LaRue et al., 2010; Chezan, Drasgow, & Martin, 2014), one was implemented in a community residential center (Lambert et al., 2013), one was implemented in the home (Vasquez, Brewer, Leon, & Vasquez, 2017), and 14 were implemented in educational settings (Austin et al., 2015; Bloom et al., 2011; Bloom et al., 2013; Flynn & Lo,

2016; Kodak et al., 2013; Kunnavatana et al., 2013a; Kunnavatana et al., 2013b; Lambert et al., 2013; Lambert et al., 2012; LaRue et al., 2010; Lloyd et al., 2015; Rispoli et al., 2013; Rispoli et al., 2015; Sigafoos & Saggers, 1995).

While a large portion of the current research evaluating TBFAs was implemented in educational settings, the type of setting and the detail provided about those settings varied. Of the fourteen studies that implemented TBFAs in educational settings, three were implemented within schools that served only students with developmental disabilities (Bloom et al., 2011; Bloom et al., 2013; Sigafoos & Saggers, 1995). Three studies were conducted in public or university-based preschool classrooms (Bloom et al., 2013; Lambert et al., 2012; Rispoli et al., 2015). Eight studies implemented TBFA procedures in public elementary and secondary schools (Austin et al., 2015; Flynn & Lo, 2016; Kodak et al., 2013; Kunnavatana et al., 2013a; Kunnavatana et al., 2013b; Lloyd et al., 2015; Rispoli et al., 2013; Rispoli et al., 2016). Of those eight studies, four were focused on training as opposed to effectiveness of the procedures (Flynn & Lo, 2016; Kunnavatana et al., 2013a; Kunnavatana et al., 2013b; Rispoli et al., 2016). Across current research examining the TBFA, only four studies explicitly state that the procedures were implemented for at least one participant in inclusive settings (Austin et al., 2015; Bloom et al., 2013; Lloyd et al., 2015; Rispoli et al., 2015).

One strength of the TBFA that is evidenced by current research is that agents in applied settings can implement the procedures within the natural contexts in which challenging behaviors occur. In 13 of the 28 existing studies focused on TBFA, educators (i.e., classroom staff, paraprofessionals, teachers) with varying levels of training and expertise were the primary implementers of the assessment (Austin et al., 2015; Bloom et al., 2013; Flynn & Lo, 2016; Kodak et al., 2013; Kunnavatana et al., 2013a; Kunnavatana et al., 2013b; Lambert et al., 2012;

Table 1

Trial Based Functional Analysis Research

Reference	Purpose	Setting	Implementer
Alnemary et al. (2017)	Training	Behavior Clinic	Behavior Consultant; Behavior Technician
Austin et al. (2015)	Validity (Treatment)	Mainstream Primary School	Teacher; Teaching Assistant
Bloom et al. (2011)	Validity (FA Comparison)	School for Children with Developmental Disabilities	Graduate Students
Bloom et al. (2013)	Validity (Treatment)	Public Preschool; University Based Preschool for Students with ASD	Teachers
Chezan et al. (2014)	Validity (Treatment)	Vocational Facilities	Staff member; Behavior Consultant; Researcher
Flynn & Lo (2016)	Training	Public School Self-Contained & Resource Classrooms	Special Education Teachers
Hodges et al. (2018)	Validity (FA Comparison)	Applied Behavior Analysis Clinic	Board Certified Behavior Analyst
Kodak et al. (2013)	Usability	University Based EI Program; Self-Contained Elementary School Classroom	Classroom Staff
Kunnavatana et al. (2013a)	Training	Public School Classrooms	Special Education Teachers
Kunnavatana et al. (2013b)	Training	Public School Classrooms	Special Education Teachers
Lambert et al. (2013)	Training	Community Residential Service	Behavioral Supervisors; House Managers

Reference	Purpose	Setting	Implementer
Lambert et al. (2012)	Validity (Treatment)	Preschool Special Education Classrooms	Special Education Teachers
Lambert et al. (2017)	Validity (FA Comparison)	Behavior Clinic	Behavior Technicians
Lambert et al. (2014)	Training	N/A	Pre-Service Behavior Analysts
Larkin et al. (2016)	Validity (Treatment)	Private Center for Children with ASD	Graduate Students
LaRue et al. (2010)	Validity (FA Comparison)	Classrooms; Vocational Settings	Classroom Staff
Lloyd et al. (2015)	Validity (Treatment)	Public School Self-Contained & General Education Settings	Paraprofessionals
Rispoli et al. (2018)	Validity (Treatment)	Private Center	Behavior Technician
Rispoli et al. (2013)	Validity (FA Comparison)	Public School Self-Contained Classrooms	Teacher; Paraprofessional
Rispoli et al. (2016)	Training	Local Public School District	Special Education Teachers; District Coordinator
Rispoli et al. (2015)	Training	Head Start Centers	Teachers; Teaching Assistant
Schmidt et al. (2014)	Validity (Treatment)	Treatment Facility	Behavior Staff Member
Sigafoos & Saggers (1995)	Validity (Treatment)	School for Children with ASD	Teacher
Vasquez et al. (2017)	Validity (Treatment)	Home	Researcher

LaRue et al., 2010; Lloyd et al., 2015; Rispoli et al., 2013; Rispoli et al., 2016; Rispoli et al., 2015; Sigafoos & Saggers 1995). Of those 13 studies, eight were specifically focused on training educators to implement the TBFA (Alnemary et al., 2017; Bloom et al., 2013; Flynn & Lo, 2016; Kunnavatana, 2013a; Kunnavatana et al., 2013b; Lambert et al., 2013; Lambert et al., 2013; Rispoli et al., 2015). At least one implementer was a general education teacher in only three studies (Austin et al., 2015; Bloom et al., 2013; Rispoli et al., 2015).

While available literature suggests that the TBFA is an effective method when used across applied settings, and that implementation agents are able to implement the assessment with high procedural fidelity and positive outcomes, there is limited information on educators' experiences with the assessment. Because test and control conditions are implemented within the naturally occurring routines in which challenging behavior typically occurs, and due to the demonstrated ability for school-based practitioners to implement TBFA procedures with relatively minimal training, the TBFA represents an especially promising functional assessment method for use in schools. However, unless research explores the characteristics of the context in which successful implementation of TBFA methods occurs, including information about educators who are responsible for implementation, dissemination and translation from research to practice is unlikely.

Problem Statement & Conceptual Framework

Practical and ethical problems related to the assessment and treatment of challenging behavior in public school settings are substantial and multifaceted. While research exists that provides effective strategies for use in educational contexts (e.g., PBIS), there is a significant research to practice gap related to implementation of such strategies to address severe and persistent challenging behaviors (e.g., Kurth & Enyart, 2016; Snell, 2006; Crimmins & Farrell,

2006). There is a need for applied research that demonstrates effectiveness of assessment and intervention strategies, while explicitly focusing on promoting sustainable implementation of such practices by practitioners operating in classrooms. Developing a better understanding of how educators' perspectives on working with challenging behavior are impacted by their participation in the implementation of functional assessment procedures, including the TBFA, is important to further implementation of research based functional assessment and intervention practices.

Cook and Odom (2013) describe implementation as the "critical link between research and practice" (p. 139). Implementation, or the processes through which practices are put into use in applied settings, involves many distinct but inter-related variables related to the practice itself, the consumers of that practice, and the immediate and remote contexts in which that practice is adopted (Damschroder et al., 2009). The consolidated framework for implementation research (CFIR; Damschroder et al., 2009) represents a model through which researchers can examine the complex constructs related to implementation in order to understand not just 'what works,' but "what works, and why" (p. 52).

The CFIR, intended as a tool for researchers to use as they investigate implementation of effective practices in applied settings, consists of five major domains: the intervention, inner and outer setting, the individuals involved, and the process by which implementation is accomplished. Each of these domains includes a series of constructs that, based on support in relevant literature, are believed to influence implementation. The authors of the CFIR suggest that researchers use the framework to evaluate issues of implementation by selecting constructs that are most relevant to their research.

The present research seeks to evaluate not only the effectiveness of the TBFA, but also to explore educators' experiences as they participate in the research process (i.e., TBFA, treatment evaluation). The focus of this research on the educators' experiences with functional assessment and relevant intervention practices, led to the development of a conceptual framework centered on two CFIR domains: intervention characteristics and characteristics of the individuals. The intervention characteristics domain is concerned with qualities and perceived qualities of the practice to be implemented. Constructs within this domain, with brief explanations, can be found in Table 2. The constructs within characteristics of the individual domain include those related to individual change, and in particular the knowledge, beliefs, and self-efficacy of implementers of a practice of interest.

The present study relies on the CFIR constructs related to characteristics of the intervention (i.e., TBFA and functionally relevant intervention packages) and the individuals (i.e., educators) to frame the processes through which educators adopt practices for use in their work with students who engage in challenging behavior. Specifically, and illustrated in Figure 1, the processes described in this conceptual framework suggest that intervention

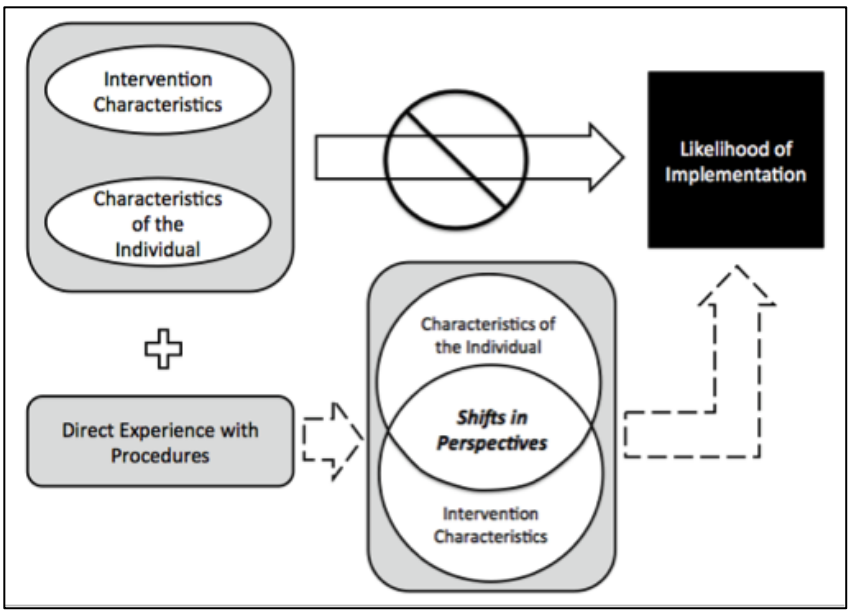


Figure 1. Conceptual Framework illustrating hypothesized processes developing to shifts in educator perspectives on working with challenging behaviors.

Table 2

Consolidated Framework for Implementation Research: Relevant Constructs

Domain	Construct	Short Description
Intervention Characteristics	Intervention Source	Perception of key stakeholders about whether the intervention is externally or internally developed
	Evidence Strength and Quality	Stakeholders' perceptions of the quality and validity of evidence supporting the beliefthat the intervention will have desired outcomes
	Relative Advantage	Stakeholder's perception of the advantage aof implementing the intervention versus an alternative solution
	Adaptability	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs
	Trialability	The ability to test the intervention on a small scale in the organization, and to be able to reverse course (undo implementation) if warranted
	Complexity	Perceived difficulty of implementation, reflected by duration, scope, radicalness, disruptiveness, centrality, and intricacy and number of steps required to implement
	Design Quality and Packaging	Perceived excellence in how the intervention is bundled, presented, and assembled
	Cost	Costs of the intervention and costs associated with implementing the intervention including investment, supply, and opportunity costs
Characteristics of the Individual	Knowledge and Beliefs about the Intervention	Individuals' attitudes toward and value placed on the intervention as well as familiarity with facts, truths, and principles related to the intervention
	Self-Efficacy	Individual belief in their own capabilies to execute courses of action to achieve implementation goals
	Individual State of Change	Characterization of the phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustainedus of the intervention

Note. Adapted from CFIR Constructs. Retrieved from www.cfirguide.org/constructs.html

source and quality is not sufficient in promoting implementation, even when characteristics of the individual suggest openness to the intervention. Rather, the educators' direct experience with the TBFA and subsequent treatment evaluation will directly influence perspectives on working with challenging behaviors that are related to the individual and the intervention itself. When this shift occurs, the result is an increase the likelihood of sustained implementation.

Research Questions

The purpose of this dissertation was to evaluate the effectiveness of an educator-implemented experimental functional assessment (i.e., Trial Based Functional Analysis [TBFA]; Bloom et al., 2011) in determining effective, functionally relevant intervention to address challenging behavior. This study extends the current literature on functional assessment, and specifically on functional assessment in classroom settings, by using a mixed methods approach (single case and qualitative research designs) to evaluate the effectiveness of the TBFA and to explore educators' perspectives on working with challenging behavior as they engage in the assessment process. Two research questions were addressed using a mixed methods approach. Each of these questions, and the methods used to address them, are listed in Table 3.

Table 3

Research Questions with Corresponding Methods

	Research Question	Methodology
1	What is the effectiveness of the Trial Based Functional Analysis in identifying appropriate interventions to address challenging behavior in classroom settings?	Single Case Designs
2	How are educators' perspectives on working with challenging behavior affected by their participation in implementing a TBFA and functionally relevant intervention?	Semi-Structured Interview Questionnaire Qualitative Memos

Chapter 2

Method

Participants, Settings, and Materials

Five educator-student dyads participated in this study (see Table 4). Three dyads completed the study, and two withdrew from the study during the implementation of the Trial Based Functional Analysis (TBFA). Three educators (Catherine, Emily, and Melanie) were referred to participate in this research by a district level behavior support specialist, and two (Nicole and Claire) were referred to participate by a building level teacher coach. All were identified as potential participants because they had at least one student in their class who was engaging in persistent challenging behavior, and that student had not responded to previous intervention. This research was approved by the Human Subjects Division at the University of Washington, and informed consent was collected for all participants.

Table 3

Characteristics of Educator-Student Dyads

	Educator			Student		
Name	Position	Experience	Name	Age	Referral Behavior	Setting
Catherine	Special Education Teacher	22 years	Gabriel	5 years	Property Destruction, Aggression	Self-Contained
Emily	General Education Teacher	17 years	Suhash	6 years	Tantrum	Inclusive
Nicole	Instructional Assistant	2 years	Sebastien	3 years	Screaming	Inclusive
Melanie*	Special Education Teacher	15 years	Sajiv*	6 years	Elopement	Self-Contained
Claire*	Instructional Assistant	2 years	Chase*	5 years	Aggression	Inclusive

**Did not complete the study*

Dyad 1: Catherine and Gabriel. Catherine was a 48-year-old Caucasian female special education teacher with 22 years of experience. She held a Master's degree in teaching with an endorsement in special education. Catherine's teaching experience was primarily in elementary level resource room settings with more recent experience serving students in self-contained settings who had greater behavioral needs. Prior to the start of this research, Catherine reported that she had completed fewer than five functional behavior assessments, and that she had completed those assessments by meeting with colleagues and by collecting data using an antecedent-behavior-consequence recording system.

Gabriel was a 5-year-old Caucasian student enrolled in a special education program at his local public elementary school. Students in this program typically received push in academic and behavioral support from paraprofessionals and pull out social and emotional support from special education teachers, but due to the severity of Gabriel's challenging behaviors, he spent all of his time in school in the special education classroom at the start of this study. Gabriel was diagnosed with an autism spectrum disorder (ASD) and attention deficit hyperactive disorder (ADHD) and his individualized education program (IEP) provided access to social and behavioral supports, which translated into his participation in a small group social skills session with other students enrolled in the same special education program. Gabriel also received one hour per week of occupational therapy outside of school. Gabriel communicated using full sentences and was conversational with peers and adults. His challenging behavior included crying, loud vocalizations, property destruction, and aggression.

Traditional functional analysis (FA) sessions for Gabriel occurred in an empty conference room in the main office of the school building. Materials included in the FA sessions were based on direct observation of the student in his classroom as well as teacher reported preference.

Materials related to task demands included age appropriate writing and math tasks provided by Gabriel's teacher. High preferred materials included the iPad and play dough related toys. Moderately preferred items included books. Gabriel also had a comfort item, a blanket, that he had with him for several FA sessions. This item was not used in the assessment and Gabriel was allowed to retain access if he chose to across all sessions. Other materials in the conference room included a long table surrounded by eight rolling chairs, a white board with markers, and a closed cabinet. The researcher and an assistant were present for all FA sessions.

All TBFA and treatment evaluation sessions occurred in the special education classroom. The classroom included three long tables where work stations were set for each of the students who were pulled out of the general education setting throughout the day, a kidney table for small group instruction, a carpet area with designated seating for each student, a sand table that was empty when not in use, and several computers with attached headphones. Across the study, there were occasionally other students in the classroom. These students were Gabriel's same age peers and their presence was inconsistent. One student who joined the classroom during sessions was accompanied by a one on one paraprofessional, and the other accessed instruction from Catherine alongside Gabriel. All sessions occurred within the same one-hour time frame, during which Gabriel followed a schedule that alternated between play and work. Materials included in the TBFA and treatment evaluation phases were those that were typically used in Gabriel's classroom routines, and included a sand table with sand and related toys, play dough and related toys, an iPad, legos, and grade-level reading, writing, and math materials. Additionally, a token economy with eight stars was used throughout the study. Only materials that were in use during a particular activity were available, and materials were kept in closed cabinets or high shelves when they were not in use.

Dyad 2: Emily and Suhash. Emily was a 40-year-old Caucasian female general education teacher with 17 years of experience at the time of this research. She held a Master's degree in education, and did not have an endorsement in special education. Prior to participating in this research, she had not completed any functional behavior assessments.

Suhash was a six-year-old boy of Asian descent who was in the first grade and had a diagnosis of ASD. He was enrolled in the same special education program as Gabriel, but spent the majority of his day in a general education classroom, with pull out services for social skills instruction and math instruction in a small group setting. Suhash qualified for speech language services, cognitive supports, and social emotional supports through his IEP. Outside of school, Suhash received five hours of speech therapy, one hour of occupational therapy, and 10-11 hours of applied behavior analysis (ABA) therapy per week. Suhash was verbal and conversational. He engaged in academic tasks at or close to the level of his same age peers with some support from a paraprofessional who also served three other students in the same general education classroom. Suhash's challenging behaviors included tantrums, which his teachers described as including crying, elopement, property destruction, and aggression. At the start of the study, Suhash would frequently ask for a break throughout his day while engaging in tantrum behaviors.

Traditional FA sessions for Suhash occurred in an empty conference room in the main office of the school building. Materials included in the FA were based on direct observation of the student in his typical classroom as well as teacher reported preference. Materials related to task demands included writing worksheets provided by Suhash's teacher. Highly preferred materials included crayons and blank white paper and an iPad. Moderately preferred items included books. Other materials in the conference room included a long table surrounded by

eight rolling chairs, a white board with markers, and a closed cabinet. The researcher and an assistant were present for all FA sessions.

All sessions of the TBFA and treatment evaluation phases occurred in Suhash's general education classroom. This classroom had one general education teacher (Emily), two paraprofessionals, and 22 students. Four students, including Suhash, had IEPs, and six students were English Language Learners. The classroom included five desks that each sat six students, a large carpet area, a kidney desk for small group instruction, a library area, and several computers with headphones attached. All sessions occurred within the Literacy Block of the class's daily schedule. During this time, Suhash was expected to work either at the carpet, at his desk, or at the kidney desk, depending on the activity that he was working on based on a classroom wide rotation schedule. During small group instruction at the kidney desk, Suhash worked in a group of four to five students with one teacher, and during independent work at the carpet or at his desk he worked with a paraprofessional who divided her attention between Suhash and one to two other students who required additional behavioral and academic support. Rotations occurred at least once per session, and at that time Suhash and the other students were expected to transition to another area in the classroom to complete a different activity. Materials included in the TBFA and treatment evaluation were those typically used across classroom activities. These included books, lined paper with pencils and art supplies, and a clipboard for work at the carpet area.

Dyad 3: Nicole and Sebastien. Nicole was a 24 year old Caucasian, female instructional assistant in an inclusive preschool classroom. She held a Bachelor's degree and was preparing to enter a graduate program that would lead to a Master's degree in special education. At the time of this research, Nicole had been working in education for three years. She had not participated in the implementation of any functional behavior assessments.

Sebastien was a 3.5 year old Caucasian boy who attended an inclusive preschool affiliated with both the local school district and the nearby university. His primary language in the home was Spanish and he used both English and Spanish at school. Sebastien did not qualify for special education services and thus did not receive any services at school. However, due to concerns about possible developmental delays expressed by parents and teachers, he received 1-2 hours per week of occupational therapy outside of school. He communicated using full sentences, but often used Spanish and English interchangeably, which limited his ability to communicate with his peers and with the adults in the classroom who were not bilingual. Sebastien's challenging behaviors included crying, screaming, elopement, and aggression.

Traditional FA sessions for Sebastien were implemented in a testing room located within his preschool building. The testing room included a child sized desk and chair, and was equipped with a double sided mirror for observation. Materials for use in the traditional FA were identified through direct observation and teacher recommendations. Materials related to task demands included paper and markers. High-preferred materials included vehicle themed toys (e.g., cars, large trucks, trains) and animals. These toys were similar but not identical to those found in his classroom. Moderately preferred materials included books and wooden blocks that were taken directly from his preschool classroom for the assessment. The researcher and an assistant were present for all traditional FA sessions.

All TBFA and treatment evaluation sessions were implemented within Sebastien's preschool classroom. Four primary staff, including a lead teacher, two instructional assistants in the process of completing graduate teacher preparation programs, and an instructional assistant (Nicole) supported 15 students in the classroom. Additional staff was present intermittently throughout the research process and included a physical therapist, a speech language pathologist,

an occupational therapist, and a behavior technician. Of the 15 students in the classroom, six had IEPs and four were English language learners. The lead teacher provided bilingual instruction throughout the school day. The classroom contained a large carpet space, a break area with books and blankets, a dramatic play center with food and dress up materials, a block area with various building materials and themed toys (e.g., vehicles, animals), three long child-sized tables with chairs, and an outdoor play area with a water table and a trampoline. Sessions for the TBFA and the treatment evaluation occurred across all classroom environments and materials included those typically available during classroom routines (e.g., play dough, building materials, water table, etc).

Dyad 4: Melanie and Sajiv. Melanie was a 40-year-old Latina female who was a Master's level teacher certified to teach special education. She had 15 years of teaching experience, primarily in resource and self-contained settings. Prior to this research, Melanie reported that she had completed fewer than five functional behavior assessments, and that she had relied on meeting with colleagues and collecting information about behaviors using antecedent-behavior-consequence recording systems to complete the assessments.

Sajiv was a six-year-old boy with ASD who was enrolled in the first grade and received services through the same special education program as Gabriel and Suhash. Sajiv was of Asian descent, and his primary language was English. According to his IEP, he received speech-language, occupational, and behavioral supports within the school. Additionally, Sajiv accessed 18 hours of ABA in his home each week. Sajiv had limited language and communicated primarily through gestures and 1-2 word utterances. His challenging behavior was elopement, which occurred across settings and to the extent that he was staffed with a one on one paraprofessional at all times.

Initially, traditional FA sessions for Sajiv occurred in an empty conference room in the school's main office area. However, it was quickly determined that this location was inappropriate due to the fact that the transition to and from the main office from his classroom elevated the risk of elopement. Based on these concerns, the traditional FA was implemented in Sajiv's special education classroom, where he received pull out services throughout his day. The classroom contained a large open space with shapes taped onto the carpet, a computer area containing several computers with headphones attached, eight stand-alone student desks arranged to face a white board, and a teacher desk area. For Sajiv's FA, the researcher used painter's tape to create a large area indicating two feet in any direction from the instructional space. Materials included those in his natural classroom environment, and were selected based on direct observation and teacher recommendation. Materials related to task demands included worksheets, file folder games, and "touch math" index cards. Highly preferred materials included the iPad, and a portable whiteboard with several markers. Moderately preferred materials included Duplo blocks and drawing materials. A trampoline was also in the environment, but was not specifically used in the FA. This dyad exited the study during the TBFA phase.

Dyad 5: Claire and Chase. Claire was a 22-year-old Caucasian female instructional assistant in an inclusive kindergarten classroom. She held a bachelor's degree and had worked in education for two years at the time of this research. Claire had not participated in the completion of any functional behavior assessments prior to this study.

Chase was a 5-year-old Caucasian boy with ASD. He was in kindergarten at the time of this research, and received in school services to address social and communication deficits. He also received 3-5 hours per week of ABA services outside of school. Chase communicated using

three to five word phrases, but his language was not always intelligible and often appeared not to serve a communicative purpose. His challenging behavior was aggression.

All sessions of the traditional FA for Chase were implemented in a small testing room within his school. The testing room included a child sized desk and chair, and was equipped with a double sided mirror for observation. Materials for use in the traditional FA were identified through direct observation and teacher recommendations. Materials related to task demands included writing and math tasks and writing utensils. High-preferred materials included an iPad that was available during his time in the classroom. Moderately preferred materials included age appropriate books. The researcher and an assistant were present for all traditional FA sessions. Chase and his teacher did not complete the TBFA and thus did not enter the treatment evaluation phase.

Response Definitions and Measurement Strategies

Across each dyad, data was collected on students' target challenging behaviors, an alternative behavior (i.e., functionally equivalent mand), and a desired behavior (i.e., educators' expected behavior for all students). Target challenging behaviors were identified through functional assessment interview (FAI; O'Neill et al., 1997) with the educators. Alternative and desired target behaviors were identified during treatment planning meetings between the researcher and the participating educators that occurred following the TBFA. Target behaviors for all participants are listed in Table 5.

Table 5

Target Behaviors for All Participants

Participant	Challenging Behaviors	Alternative Behaviors	Desired Behaviors*
Gabriel	Screaming, Crying, Grabbing, Property Destruction, & Aggression	Verbal Mand	First Time Listening
Suhash	Crying, Elopement, Disrobing, Aggression, Property Destruction	Verbal Mand	Flexibility
Sebastien	Elopement, Crying/Screaming, Aggression	Verbal Mand	Sharing
Sajiv**	Elopement		
Chase**	Aggression		

**Desired behaviors were selected by the educators.*
***Participant did not continue beyond the TBFA*

Measurement strategies varied across phases of the research (see Table 6). In the FA, target behaviors (i.e., challenging behavior) were measured using a 10-s partial interval recording system, with the exception of Sajiv, whose behavior was measured using a latency system. During the TBFA, data was collected based on occurrence or non-occurrence of challenging behavior during trials, resulting in percent of trials data. During the treatment evaluation phase, two measurement systems were used. The primary measurement system in this phase was the occurrence or non-occurrence of any target behaviors (i.e., challenging, alternative, and desired) within a trial (i.e., presentation of the establishing operation identified within the TBFA), resulting in percent of trials in which challenging behavior occurred. It should be noted that if challenging behavior co-occurred with the alternative (manding) behavior, both challenging and alternative behaviors were counted for that trial. The secondary measurement system during treatment evaluation was a 1-minute partial interval recording system collected for the duration of each session.

Table 6

Measurement Strategies across Single Case Research Activities

Research Activity	Measurement Strategy
Functional Analysis	10-second Partial Interval Recording
Trial Based Functional Analysis	Frequency (i.e., Percent of Trials)
Treatment Evaluation	Frequency (i.e., Percent of Trials) 1-minute Partial Interval Recording

Gabriel. Challenging behaviors for Gabriel included screaming, crying, grabbing, property destruction, and aggression. Screaming was defined as loud, short, high-pitched noises not paired with functional language. Crying was defined as a prolonged whimpering with or without tears and lasting for more than 3 seconds. Grabbing was defined as placing one or two hands around an item and pulling towards his body with force evidenced by physically straining and leaning body. Property destruction was defined as throwing items and tipping over items (e.g., chairs). Aggression was defined as hitting, kicking, or biting any part of another person's body. Gabriel's challenging behaviors consistently occurred within a predictable hierarchy, beginning with screaming and/or crying, escalating to grabbing, and occasionally escalating to physical aggression and/or property destruction. Gabriel's alternative behavior, manding, was any verbal functional request to retain control of an item, occurring without any challenging behavior. Honored mands included the following statements: "more time", "I want to keep it" and variations on "one more minute." Gabriel's desired behavior was referred to as "first time listening" and was defined as relinquishing an item to an adult or peer, or transitioning from one activity to another with no challenging behavior.

Suhash. The target challenging behavior for Suhash was tantrumming. Tantrums occurred in a predictable hierarchy, beginning with crying, then leaving the instructional area,

and occasionally escalating to disrobing, aggression, and property destruction. Crying was defined as a high pitched whine regardless of duration, and even short instances of crying were reinforced during the assessment and baseline conditions due to the extreme nature of his more severe behaviors that occurred later in the tantrum hierarchy. Leaving the instructional area was defined as running or walking more than 2 feet from the instructional area (i.e., carpet, table), without permission from the educator and without the purpose of retrieving an item related to the task at hand. Disrobing was defined as removing his pants in any amount, including unbuttoning. Aggression included hitting, kicking, and spitting on or towards any part of another person's body. Property destruction included hitting, kicking, ripping, throwing, and spitting on any instructional materials, as well as tipping over tables and chairs. Suhash's alternative behavior, or functionally equivalent mand, was to verbally request to complete an activity "my way," or to request to retain or regain access to materials or an activity (e.g., "I want to keep drawing", "Can I have that back"). For Suhash, the desired behavior was conceptualized as 'being flexible' and was defined as tolerating interruptions either by transitioning to a new activity, complying with educator directed changes to his 'plan' (i.e., if he was working on a drawing or writing assignment and an educator interrupted him, he would make those changes), or waiting for at least 30 seconds while an educator reviewed his materials without any co-occurrence of target challenging behaviors.

Sebastien. The target challenging behaviors for Sebastien were elopement, crying/screaming, and aggression. Elopement was defined as running in any direction at least 2 feet from the instructional area where an educator was located. He typically ran away from the educator and hid. Crying/screaming was defined as any high pitched vocalization lasting at least 3 seconds in duration and paired with repetitive refusal statements, tears, and/or a distressed

facial expression (i.e., furrowed brow, grimace). While not all of these behaviors occurred together, it was common for at least one to co-occur with crying. Aggression was defined as hitting with an open or closed fist and biting. The alternative behavior for Sebastien was vocally requesting to maintain control of an item or to continue engaging in a preferred activity. Phrases that were reinforced were "I want to keep it", "Can I have it back", and "I want to keep playing." It should be noted that the researcher initially prompted the phrase, "one more minute" as this phrase was commonly used as a functional communicative response across classrooms within the preschool but that when prompted to "ask for one more minute," the student would engage in challenging behavior and repetitively scream, "Now!" The desired behavior for Sebastien was referred to as either 'sharing' or 'following directions' and was defined as relinquishing access of preferred materials to an adult or peer, or ending an activity when directed, without co-occurring challenging behavior.

Sajiv. The target challenging behavior for Sajiv was elopement, defined as running or walking two or more feet away from the instructional area in any direction. Sajiv and his teacher did not complete the TBFA, so no alternative or desired behaviors were identified.

Chase. The target challenging behavior for Chase was aggression, which included hitting, kicking, and making full body contact with another child in his environment. Chase and his teacher did not complete the TBFA, so no alternative of desired behaviors were identified.

Research Design

The mixed methods approach used in this research falls under the category of "significance enhancement" presented by Collins and colleagues (2006). The primary method of inquiry was single case research design, but qualitative methods were used to enrich the findings of this design. Qualitative methods were used in this research with the intention of

supplementing the significance of the findings of single case designs by (a) enhancing findings that are significant for research and practice (e.g., identifying personal implications for professional growth among participants to be explored in future studies and implementation), (b) adding contextual and personal perspective of the participants to quantitative results, (c) complimenting quantitative results through elaboration, illustration, and clarification, and (d) expanding the range of inquiry by exploring different levels of the same phenomenon, shedding new light on findings that do or do not align with previous research on TBFA, and informing future research on the impact of participation in TBFA implementation on educators' perspectives on challenging behavior. A sequential mixed analysis approach to data collection and analysis was used, in which qualitative methods were used to enhance the significance of findings from a series of single case research designs implemented with each participant (Collins, Onwuegbuzie, & Sutton, 2006).

Single case methods. In the assessment phase of this research, a multi-element design (Gast and Ledford, 2014) was used to evaluate the results of both the FA and the TBFA. A withdrawal design (Gast & Ledford, 2014) was used to evaluate the effect of the functionally relevant intervention (determined by results of the TBFA) on problem behavior when compared to baseline conditions in which the problem behaviors were intermittently reinforced.

Qualitative methods. Qualitative methods were appropriate for addressing the question of whether and in what ways educators' perspectives on working with challenging behavior were affected by their experience in implementing the TBFA and subsequent functionally relevant intervention. A series of semi-structured interviews, qualitative memos, and completion of pre-post questionnaires were implemented with each participating educator. Using this array of data collection strategies allowed for analysis within and across cases (i.e., educator-student dyads),

promoting triangulation of data by checking for consistencies (and inconsistencies) across data sources and thus increasing the trustworthiness of findings (Merriam, 2009). Convenience sampling was used to identify cases for inclusion in this research (Patton, 2002). Dyads were from local schools within districts that had relationships with the researcher's institution. Sampling involved using inclusion and exclusion criteria to select sites, or cases, that were representative of the average educator working with students who engage in challenging behaviors. In this research, a representative case was an educator who did not have specific training in behavioral principles prior to the study and a student who engaged in a challenging behavior that was low to moderate in severity (i.e., did not cause significant harm or damage to self, others, or property).

***Position to the research*.** In discussing the qualitative methods used in this research, it is important that the position of the researcher be disclosed. The researcher in this study was a Board Certified Behavior Analyst (BCBA) who had never been a classroom teacher, but had experience working with educators in schools. She approached implementation of the single case designs and qualitative interviewing with a behavior analytic perspective, with an effort to be objective and focused on data emerging from all data sources. That said, she also approached this research with a strong desire to better understand the experiences of teachers and a conviction that ABA be implemented in classroom settings.

The researcher was referred to each educator-student dyad that participated in this study by a district level or school administrator, and thus participation in the research was not directly initiated by the participating educators themselves. Throughout the course of this research, the researcher was an outsider in each classroom setting, though she did make efforts to build relationships with the educators and students. The position of the researcher as an outsider to the

participants in terms of training, expertise and relation to the classroom certainly had an effect on the interactions that she had with participating students and educators, and this complex relationship and inherent competing values of the research and the educator should be considered with the findings of this research.

The researcher's position within the inclusive preschool where Nicole and Claire were educators may have impacted findings. The researcher was a doctoral student who had engaged in research in the building in previous years. Additionally, she was a member of the school intervention team within the building and frequently consulted on functional assessments behavior intervention plan development. Finally, the researcher was a parent of a child who attended the school but who was not in either of the participating classrooms. The participants were not familiar with the researcher's child. These factors should be considered with the findings for Nicole and Claire.

Procedures

The current research was sequential in nature, involving multiple phases in which single case designs and qualitative research methods were used simultaneously (see Figure 2). The phases were (1) Functional Analysis, (2) Trial Based Functional Analysis, and (3) Treatment Evaluation. The data sources for each phase are detailed below and in Figure 2.

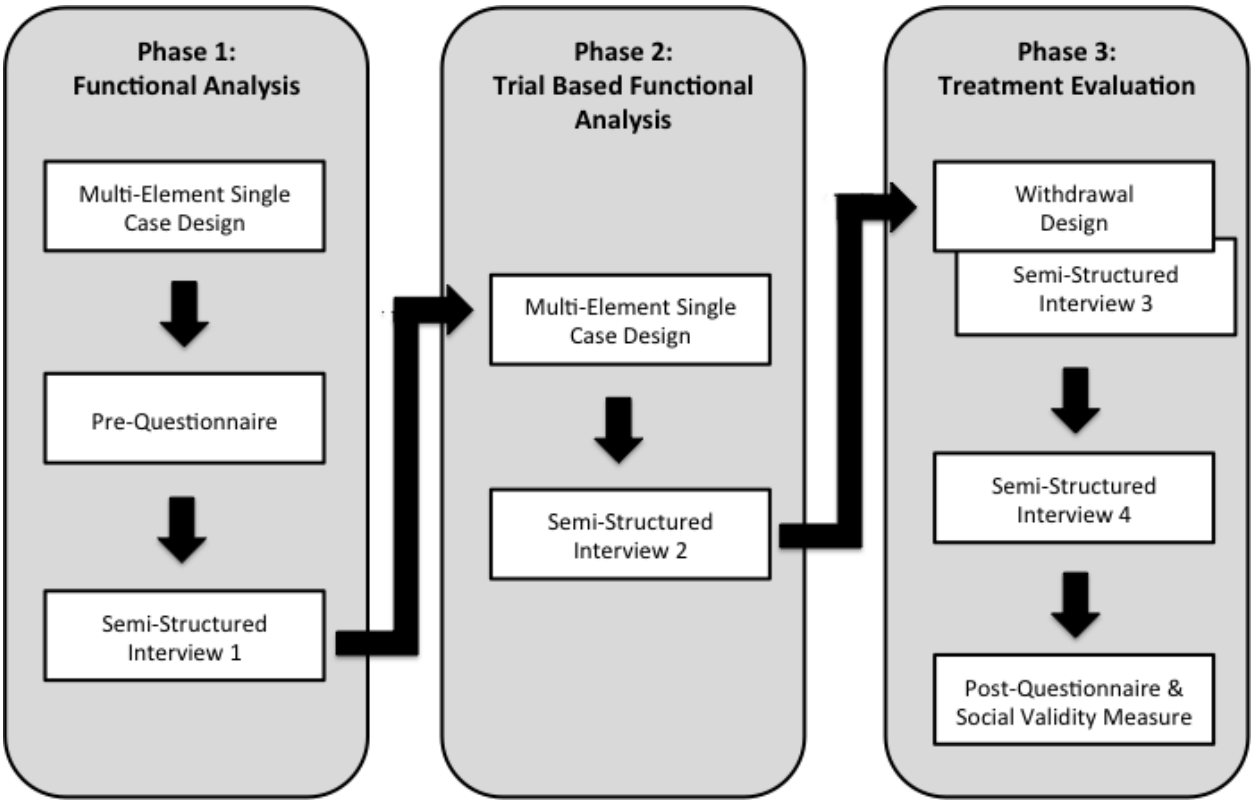


Figure 2. Research methods across study phases.

Phase 1: Functional Analysis. An initial traditional Functional Analysis (FA; Iwata et al., 1994) was conducted in order to identify whether a target challenging behavior was primarily maintained by automatic reinforcement, and to compare findings with the Trial Based Functional Analysis (TBFA; Bloom et al., 2013). All FAs included attention, tangible, demand, and free play conditions, which were designed based on a Functional Assessment Interview (FAI; O'Neill, Horner, Albin, & Storey, 1997) conducted with the educator prior to the start of the study. Alone/Ignore conditions were not included because this research was conducted within schools, where it was not appropriate to leave a student in a room for any amount of time. Modified alone/ignore conditions were not included because it was important to prevent behaviors from escalating in severity in the school environment and providing functionally equivalent reinforcement following the first, and typically minor, instance of challenging

behavior often prevented the occurrence of more severe challenging behaviors. FA conditions were five minutes in duration, with the exception of the final four sessions of Suhash's FA which were extended to 10-minutes due to an absence of problem behaviors within the brief five-minute model. Procedures for each condition of the FAs are described below

Free play condition. The free play condition served as the control, to which levels of behavior observed in other conditions were compared. During free play, the assessor provided the student participant with continuous access to attention and highly preferred items and/or activities. No demands were placed on the student. If challenging behavior occurred, all instances were ignored.

Attention condition. Prior to the start of the session, the assessor provided the student participant with 30-60 seconds of high quality attention. When the session began, the assessor stated that she "needed to do some work," and diverted attention from the participant towards her phone or reading material. The student-participant had access to low preference items and activities throughout the session. The assessor provided immediate, contingent high quality attention for 30 seconds following each instance of the target challenging behavior.

Demand condition. The session began with the presentation of a task demand using a three step prompting procedure (e.g., verbal, model, and physical prompts). When a student responded appropriately to the demand, the assessor provided verbal praise statements (e.g., "nice job", "that's right") in a neutral tone. The assessor provided a 30 second break immediately contingent upon each instance of the target challenging behavior.

Tangible condition. Prior to the session, the student-participant had 30-60 seconds of access to high-preferred items and activities. Moderately preferred tangibles were be available throughout the session. The session began when the assessor restricted access to the preferred

materials, placing them in the student participant's sight, but out of reach. The assessor provided 30 seconds of access to the high-preferred materials immediately contingent upon each occurrence of the target challenging behavior.

Interview 1. After the FA was completed, the researcher met with the educator for 60-90 minutes to collect a pre-questionnaire that was delivered during intake, and to conduct a semi-structured interview.

The questionnaire focused on educators' beliefs, knowledge, and self-efficacy related to working with challenging behavior. It was similar to that used in research by Hastings and Brown (2002a), and included three sections. Section I (Appendix A) assessed the educator's behavioral knowledge, and consists of a 25 item multiple choice questionnaire consisting of odd numbered items from the Knowledge of Behavioral Principles as Applied to Children instrument (KBPAC; O'Dell, Tarler-Benlolo, & Flynn, 1979). These items were selected based on findings from an evaluation of the psychometric properties of the original 50-item KBPAC instrument and two abbreviated versions of the instrument, which found that 25-item forms consisting of even or odd numbered items from the full instrument were parallel forms with good internal consistency (Sturmey, Newton, Milne, & Burdett, 1987). Section II (Appendix B) assessed educators' beliefs around the cause of challenging behavior, using items from the Challenging Behavior Attributions Scale (CHABAS; Hastings, 1997a). This questionnaire consisted of 32 statements, each of which explained *why* a person might engage in challenging behavior, rated on a five-point Likert-scale ranging from 'very unlikely' to 'very likely' as a cause. Section III (Appendix C) assessed educators' feelings of self-efficacy, using five Likert-style questions developed by Hastings (2002) to measure perceived confidence, control, satisfaction, perceived impact, and difficulty. This questionnaire served as a pre-participation measure and results were

compared with those of a second implementation of a similar questionnaire following completion of the treatment evaluation phase.

The first semi-structured interview was 45-60 minutes in length and included questions related to beliefs, behavioral knowledge, and self-efficacy surrounding working with challenging behaviors (see Appendix D). For example, interview questions explored teacher beliefs around why students engage in challenging behavior and prompted teacher participants to reflect on their current and previous experiences with challenging behavior. The interviews were conducted in quiet, educator-selected locations and were audio-recorded and later transcribed for analysis.

Phase 2: Trial Based Functional Analysis.

TBFA Training. Educators were trained to implement demand, attention, and tangible conditions of the TBFA. Alone conditions were not implemented within the TBFA because students were not included in this research if the traditional FA indicated a primary automatic function. Educator training loosely followed the model used by Rispoli and colleagues (2016).

Prior to training, the educator participant was provided with a copy of the Bloom (2013) article that details implementation of TBFA in classroom settings. Once educators confirmed that they had read this article, the researcher met with them for a 90-minute training session. The educators at the elementary school were trained together, as were the educators at the preschool. The training was led by the researcher, but was interactive. Educators were provided with handouts about the material and videos were used as examples throughout the training. The presentation included an overview of operant conditioning, social functions of behavior, rationale for conducting a TBFA, and task analyses of each TBFA condition.

Immediately following this didactic element of the training, the educators and the researcher, along with a research assistant, practiced 2-minute trials representing each control

and test condition of the TBFA, with the educators and researchers each playing the role of the student and the teacher. The researcher provided feedback on each role-play. Due to time constraints, participants at the elementary school were not able to engage in extended role-plays, and instead, the researcher and one participant role-played each condition one time.

Training continued during the implementation of the TBFA, with the researcher initially modeling trials for the educator participant, then side by side coaching the participants through implementation of trials, and finally providing feedback as requested by the educators. The level of coaching and feedback varied across participants and was provided based on their requests.

Implementation of the TBFA. Immediately following the training session, the researcher worked with each educator to identify classroom routines in which she felt that she would be able to run trials. Once routines were identified, the educator began to implement the TBFA with researcher support that was faded as more trials were implemented. The educator was asked to collect data using a TBFA data collection tool, based on that used by Bloom and colleagues (2011; see Appendix E).

Procedures for the TBFA were based on those described by Bloom and colleagues (2013). Each TBFA included 10 trials of each condition. Educators were initially asked to avoid implementing more than two trials of the same condition in succession, but several participants expressed a desire to implement sessions together at first in order to master the procedures and the researcher obliged. Each trial included a one-minute control segment followed by a test segment lasting up to one minute (depending on whether the target behavior was observed). Educators used a MotivAider® set to one minute in order to signal the end of the control segment and the start of the test segment for each trial. During the control condition, all instances of the target behavior were ignored. During the test conditions, relevant consequences were

delivered contingent upon the occurrence of the target challenging behavior. For each trial, data was collected on the occurrence or non-occurrence of the target challenging behavior within control and test conditions. Percent of trials in which challenging behavior occurred was calculated, and these percentages were graphically displayed using a histogram in order to visually compare levels of behavior within and across conditions.

Attention. During the control segment of the attention condition, the educator provided attention about every 5 seconds. (e.g., talking to the student, commenting on the student's actions, lightly touching the student's back or arm). Instances of target behavior were ignored. After 60 seconds, the test segment began with the educator telling the student that they were busy and turning away from the student. If the student engaged in the target behavior(s), the educator immediately delivered attention in the form of commenting on the student's behavior and lightly touching the student. If the student walked away from the educator (not including elopement), the educator remained within arm's reach of the student without providing verbal or physical attention. The test segment ended when behavior occurred. If the target behavior did not occur, the test segment ended after 60 seconds.

Tangible. During the control segment of the tangible condition, the educator was seated near the student and provided the student with access to highly preferred materials for 60 seconds. After 60 seconds passed, the test condition began with the educator removing the materials from the student's possession and placing them in sight but out of reach. The educator blocked access to the item if the student reached for them, and if the student requested access, the educator responded by saying, "it's my turn right now" or "we're all done with this" in a neutral tone. If the target challenging behavior occured, the educator provided immediate access

to the preferred items and the trial ended. If the target behavior did not occur, the test segment ended when 60 seconds had passed.

For Suhash, the tangible condition was implemented slightly differently because interview and direct observation suggested an indisyncratic function. At the start of the test condition, the educator interrupted the task that Suhash was engaged in (e.g., reading, writing, drawing) and either destroyed the material by 'accidentally' stepping on or spilling water on his work (a common occurrence in the classroom setting), by erasing and correcting an element of his work, or by taking his materials and pretending to review them while he waited. Items were returned, new materials were provided, or the educator apologized and stated that he could do the work "his way" immediately following challenging behavior. If no behavior occurred, then the trial ended after 60 seconds elapsed.

Demand. During the control segment of the demand condition, the educator approached the student when he was engaged in a moderately or non-preferred activity, or when he was sitting with no materials. She did not place any demands or interrupt engagement with materials during the initial 60 seconds. When the test segment began, the educator instructed the student to complete a task related to the activity that he was already engaging in, or presented a new task if he was not engaging in any task at the start of the demand trial. All demands were typical of classroom routines (i.e., writing, math, drawing, manipulating objects). The educator provided least to most prompting, moving from a verbal to a model and finally a physical prompt. Should the student complete a task, the educator provided brief verbal praise in a neutral tone and a new task was presented immediately. Should the target challenging behavior occur, the educator removed the task materials and told the student that he could take a break. The trial ended when

the target behavior occurred or, if the target behavior did not occur, the test segment ended after 60 seconds.

The demand condition implemented in this research deviated from the typical condition described in the TBFA literature. Typically, control segments within the demand condition consist of the student having no access to task related materials. However, the researcher and the participating educators found that this was not appropriate given the fact that students were not expected to be without materials in the context of their educational environments. Both the educators and the researcher were concerned that interrupting routines in order to provide an unnatural break in the control segment of this condition would risk evoking challenging behavior in a way that would not happen in the classroom outside of the assessment. Modifications described above were made to the demand condition for all participating students in order to ensure the contextual relevance of the TBFA results.

Interview 2. When the TBFA was completed, the researcher met with the educator for 60-90 minutes in a quiet location of the educator's choosing. During this meeting, the researcher conducted a second semi-structured interview with the educator (see Appendix D), reviewed the results of the TBFA, and proposed a treatment plan to the educator with a request for feedback and suggested changes.

The second semi-structured interview was 45-60 minutes in length and included questions related to educators' experiences with and perspectives on working with challenging behaviors. Additionally, the interview protocol asked the educator to reflect on her experiences during implementation of the TBFA in order to gain information on the social validity of the procedures. The interview was audio-recorded and later transcribed for analysis. During this meeting, the researcher also collected detailed field notes that were used used in data analysis.

Also during this meeting, the researcher shared the results of the TBFA with the educator and asked her to identify potential strategies for intervention. As the educator described potential intervention elements, the researcher took detailed notes. Then, the researcher presented her plan for intervention, which was a functional communication training (FCT) based package for each of the three student participants who completed the TBFA. Finally, the educator and the researcher worked together to incorporate the educators' feedback into the researcher's proposed intervention package. The researcher then prepared intervention materials for the educator to use during the third phase of the research: treatment evaluation.

Phase 3: Treatment evaluation. Following the completion of the TBFA, the researcher implemented a FCT based treatment package that was informed by TBFA results, as well as educator feedback, for each student. The effectiveness of the treatment was evaluated within a withdrawal design in which baseline and intervention were presented in an alternating fashion across four phases (i.e., ABAB; Gast & Ledford, 2014). With the exception of Nicole, the educator participants were the primary implementers of all phases of the treatment evaluation, with the researcher supporting as requested.

Baseline. During baseline, educators were asked to present at least ten trials, in which the establishing operation (EO) relevant to the condition of the TBFA with the highest level of challenging behavior. For example, if the highest levels of challenging behavior occurred during the tangible condition, the teacher removed access or interrupted a preferred activity at least ten times during each baseline session. During baseline, educator participants were asked to provide functionally equivalent reinforcement (e.g., allow continued access to preferred materials) following challenging behaviors when they occurred within trials. Alternative and desired behaviors were intermittently reinforced, but were often ignored, as was typical practice in the

classrooms prior to the start of the research. Baseline sessions lasted the duration of the activity that the educator and/or classroom team identified as appropriate based on staff availability and typical levels of challenging behavior.

Treatment. As in baseline, educators were asked to implement at least 10 trials in which the establishing operation (EO) indicated by the TBFA results was placed. FCT-based treatment packages were implemented for each of the three student participants and consisted of three steps: (a) prompting the student that they could use their words (i.e., engage in the functional communicative response, or verbal mand) or engage in educators' desired behaviors (i.e., behaviors that are appropriate for the classroom but not functionally equivalent to the challenging behavior), (b) implementing the EO (i.e., interrupting access to preferred activities), and (c) delivering a consequence relevant to the student behavior (i.e., access to preferred activities following functional communicative response, access to a token or edible following engagement in the desired behavior, and ignoring or error correction following challenging behavior).

Consequences for student behaviors were developed based on the researchers' recommendations with consultation from the educators. Functionally communicative responses (i.e., verbal mands) accessed functionally equivalent reinforcement that was based on the outcome of the TBFA. In other words, when a student asked for access to a preferred item or activity using phrasing determined appropriate by the educator, their request was granted. When a student engaged in a desired behavior, which was defined by the educator based on behavioral expectations within their classrooms, they earned access to a highly preferred item that was not functionally relevant. Token economies were used for Suhash and Gabriel because educators were familiar with the strategy and their recommendations during meetings included the use of

star charts. The educators determined the back up reinforcer for their students (i.e., choice of typically restricted tangible for Gabriel, helping roles for Suhash). Edibles were used as reinforcement for Sebastien, as was requested by the educator. Finally, challenging behavior was either ignored or accessed an error correction (i.e., responded to with direct feedback and an instruction to mand). For Gabriel and Sebastien, error corrections were used. For Suhash, challenging behavior was ignored.

Interview 3. Following the initial treatment phase of the withdrawal design, the researcher and the educator met at a quiet location selected by the educator. During this meeting, the researcher conducted a third semi-structured interview with the educator (see Appendix D). The interview was 45-60 minutes in length and was similar to the second interview in that it focused on educators' experiences with and perspectives on working with challenging behaviors, as well as their perspectives on the assessment and intervention procedures that they implemented within this research (i.e., social validity). The researcher also collected detailed field notes throughout the interview that were be used in data analysis.

Interview 4. Within one week of completing the treatment evaluation, the researcher met with the educator for a final 45-60 minute interview, conducted in a quiet location chosen by the participant. During this interview, the educators were told that they could invite any members of their classroom staff who they felt would like to reflect on the experience of engaging in the phases of this research in the classroom setting. Neither Catherine nor Nicole invited additional members of the classroom staff. Emily invited the paraprofessional who worked with Suhash.

The semi-structured interview asked educators to provide a general update on the target student's behavior, to share experiences and perspectives related to working with challenging

behavior, and to reflect on the social validity of the TBFA and functionally relevant intervention. Educators were also asked to identify any changes they had made to the treatment package.

During this meeting, the researcher delivered the post-test and Likert-style social validity measures. The post-test was identical to the pre-test, except that the initial section focused on behavioral knowledge included the 25 even-numbered items from the full KBPAC questionnaire (O'Dell, 1979) items that were not included in the pre-test. The social validity measures were modified versions of the Treatment Acceptability Rating Form Revised (TARF-R; Reimers & Wacker, 1992; Reimers & Wacker, 1988) that were designed to assess the social acceptability of TBFA and functionally relevant intervention. The first measure was specifically designed to assess the social validity of the TBFA (see Appendix F), and included 13 Likert-style questions and space to provide additional feedback. The second measure was designed to assess the social validity of the functionally relevant intervention (See Appendix G), and included 15 Likert-style questions and space to provide additional feedback.

Data Analysis.

Data analysis occurred throughout all phases of the research. Both single case and qualitative research methods are well suited for ongoing data analysis. When using single case research designs (i.e., multi-element and withdrawal designs), ongoing visual analysis was used to evaluate the effect of environmental changes (i.e., independent variables) on the level, trend, and variability of behaviors of interest (Gast & Ledford, 2014). Such ongoing visual analysis of the data allowed the researcher to make informed and data based decisions surrounding phase changes and implementation. Qualitative data analysis was an iterative process in which data (e.g., interview transcripts, qualitative memos) were continuously compared and contrasted in an

effort to identify emergent themes related to the research questions (Miles, Huberman, & Saldana, 2014).

This research used a case-oriented approach to qualitative data analysis (Miles et al., 2014). This was appropriate for the present study because while there are associated limitations related to generalizability, the case-oriented approach is ideal for identifying concrete patterns among small sets of cases. There were three distinct cases (i.e., educator-student dyads) included in this research and the purpose of this qualitative analysis was to identify patterns related to each educator's perspectives on working with challenging behavior. It is important to note that while each case is conceptualized as an educator-student dyad, the students' voice was not included. Qualitative data in this research was focused on the experience of the educators, as they worked with their participating student. As such, each educator's experience is inextricably tied to the student's experience.

Data analysis occurred within and across cases (i.e., dyads). First, within case analysis was conducted for each educator-student dyad. This allowed for the development of a description of what happened within each bounded context (i.e., classroom; Miles et al., 2014). Then, subsequent cross case analysis was used both to enhance understanding of emergent themes and to promote generalization. While the limited number of cases (n = 3) does limit generalization, comparison across cases allowed for the identification of broader themes related to the impact of participation in TBFA on educators' perspectives on working with challenging behavior that may be applied to other cases or contexts in future research.

During the within case analysis phase, data (e.g., interview transcripts, questionnaires, qualitative memos, and single case data) from each distinct case was analyzed separately and as the cases were completed. The analysis process was both deductive and inductive, and began

with the application of an a priori coding schema that was derived from the conceptual framework and included three concepts from the Consolidated Framework for Implementation Research (CFIR) characteristics of individual domain: knowledge, beliefs, and self-efficacy (Damschroder et al., 2009). These three codes were applied to qualitative data from each case in order to provide a frame with which to approach data. The codes were adjusted and expanded upon through an initial analytic process of open coding and thus each within case analysis began with an evolved a priori schema that was impacted by previous case analyses.

Once the a priori schema had been applied and text excerpts that related to beliefs, self-efficacy, and knowledge surrounding challenging behavior had been identified, text excerpts were removed from the larger context of the interview and organized by code (i.e., knowledge, self-efficacy, beliefs) for each participant in an excel document. This step in analysis was implemented based on the fact that each of these units of text was both heuristic and interpretable on its own, separate from the body of the data source (Lincoln & Guba, 1985). The purpose of this reorganization of the data was to allow for interpretation separate from the body of the text such that themes might be identified.

Once qualitative data was separated by code (i.e., knowledge, beliefs, and self-efficacy), it was entered into excel, and color coded by interview number for each educator. At this point, the researcher applied open coding to within each case. Emergent themes were then compared and contrasted across dyads as cross case analysis. Themes that emerged for the first two participants to complete the research process (Emily and Catherine) included predictability of behavior, understanding the rationale for recommended strategies, and causes of challenging behavior as within or outside of their control. Because Nicole finished the research process later, and because she did not participate in the research activities to the same extent that the other

participants did, her interviews were coded as a contrasting case. In other words, themes developed through analysis of data from the first two participants were applied to the third dataset and were considered in terms of agreement or disagreement with the initial findings.

Once the analysis process was complete, each of the three emergent themes were summarized with supporting data and shared with the participating educators, as well as several practitioners whose own work related closely to the issues addressed in this research. The professionals who reviewed the themes included the participating educators, a Board Certified Behavior Analyst (BCBA) who oversaw training of registered behavior technicians for a major behavioral company located in the southwestern United States, and three practicing BCBAs who were formerly special education teachers and whose primary job responsibilities focused on working with educators in classrooms to address challenging behavior. Each of these community members, including the participants, were emailed the theme summary document and asked to share any feedback if they had it. Of the participating educators, only Emily responded, saying that she agreed with the findings and that nothing included appeared to be "out of the ordinary." Each of the BCBAs who had practiced as teachers also shared that their experiences aligned with the findings, with one sharing that the themes reflect the challenges that led her to leave the teaching field to become a BCBA. Another commented on the implications for the findings of this research for consulting in schools. Interestingly, the BCBA who oversaw training at a major behavioral company, who had no professional experience in classrooms, shared that she saw similar themes in her work with registered behavior technicians. These comments from stakeholders add to the believability of the findings.

Reliability Measures

Interobserver agreement. A second observer recorded interobserver agreement (IOA) in at least 30% of sessions and at least once per condition for each phase of the research (i.e., FA, TBFA, Treatment Evaluation). IOA procedures varied across phases, and are described with corresponding results below. IOA for all participants is depicted in Table 7.

Functional analysis. IOA for the FA was calculated using the interval by interval method, in which the total number of intervals in which observers agreed were divided by the total number of intervals, and then multiplied by 100 in order to identify a percent of agreement. For Gabriel, IOA was calculated in 32% of sessions, with average agreement of 98.9% (range = 93.3-100%). For Suhash, IOA was calculated in 36% of sessions and IOA was 100%. For Sebastian, IOA was calculated in 35%, resulting in 98.1% agreement (range = 96.7-100%).

Trial based functional analysis. IOA for the TBFA was recorded by a second observer in at least 30% of trials and across all conditions. The trial-by-trial method (Cooper et al., 2007) was used, in which IOA was calculated by dividing the number of trials in which observers agreed by the total number of intervals and the result was multiplied by 100 in order to find a percent of agreement. For Gabriel, IOA was calculated in 80% of trials, and total IOA was 95.8%. For Suhash, IOA was collected in 100% of trials, and total IOA was 96.7%. For Sebastien, IOA was collected in 30% of trials, and total IOA was 100%.

Treatment evaluation. IOA for treatment evaluation sessions was calculated by a second observer in at least 30% of sessions and at least once per phase. The trial-by-trial method (Cooper et al., 2007) was used to calculate IOA for trial data, in which the total number of agreements was divided by the total number of trials, and then multiplied by 100 to identify a

Table 7

Inter Oberver Agreement

	Gabriel			Suhash			Sebastien		
	% Sessions or Trials	Average	Range	% Sessions or Trials	Average	Range	% Sessions or Trials	Average	Range
FA	32.0%	98.9%	93.3-100%	36.0%	100.0%	-	35.0%	98.1%	96.7-100%
TBFA	80.0%	95.8%	-	100.0%	96.7%	-	30.0%	100.0%	-
Treatment Evaluation									
Trial Data	31.0%	90.3%	75-100%	33.0%	90.6%	81.8-100%	31.0%	87.1%	76.2-95.8%
Percent of Interval Data	31.0%	91.7%	86.7-98.1%	33.0%	91.3%	81.8-100%	31.0%	94.4%	83.3-100%

Table 8

Procedural Fidelity

	Gabriel			Suhash			Sebastien		
	% Sessions or Trials	*M*	Range	% Sessions or Trials	*M*	Range	% Sessions or Trials	*M*	Range
FA	42%	100%	-	29%	95.70%	-	23.50%	100%	-
TBFA	76.70%	95.70%	60-100%	83.30%	96.10%	80-100%	27%	100%	-
Attention	80%	100%	-	90%	96.80%	85.7-100%	30%	100%	-
Demand	80%	95%	80-100%	90%	94.40%	83.3-100%	20%	100%	-
Tangible	70%	91%	60-100%	70%	97.10%	80-100%	30%	100%	-
Treatment Evaluation	100%			100%			100%		
Prompt	-	14.40%	0-27.8%	-	21.20%	3.2-52.2%	-	79.10%	66.7-94.4%
Access Interrupted	-	98.96%	94.4-100%	-	100%	-	-	98.96%	94.4-100%
Response to Desired Bx	-	51.10%	25-100%	-	71.80%	45.5-100%	-	63.40%	0-100%
Response to Alt. Bx	-	95.90%	87.5-100%	-	95%	85.7-100%	-	95.50%	76.5-100%
Response to Ch. Bx	-	76.70%	0-100%	-	100%	-	-	97.20%	75-100%

percent of agreement. The interval-by-interval method was used to calculate IOA for percent of intervals data, in which IOA was calculated by dividing the number of intervals in which observers agreed by the total number of intervals and the result was multiplied by 100 in order to identify a percent of agreement. For Gabriel, IOA was collected in 31% of sessions and average IOA was 90.3% (range = 75-100%) for trial data and 91.7% (range = 86.7-98.1%) for percent of interval data. For Suhash, IOA was collected in 33% of sessions, and average IOA was 90.6% (range = 81.8-100%) for trial data and 91.3% (range = 81.8-100%) for percent of interval data. For Sebastien, IOA was collected in 31% of sessions and there was 87.1% agreement (range = 76.2-95.8%) in trial data and 94.4% agreement (range = 83.3-100%) in percent of interval data.

Procedural fidelity. Procedural fidelity was measured in at least 20% of FAs, TBFA, and treatment sessions for all participants. Procedural fidelity was measured by the researcher, using checklists developed for this research. Levels of procedural fidelity for all participants are included in Table 8.

Functional analysis. Procedural fidelity for the FA was evaluated using a checklist (see Appendix H) based on the procedures described by Iwata et al. (1984), and calculated by dividing the number of elements implemented correctly by the total number of steps. For Gabriel, procedural fidelity was measured in 42% of total sessions, or twice per condition. All elements were accurately implemented across conditions. For Suhash, procedural fidelity was measured in 29% of sessions, and at least once per condition. Procedural Fidelity averaged 95.7% of steps accurately implemented, with one step in the attention condition coded as incorrect due to the delayed implementation of the EO. For Sebastien, procedural fidelity was measured in 23.5% of total sessions, with 100% of steps accurately implemented.

Trial based functional analysis. Procedural fidelity data for the TBFA was collected live by the researcher as educators implemented sessions, using a checklist that included elements of trials for each type of condition (see Appendix I). Total procedural fidelity was calculated by dividing the number of correctly completed steps in the trial by the total number of steps. Additionally, procedural fidelity was calculated for each type of trial that was run (i.e., attention, tangible, demand). Procedural fidelity per condition was calculated by dividing the number of correctly completed steps in the relevant trial by the number of steps in the relevant trial.

For Gabriel, procedural fidelity was measured in 76.7% of total trials, with an average of 95.7% of steps implemented correctly across all conditions (range = 60-100%). Procedural fidelity was measured in 80% of attention trials and was 100%, in 70% of tangible trials showing 91% fidelity (range = 60-100%), and in 80% of escape trials where 95% of steps were implemented correctly (range = 80-100%).

For Suhash, procedural fidelity was measured in 83.3% of total trials, with an average of 96.1% of steps implemented correctly across all conditions (range = 80-100%). Procedural fidelity was measured in 90% of attention trials and was 96.8% (range = 85.7-100%), in 70% of tangible trials showing 97.1% fidelity (range = 80-100%), and in 90% of escape trials where 94.4% of steps were implemented correctly (range = 83.3-100).

For Sebastien, procedural fidelity was measured in 27% of total trials, with 100% steps implemented correctly. Procedural fidelity was measured in 30% of attention trials and was 100%, in 30% of tangible trials showing 100% fidelity, and in 20% of escape trials where 100% of steps were implemented correctly.

Treatment evaluation. Procedural fidelity data for the treatment evaluation was collected using a checklist developed by the researcher specifically for the functional communication

training (FCT) package used in this research (see Appendix J). For each student, procedural fidelity across three key steps of the intervention was measured: prompting, interruption of access to preferred routines or activities, and delivery of immediate consequences for challenging, alternative, or desired behaviors. Procedural fidelity for each step across sessions was calculated by dividing the number of times each step was implemented correctly by the total number of opportunities. Procedural fidelity was assessed in 100% of total treatment sessions for each participant.

For Gabriel, prompting was implemented in an average of 14.4% of trials across sessions (range = 0-27.8%). Access was interrupted in an average of 98.9% of trials across sessions (range = 94.4-100%). Reinforcement was delivered for appropriate behaviors in 51.5% of trials (range = 25-100%), functionally equivalent reinforcement was delivered for alternative behaviors in 95.9% of opportunities (range = 87.5-100%), and error corrections followed challenging behavior in 76.7% of opportunities across sessions (range = 0-100%).

For Suhash, prompting was implemented in an average of 21.2% of trials across sessions (range = 3.2-52.2%) and access was interrupted in an average of 100% of trials across sessions. Appropriate consequences were implemented for desired behaviors in 71.8% (range = 85.7-100%), alternative behaviors in 95% (range = 85.7-100%), and challenging behaviors in 100% of opportunities across treatment sessions.

For Sebastien, prompting was implemented in an average of 79.1% of trials across sessions (range = 66.7-94.4%) and access was interrupted in an average of 98.9% of trials across sessions (range = 94.4-100%). Edibles were delivered contingent upon the occurrence of desired behaviors in 63.4% of opportunities across sessions (range= 76.5-100%), functionally equivalent reinforcement was delivered following alternative behavior in 95.5% of opportunities across

sessions (range = 76.5-100%). Error corrections were implemented following engagement in challenging behavior in 97.2% of opportunities across sessions (range = 75-100%).

Chapter 3

Single Case Design Results

Research Question 1: Effectiveness of the Trial Based Functional Analysis

Dyad 1: Catherine and Gabriel. The results of the functional analysis (FA), trial based functional analysis (TBFA), and treatment evaluation for Gabriel are included in the following sections.

Functional analysis. The results of the FA for Gabriel are displayed in Figure 3. Elevated levels of challenging behavior were observed in both the tangible (M = 13.4%) and attention (M = 9.3%) conditions relative to the free play condition. In the tangible condition, challenging behavior was observed on a steady and increasing trend across the first three sessions, with clear differentiation from the free play condition in three of four tangible sessions. In the attention condition, challenging behavior was observed on a stable and increasing trend, with behavior occurring at zero levels in session 12, when there was a confounding variable that interfered with the assessor's attention (food was available to the student). These results indicate that the target challenging behaviors serve a dual function of attention and access to tangibles.

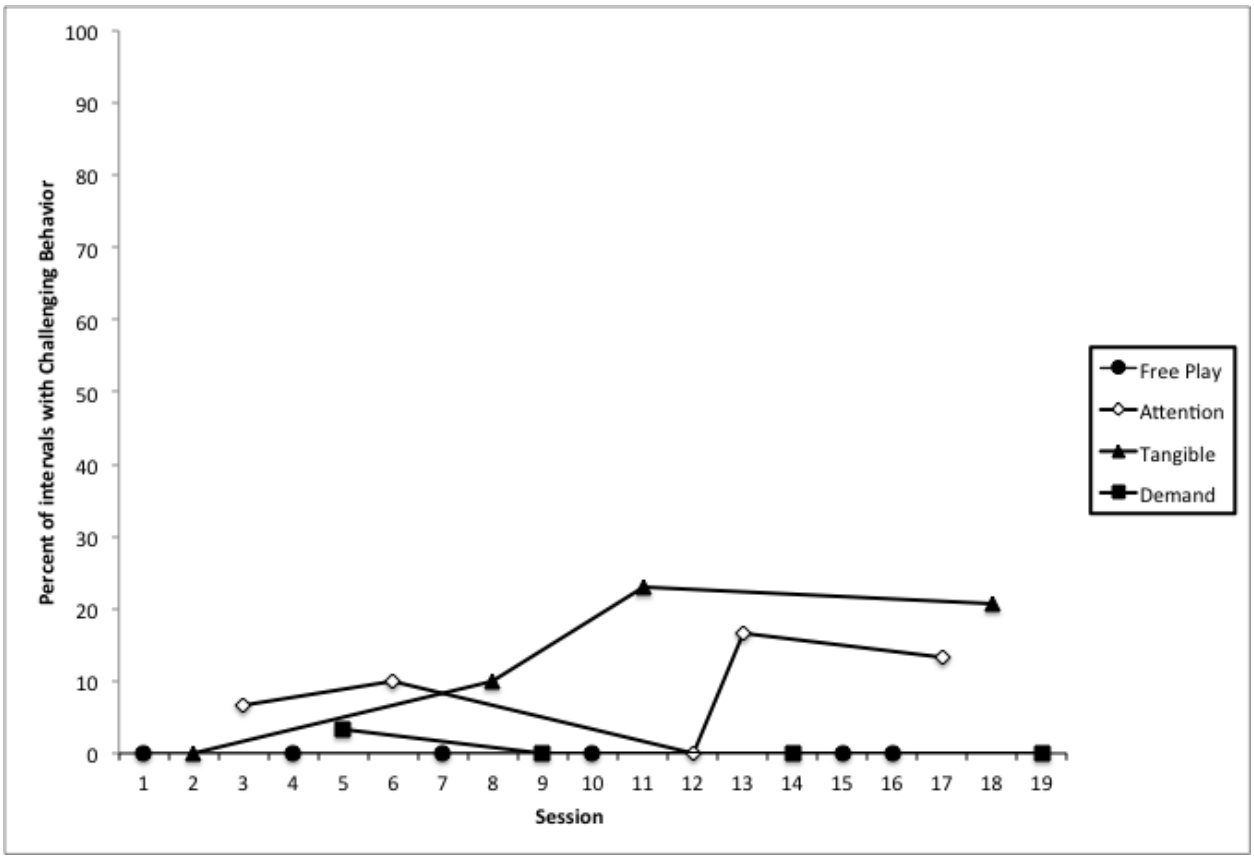


Figure 3. Functional Analysis results for Gabriel.

Trial based functional analysis. Gabriel's Trial Based Functional Analysis (TBFA) was implemented over the course of five, one-hour sessions occurring on five consecutive school days. An average of six trials were completed per session, ranging from five to seven trials in any one session. Results of the TBFA are depicted in Figure 4. Challenging behavior occurred during the highest percentage of trials in the tangible condition (80%). Challenging behavior also occurred in a single trial in the attention condition (10%). Behavior did not occur in the control segment of any trials across conditions. This indicates that Gabriel's challenging behavior was maintained primarily by access to tangibles. Ten successful trials were completed in each condition (i.e., attention, tangible, escape). Three failed trials occurred during Gabriel's TBFA,

one in each the attention, escape, and tangible conditions.

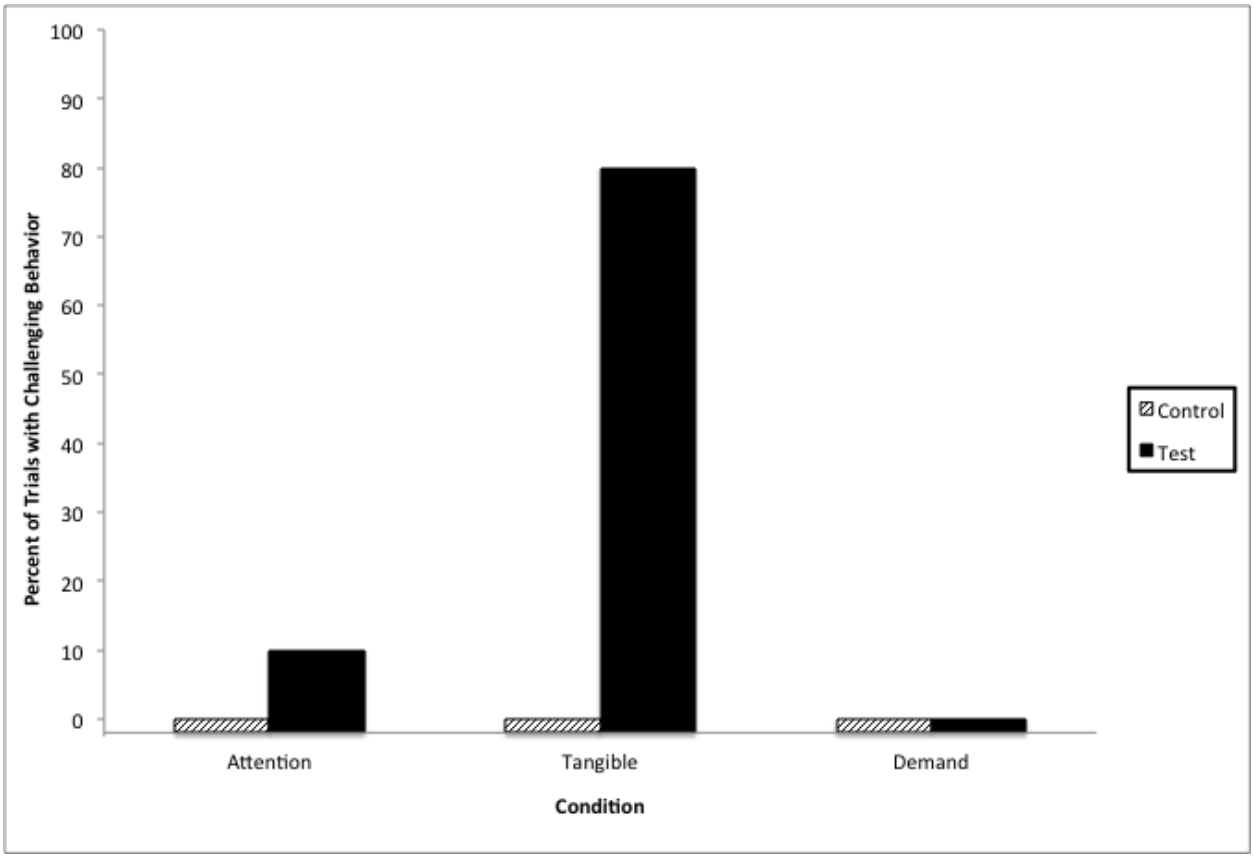


Figure 4. Trial Based Functional Analysis results for Gabriel.

Treatment evaluation. Results of Gabriel's treatment evaluation are depicted by percent of trials in which challenging, alternative, or desired behaviors occurred in Figure 5. The number of trials implemented within each session is represented by histogram on the secondary axis in Figure 6. An average of 16.7 (range = 11-25) trials were implemented across all sessions. In baseline phases, an average of 14.7 (range = 11-18) trials were implemented and in intervention phases, an average of 17.7 (range = 12-25) trials were implemented.

An immediate and significant decrease in the level of challenging behavior occurred following implementation of the functional communication training (FCT) based treatment package. During the initial baseline phase, challenging behavior occurred at high levels across four sessions (M = 88.4%; range = 78%-100%). Following an immediate decrease with the

introduction of intervention, levels of challenging behavior remained significantly lower than in baseline across five sessions (*M* = 14.7%, range = 5.6-23.1%). During the return to baseline conditions in session ten, there was an immediate and significant increase in the level of challenging behaviors that remained stable and at high levels (*M* = 96.9%; range = 93.8-100) across two sessions. When the final intervention phase was implemented, there was an immediate decrease in challenging behavior to similar levels as were observed in the initial treatment phase. Low levels of challenging behavior maintained for six sessions (*M* = 14.7%, range = 8-21.1%).

While challenging behavior was the primary target behavior, the frequency of alternative and desired behaviors were also coded. During the initial baseline phase, alternative behaviors (i.e., manding) occurred at zero levels. Desired behaviors (i.e., relinquishing access to preferred items or activities to peers or adults) occurred at low levels and on a stable and decreasing trend across four sessions (*M* = 11.6%, range = 0-22%. During the first intervention phase, there was an immediate increase in the level of alternative behaviors. Across the five sessions during the first intervention phase, alternative behaviors occurred on a decreasing and slightly variable trend (*M* = 48.2%, range = 13.3-76.2%), and desired behaviors occurred on a slightly variable and increasing trend (*M* = 41.5%, range = 19-66.7%). During the return to baseline, there was an increase in alternative behavior, which continued to increase across the two sessions of baseline and remained within the range of alternative behaviors seen in the initial treatment phase (*M* = 38.4%; range = 31.3-45.5%). Desired behaviors occurred at zero levels during the return to baseline phase. Upon return to the final treatment phase, there was an immediate increase in the alternative behavior, which remained high but with some variability across the five sessions in this phase (*M* = 54.5%, range = 37.5-80%). An immediate increase in desired behavior was

observed when the treatment package was implemented in the final treatment phase, and data was variable across the five sessions of this phase (*M* = 42.9%, range = 15-64%).

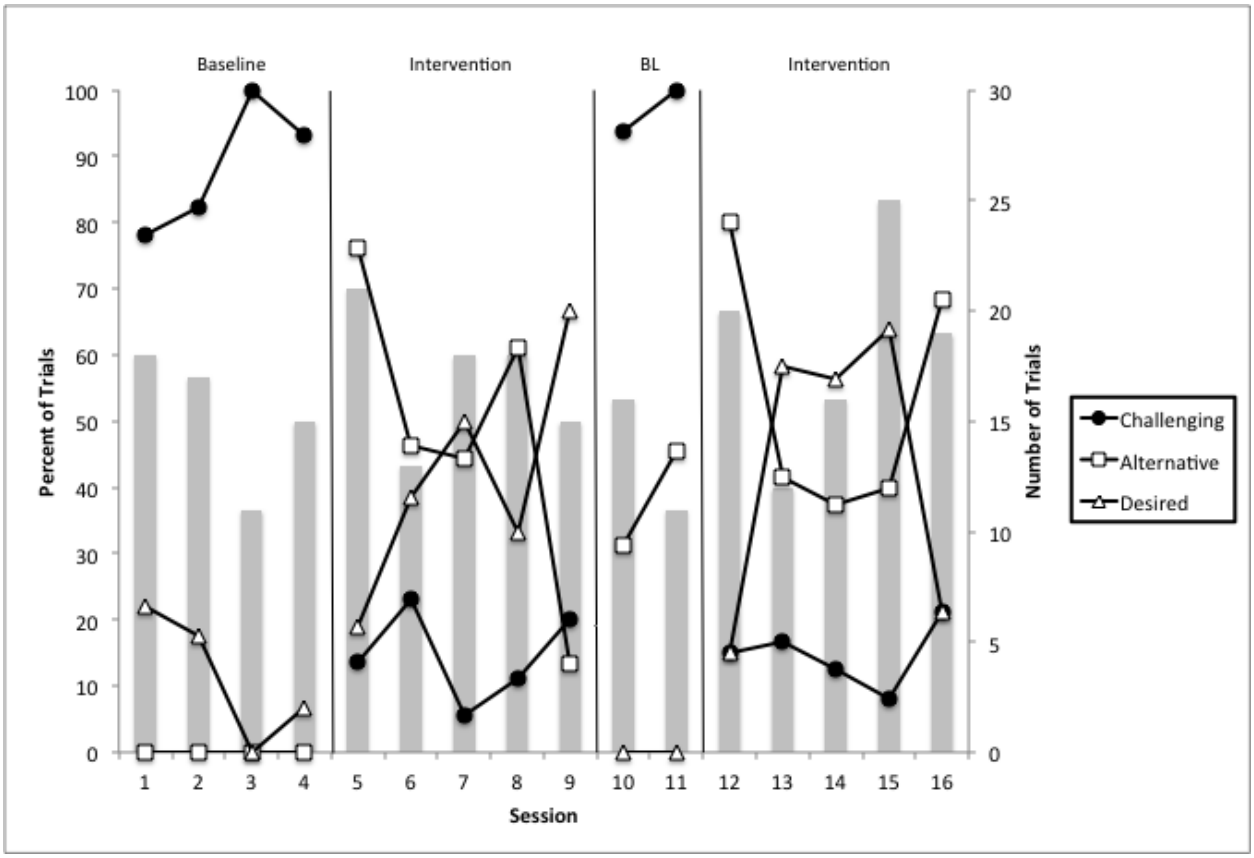


Figure 5. Treatment evaluation results for Gabriel, displayed by percent of trials in which behavior occurred.

As a secondary analysis of challenging behavior, partial interval recording was used to determine whether changes in behavior were occurring outside of the presentation of the establishing operation within trials. This data is depicted in Figure 6. During the initial baseline phase, challenging behavior occurred in an average of 30.4% of intervals (range = 22-38.1%), and was on a stable and slightly decreasing trend. When the FCT based treatment package was introduced in session five, there was an immediate decrease in challenging behavior, and the level of behavior remained low and stable (*M* = 8.2%; range = 2.3-14.2%). There was an immediate and substantial increase in challenging behavior when the intervention was removed in session ten and the return to baseline was initiated. Challenging behavior in the second

baseline phase occurred at high levels (*M* = 41.6%; range = 34.2-48.9%) compared to treatment and to the initial baseline phase, but was on a decreasing trend across the two sessions. There was an immediate decrease in the level of challenging behavior upon the reintroduction of the intervention in session twelve, and challenging behavior remained low and stable across the second treatment phase at levels similar to those seen in the initial treatment phase (*M* = 10%; range = 6.1-16.3%).

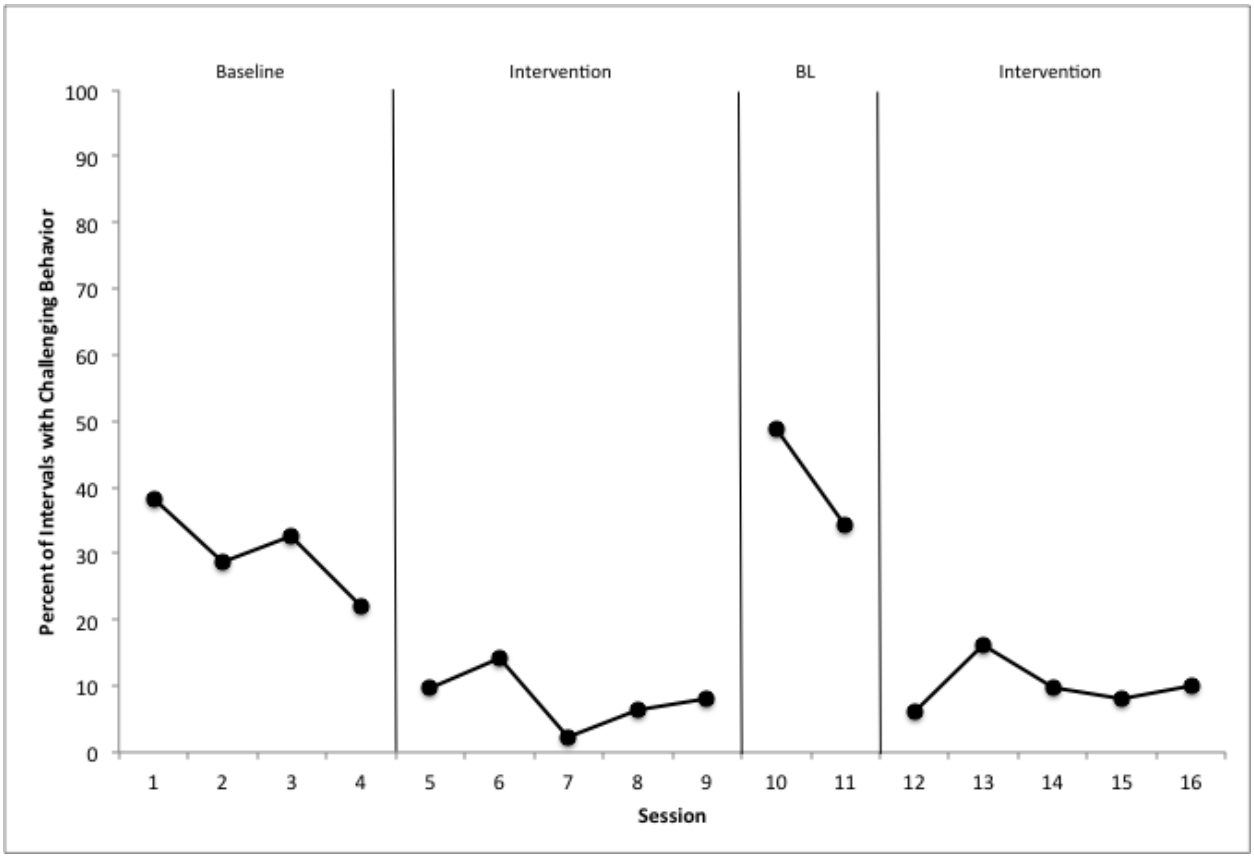


Figure 6. Treatment evaluation results for Gabriel, shown by percent of intervals in which challenging behavior occurred.

Dyad 2: Emily and Suhash. The results of the FA, TBFA, and treatment evaluation conducted to address Suhash's challenging behaviors are included in the following sections.

Functional analysis. The results of Suhash's FA are shown in Figure 7. Zero levels of challenging behavior were observed across all conditions included in the analysis. Results of the FA were inconclusive and no function was identified.

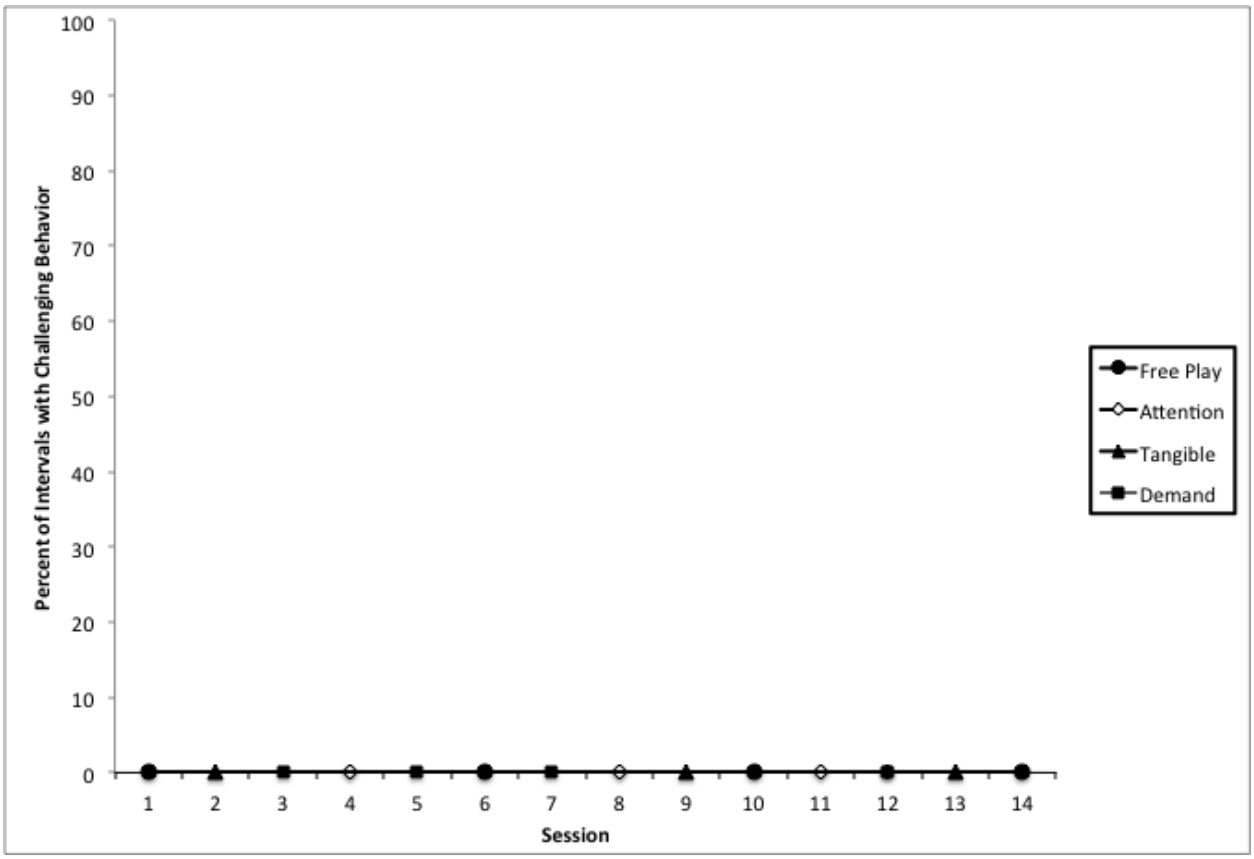


Figure 7. Functional Analysis results for Suhash.

Trial based functional analysis. The results of Suhash's TBFA are shown in Figure 8. The TBFA was implemented within roughly 40-minute sessions across eight school days. On average, four trials were implemented each day, ranging from two to seven sessions per day. Challenging behavior occurred during the highest percentage of trials in the tangible condition (80%), and in the demand condition (30%). Behavior did not occur in the control segment of any trials across conditions. These results suggest that Suhash's challenging behavior was primarily maintained by access to preferred activities, items, and routines. Results also indicate a possible secondary escape function. Ten successful trials were completed in each condition (i.e., attention, tangible, escape). Four failed trials occurred during Suhash's TBFA, two in the attention condition, one in the escape condition, and one in the tangible condition.

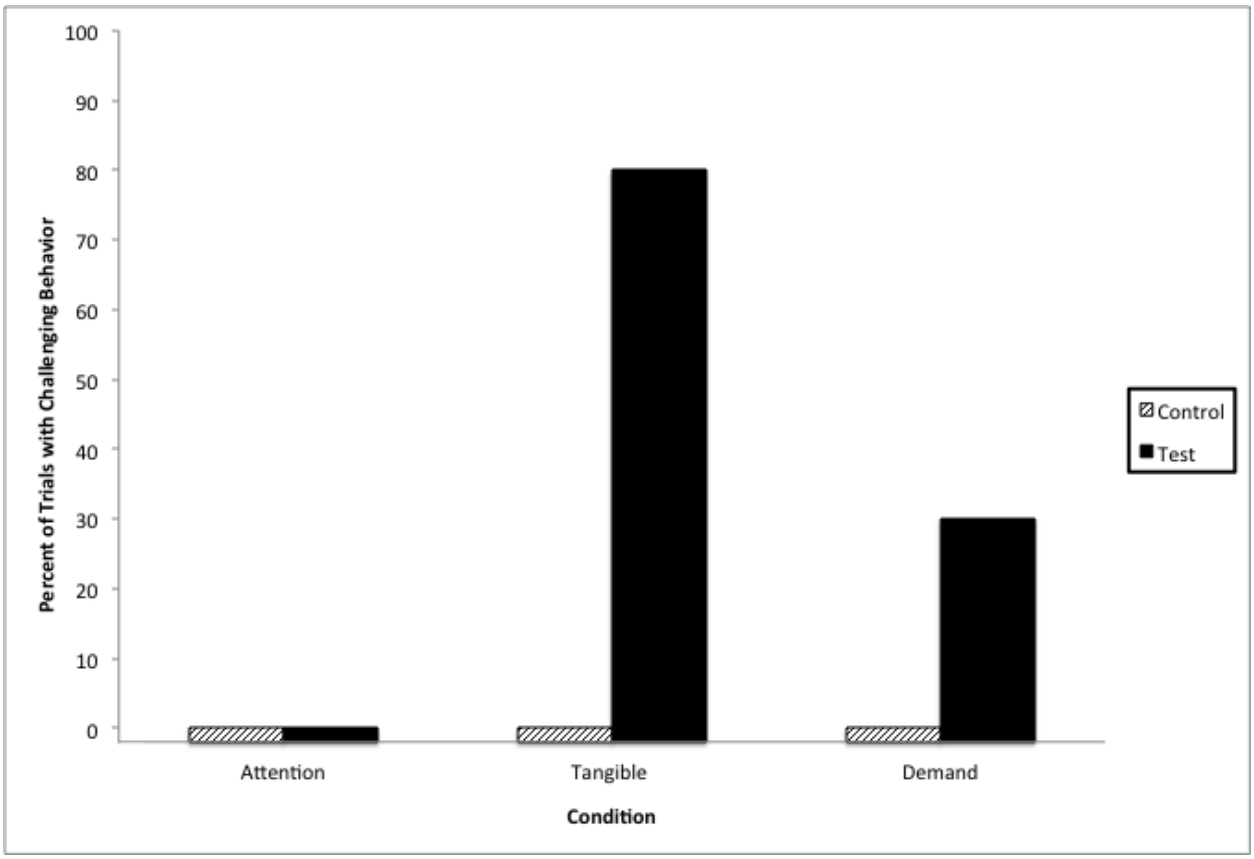


Figure 8. Trial Based Functional Analysis results for Suhash.

Treatment evaluation. Figure 9 shows the results of Suhash's treatment evaluation. An average of 18.2 (range = 8-48) trials were implemented across all sessions. In baseline phases, an average of 13.4 (range = 9-19) trials were implemented and in intervention phases, an average of 21.3 (range = 8-48) trials were implemented.

During baseline, challenging behavior occurred with high frequency following the presentation of the establishing operation within the trial. An immediate and significant decrease in the level of challenging behavior occurred following implementation of the FCT-based treatment package. During the initial baseline phase, challenging behavior occurred at high levels across five sessions (*M* = 71%; range = 57.1-81.8%). Following introduction of the intervention, there was an immediate decrease in challenging behavior with behavior occurring on a decreasing trend. Levels of challenging behavior remained lower than in baseline across six

sessions (*M* = 13.4%, range = 3.9-17.7%). During the return to baseline conditions in session 12, there was an immediate increase in the level of challenging behaviors and behavior remained stable and at high levels (*M* = 74.8%; range = 70.6-79%) across two sessions. When the final intervention phase was implemented, there was an immediate decrease in challenging behavior to similar levels as were observed in the initial treatment phase. Low levels of challenging behavior maintained for five sessions (*M* = 3.6%, range = 0-9.1%).

During the initial baseline phase, alternative behaviors (i.e., manding) occurred at low levels with some variability (*M* = 6.6%; *range* = 0-14.3%). Desired behaviors (i.e., tolerating interruptions from adults, relinquishing items without challenging behavior) occurred at low levels and on a slightly increasing trend (*M* = 22.3%, range = 15.4-28.6%). During the first intervention phase, there was an immediate increase in the level of alternative behaviors. Across the six sessions of the first intervention phase, alternative behaviors occurred on an increasing trend from sessions six through nine, and decreased in level in the final two sessions (*M* = 55.1%, range = 38.9-73.1%), and desired behaviors occurred on a slightly variable and increasing trend (*M* = 38.3%, range = 23.5-61.1%). During the return to baseline, there was an immediate decrease in alternative behaviors, which occurred at levels higher than in the initial baseline but decreased across the two sessions in the phase (*M* = 22%; range = 17.7-26.3%). Desired behaviors decreased with the reintroduction of baseline to levels similar to those in the initial baseline (*M* = 25.3; *range* = 21.1-29.4). Upon return to the final treatment phase, there was an immediate increase in the alternative behavior, which occurred on an increasing trend in sessions 14 through 16, and then decreased in the final two sessions (*M* = 66%, range = 44.4-83.3%). Desired behaviors occurred on a variable trend in sessions 14 through 16, and increased

steadily in the final two sessions (*M* = 36.5%, *range* = 20-66.7%).

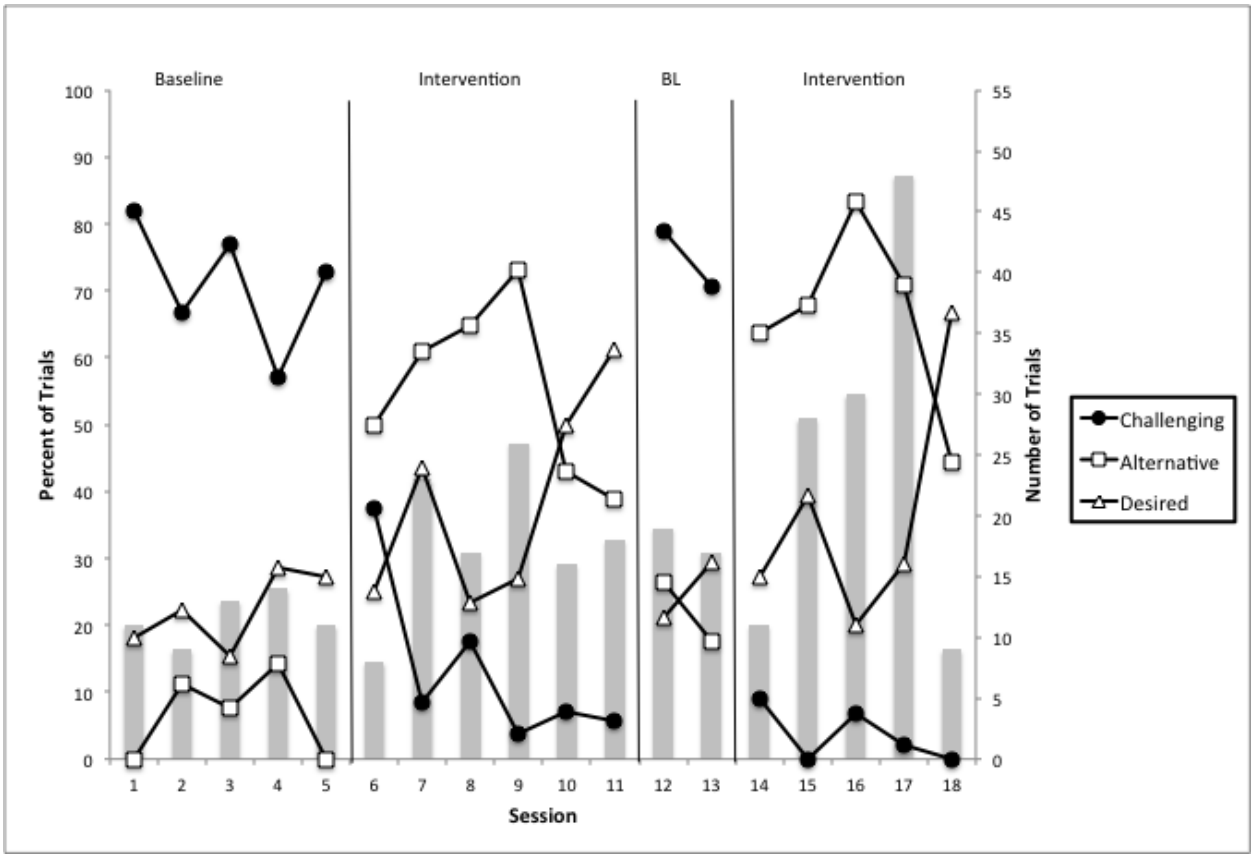


Figure 9. Treatment evaluation results for Suhash, displayed by percent of trials in which behavior occurred.

Figure 10 shows Suhash's challenging behaviors measured by percent of intervals. During the initial baseline phase, challenging behavior occurred in an average of 54.4% of intervals (range = 44-61.4%), and was on a stable and slightly decreasing trend. When the treatment package was introduced in session six, there was an immediate increase in challenging behavior that was followed by low but variable levels in the remaining five sessions (*M* = 13.4%; range = 3.9-17.7%). There was an immediate and substantial increase in challenging behavior when the intervention was removed in session 12. Challenging behavior in the second baseline phase occurred at high and stable levels (*M* = 74.8%; range = 70.6-79%). With the return to intervention in session 14, there was an immediate decrease in the level of challenging behavior to near zero levels and challenging behavior remained at low and stable levels (*M* = 3.6%; range

= 0-9.1%).

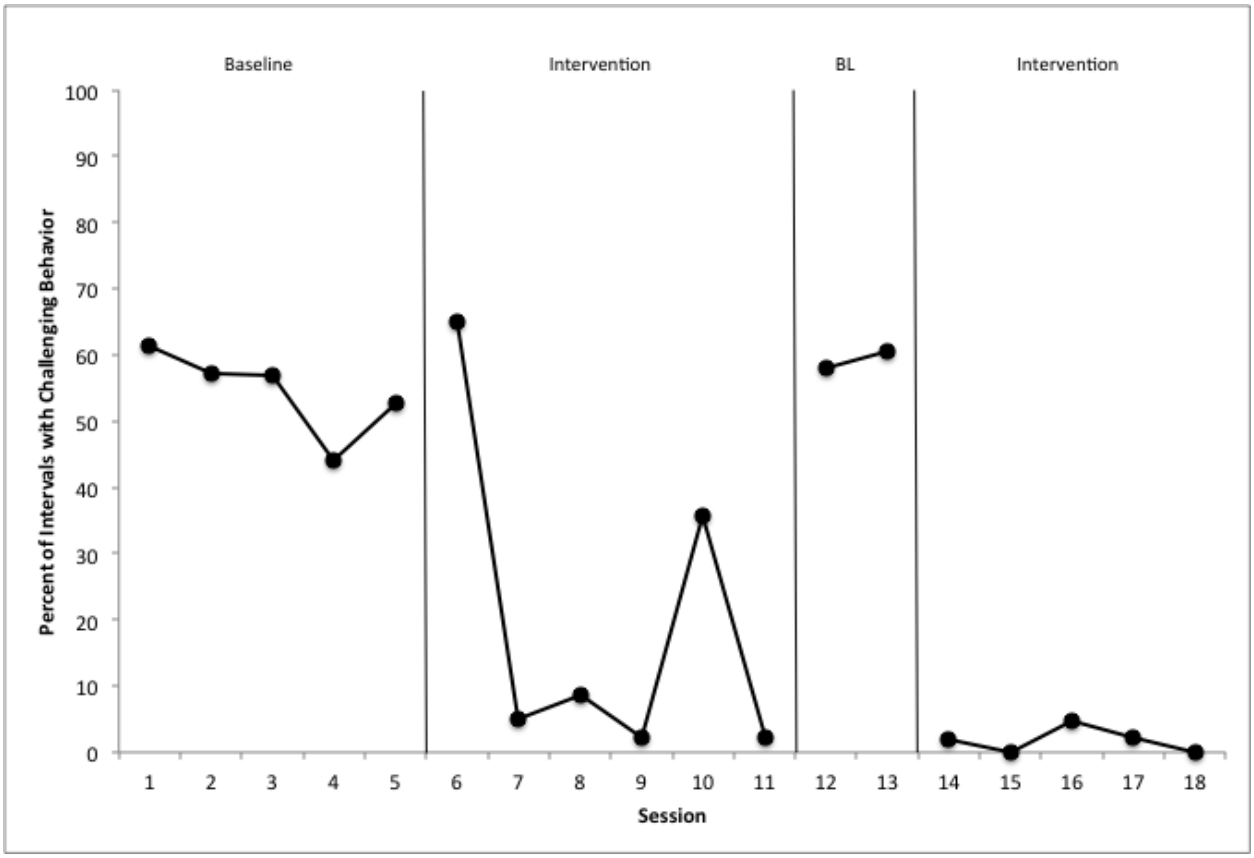


Figure 10. Treatment evaluation results for Suhash, presented by percent of intervals in which challenging behavior occurred.

Dyad 3: Nicole and Sebastien. The results of the FA, TBFA, and treatment evaluation conducted to address Sebastien's challenging behaviors are included in the following sections.

Functional analysis. The results of Sebastien's FA are shown in Figure 11. Elevated levels of challenging behavior were observed in both the attention (*M* = 15.3%; range = 10-23.3%) and in the tangible (*M* = 14.2%; range = 6.7-23%) conditions, as compared to free play. Challenging behavior occurred at elevated levels in a single session of the demand condition (session seven) but returned to zero levels in the following demand session and maintained at zero levels. These findings suggest that Sebastien's challenging behaviors were multiply maintained by tangible and attention functions.

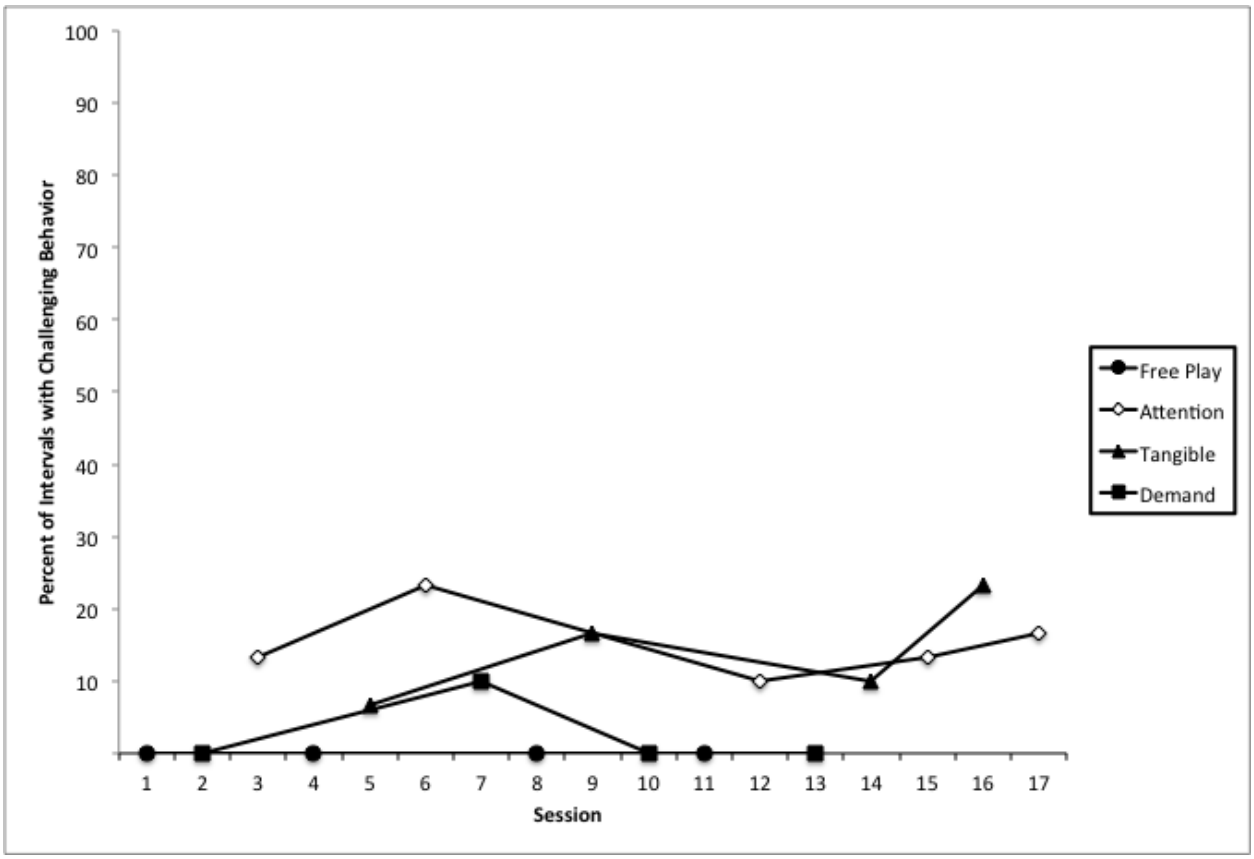


Figure 11. Functional Analysis results for Sebastien.

Trial based functional analysis. Figure 12 shows the results of Sebastien's TBFA. The TBFA was implemented within the classroom's free choice and snack routines, within two, ten minute sessions when staffing was available. On average, 4.7 trials were implemented each day, ranging from three to seven sessions per day. Challenging behavior occurred during the highest percentage of trials in the tangible condition (70%), and during a single trial in the demand condition (10%). Behavior did not occur in the control segment of any trials across conditions. These results suggest that Sebastien's challenging behavior was primarily maintained by access to preferred items and activities (i.e., the behavior served a tangible function). Ten successful trials were completed in each condition (i.e., attention, tangible, escape). Four failed trials occurred during Sebastien's TBFA, two in the attention condition, and two in the demand condition.

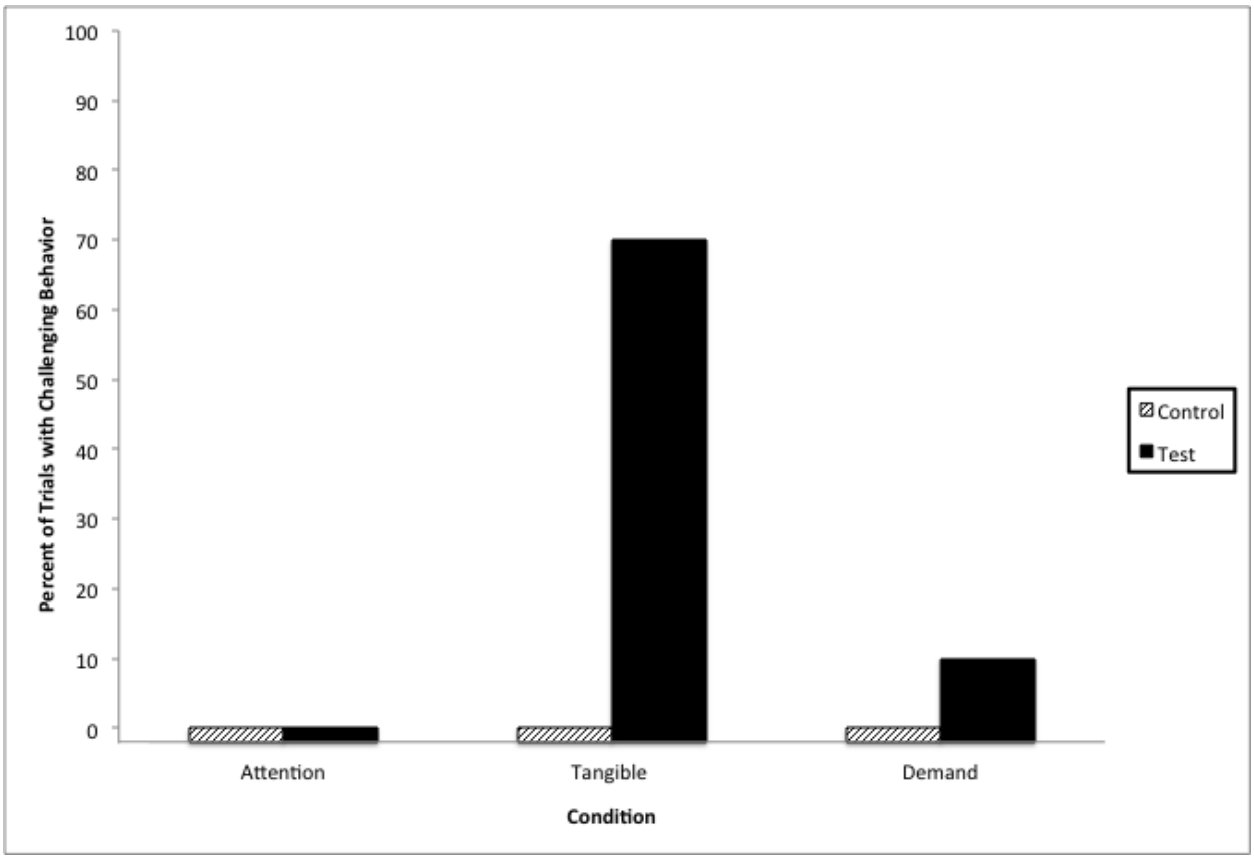


Figure 12. Trial Based Functional Analysis results for Sebastien.

Treatment evaluation. Figure 13 shows the results of Sebastien's treatment evaluation. An average of 22.1 (range = 15-34) trials were implemented across all sessions. In baseline phases, an average of 19 (range = 15-24) trials were implemented and in intervention phases, an average of 24 (range = 18-34) trials were implemented.

During the initial baseline phase, challenging behavior occurred at high levels across four sessions (*M* = 63.4%; range = 31.6%-75%). There was an immediate decrease in challenging behavior following implementation of the intervention, with levels of challenging behavior remaining at low levels across four sessions (*M* = 25%, range = 15.6-33.3%). When baseline was reintroduced in session ten, there was an immediate increase in the level of challenging behaviors to levels higher than those in the initial baseline. Challenging behavior occurred at high levels and on an increasing trend across the two sessions of the return to baseline phase (M

= 93.2%, range = 90.5 – 95.8%). There was an immediate decrease in the level of challenging behavior when the intervention was reintroduced, and challenging behavior remained at low levels with some variability across five sessions of this phase (*M* = 14.5%; range = 0 - 22.2%).

During the initial baseline phase, alternative behaviors (i.e., manding) occurred at near zero levels (*M* = 1.3%, range = 0-5.3%). Desired behaviors (i.e., relinquishing access to preferred items or activities to peers or adults) occurred at low levels with the exception of one session in which desired behaviors were substantially higher (68.4%) than observed in the other sessions where they occurred in an average of 26% (range = 25-26.7%) of trials. When intervention was implemented in session five, there was an immediate increase in the level of alternative behaviors, which continued to occur at high levels and on a generally increasing trend with some variability. Across the five sessions in the first intervention phase, alternative behaviors occurred in an average of 67.8% (range = 46.7-84.4%) of trials. Desired behaviors occurred on a slightly variable and decreasing trend at low levels (*M* = 21.9%, range = 5.7-50%). Upon the return to baseline conditions, there was an immediate decrease in alternative behaviors to zero levels, and desired behaviors continued to occur on a decreasing trend and at low levels (*M* = 6.9%, range = 4.2-9.5%). When intervention was reintroduced in session 12, there was an immediate increase in levels of alternative behavior, which remained stable across five sessions in the second intervention phase (*M* = 76.2%; range 66.7-81%). Desired behaviors in the return to intervention phase occurred at levels similar to those in the initial intervention phase, but with less variability (*M* = 17.1%; range = 5.6-24%).

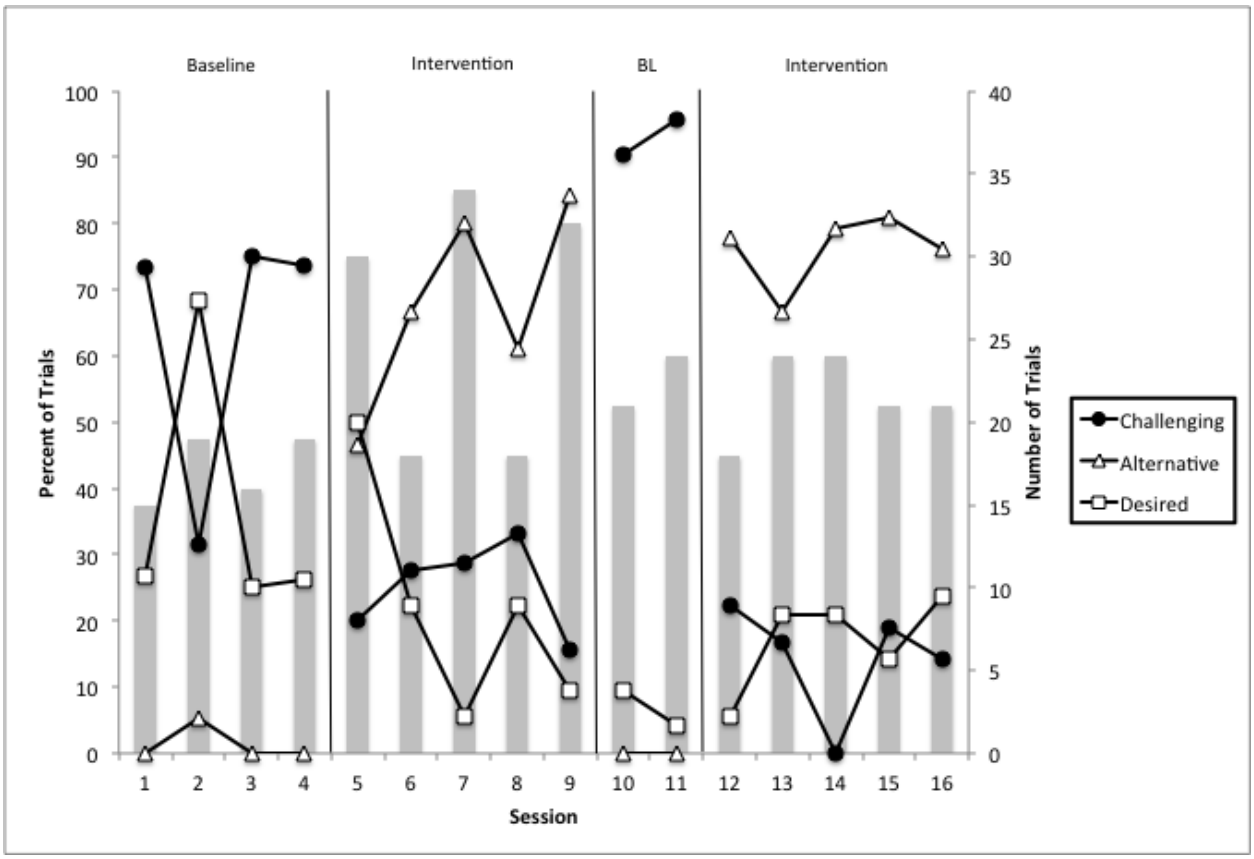


Figure 13. Treatment evaluation results for Sebastien, presented by trials.

In addition to trial data, challenging behavior was recorded separately using a partial interval recording system in order to determine the effect on challenging behaviors that occurred beyond the scope of the planned trials implemented within the intervention package (see Figure 14). During baseline, challenging behavior occurred on an increasing trend and in an average of 36.6% of intervals (range = 21.4-50%). There was an immediate decrease in the level of challenging behaviors following the implementation of the intervention, and challenging behavior occurred at low and stable levels across the first intervention phase (M = 20.7%; range = 14.8-25%). Challenging behavior immediately increased following the removal of the intervention and return to baseline conditions (M = 73.9%; range = 67.7-80%). While there was a decreasing trend in the return to baseline, the level remained high. When the intervention was reintroduced, there was an immediate decrease in challenging behavior from 67.7% to 33.3% of

intervals. Challenging behavior occurred on a variable but decreasing trend across the return to intervention phase (M = 16.3; range = 0-33.3%) and remained at levels similar to those observed in the initial intervention phase.

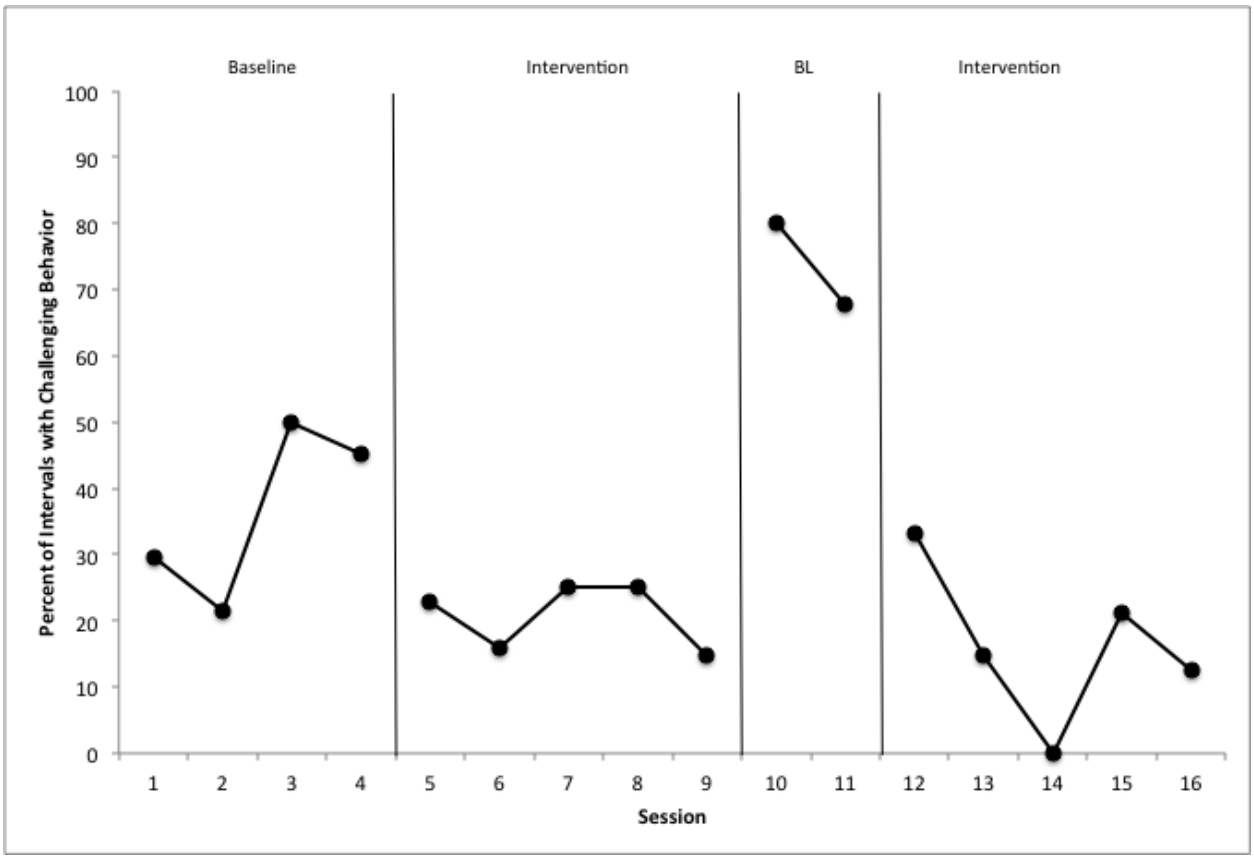


Figure 14. Treatment evaluation results for Sebastien, presented by percent of intervals in which challenging behavior occurred.

Social Validity. Social validity for the TBFA and the functionally relevant intervention was determined using Likert-style questionnaires that were based on the TARF-R (Reimer & Wacker, 1988; Reimers & Wacker, 1992) and adapted for use in this research. Items on the social validity questionnaires were categorized as being related to the acceptability, usability, or effectiveness of the procedures. Social validity results were calculated for general social validity, and for social validity across each category.

Because the focus of this research was on the experiences of the individual educators as they participated in functional assessment and intervention procedures, their responses to social

validity measures and their comments related to social validity are not reported anonymously (i.e., in aggregate). While anonymously reporting social validity is the norm in single subject research, educators' different responses as they participate in implementation appear to have important implications for the social validity of the TBFA. Additionally, educators' personal experiences are shared in great detail in the qualitative findings of this research and thus doing so with regards to social validity was not a violation of anonymity for the purposes of research. Social validity results for both the TBFA and the functionally relevant intervention are shared below.

***Trial based functional analysis*.** Social validity results for the TBFA were variable across participants (see Figure 15). Emily felt that the TBFA was effective and acceptable, but that it was difficult to implement alongside her typical responsibilities in the classroom. Catherine found the procedures to be acceptable, effective, and usable in her setting (a self-contained special education classroom). Nicole's ratings on the questionnaire were lower; while she reported that the TBFA was effective, she was neutral about the acceptability of the procedures, and felt that it was difficult to implement within classroom routines.

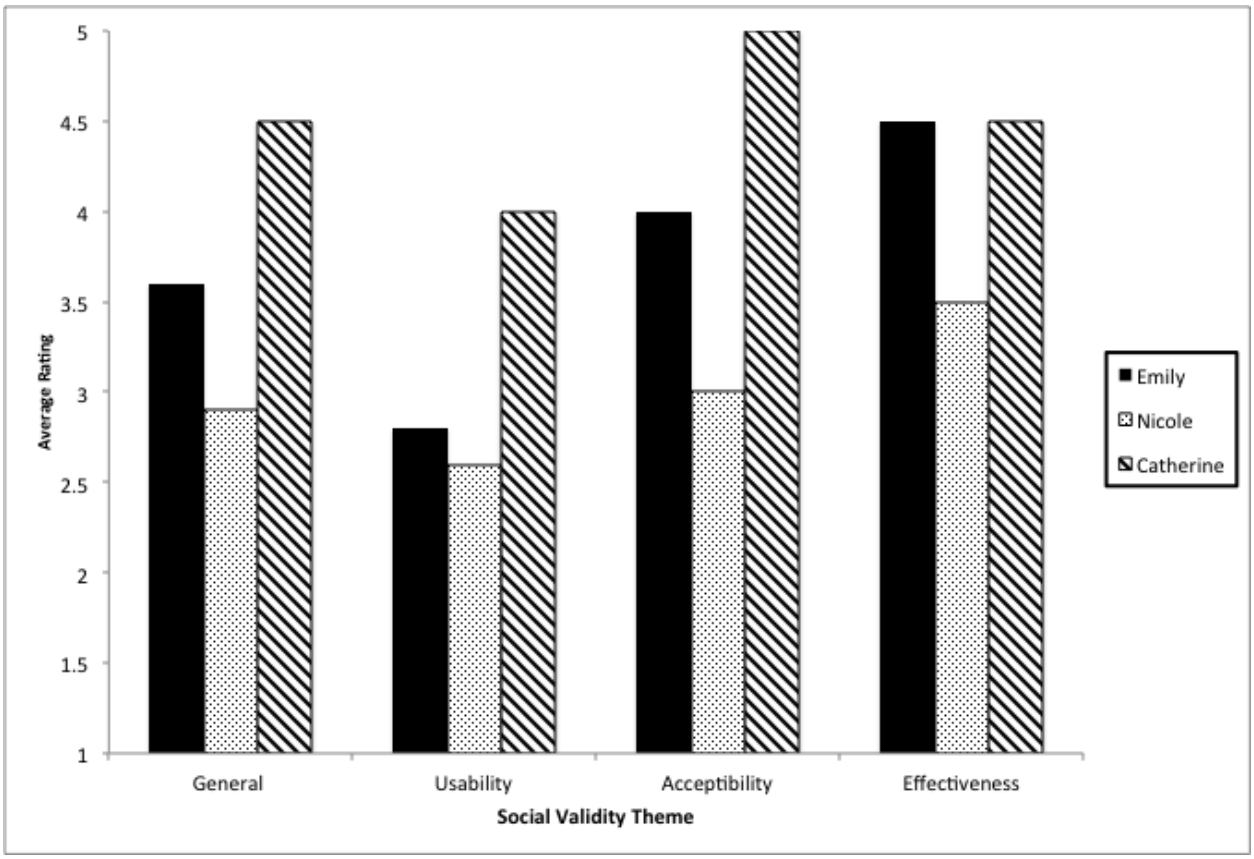


Figure 15. Social acceptability results for the Trial Based Functional Analysis, presented by social validity theme.

Two additional items were included in the questionnaire that were related to the student participants. First, educators were asked to rate the seriousness of the students' behavior in order to gauge the social significance of addressing that behavior. Nicole and Catherine responded to this stating that they were neutral, indicating that the students' behaviors were not more severe than those of other students in their classroom. Emily strongly agreed with the statement that the target students' behaviors were more severe than those of other students. These responses may have had implications for the level of social validity in that the need for intervention may have been greater in Emily's classroom. Second, educators were asked to reflect on whether they thought that the target student experienced discomfort during the implementation of the TBFA. Both Emily and Catherine stated that their students experienced discomfort. This was most likely

related to the process of evoking and reinforcing challenging behaviors during the TBFA. Nicole responded that she did not agree or disagree with the statement.

Educators were asked open-ended questions about the social validity of the TBFA during semi-structured interviews. Their statements about acceptability, effectiveness, and usability of the TBFA generally correlated with their responses to the social validity questionnaire.

Emily felt that the TBFA was effective, saying in her second interview (before intervention) that it was "beneficial because it outlined the different areas to look for in terms of what is triggering the behavior." After the intervention was implemented, she shared that she did not believe that she would have been able to implement the intervention without having implemented the TBFA herself because it "painted the picture that gives you the background information that you need to know why this intervention was created." Emily's statements also indicated that she felt the TBFA procedures were acceptable, and said that she "would definitely use it again" in her second interview. While Emily had indicated on her questionnaire that she felt that Suhash experienced discomfort during the TBFA, she stated in her interview that the procedures were not outside of her typical interactions with him in the context of the classroom: "Nothing I did today is something I wouldn't do with Suhash or any student because that is my job as a teacher is to guide [the students] to learning the objective." In line with her responses on the social validity questionnaire, Emily discussed the difficulty of implementing the TBFA while attending to her typical classroom responsibilities. She said, "I honestly do feel guilty about the time that it took away from my small group." Emily attributed her ability to implement the TBFA successfully to the presence of other adults in her classroom, saying, "it felt doable with this particular class and the particular time of day because I had so much other adult help in my classroom." She also explained how she would implement the TBFA in the future, indicating that

it would be more doable dispersed across the day instead of implemented within a single activity: "I think if I had the whole day and I was just doing it off and on when the rest of the kids were fully independent for that short period of time it would be doable." This response indicates that the value of the TBFA may have outweighed the adverse implications for implementation.

Catherine's statements about the effectiveness of the TBFA indicated high acceptability of the procedures, just as her responses to the questionnaire did. She felt that the TBFA helped her understand the challenging behavior, saying, "I definitely think it was helpful because now we know what the things are that push his buttons." Her comments in interviews also aligned with her responses on the questionnaire related to usability, but she emphasized that the TBFA was usable because she was only responsible for a small number of students: "The amount of time worked and we made it work. I have a more flexible schedule because I only have one student." While Catherine's responses to the questionnaire indicated that she found the TBFA to be acceptable, her statements during interviews suggested that she was uncomfortable with some of the procedures. Discussing the tangible condition, Catherine said, "the thing is, that's not normally how I roll. So that's hard and he's probably not used to me doing that." Finally, Catherine's indication on the questionnaire that the student experienced discomfort during the implementation of the TBFA was reflected in her interviews. She said, "it's been hard to see the behavior get worse again, but I know we're trying to get him back into kindergarten so I think it's worth it to have a blip if we can get back to where we want to be."

In interviews, Nicole's comments related to social validity were varied and shifted over the course of the research. It is important to note that Nicole did not implement the TBFA in its entirety, and that the researcher implemented the majority of trials. Also, Nicole had limited classroom experience, which was entirely within a school where there was extensive behavioral

support available on site. Following the TBFA, she was not sure that the assessment was effective. When asked if it was helpful, she said, “I don’t know yet,” and in that same interview she stated that she did not agree with the findings of the TBFA. When reviewing the data from the assessment, which indicated a clear tangible function, she said, “I think it’s attention too.” In later interviews, after the intervention had been implemented and resulted in a decrease in challenging behaviors, she described the TBFA as being effective in identifying the cause of the challenging behavior, saying,

> It was helpful to figure out what exactly caused his challenging behaviors. Like I think that was helpful. I feel like it was helpful to kind of come up with a treatment plan. That was really helpful and I saw a really clear difference.

In her second interview, Nicole reported that the TBFA procedures were difficult to implement within the context of her classroom, suggesting that she felt that the TBFA was not reasonable for use in the classroom.

> I think that [attending to my regular job responsibilities] was really difficult… it didn’t seem like it was really reasonable with being able to – like, I have 15 other kids that I’m looking at and I’m trying to teach and lead circle and make sure that IEPs are happening… all those other things were kind of hard to do at the same time.

While this statement reflects low usability, similar to Nicole’s responses to the questionnaire, her discussion of the TBFA procedures shifted to reflect a more positive view of the process following the successful intervention. In her third interview, Nicole stated that the TBFA “was reasonable – the amount of time [was reasonable]” and suggested that if Sebastien was in a different classroom that included fewer students who engaged in challenging behaviors it would have been more usable. She said, “We have so much going on in our afternoon class. I feel like if

Sebastien was in our morning class we would have gotten through it a lot quicker. We have a really high need afternoon class." Nicole's statements indicated low acceptability and usability of the TBFA across the entirety of the research. Her comments related to acceptability were primarily focused on the incongruence between her goals as an educator and the process of reinforcing challenging behaviors. For example, in her second interview, she said,

> I think just the way I would interact with Sebastien [during the TBFA] is not the way that I would normally interact with a kid. So like giving – like when he screamed – giving him [a toy back]… and that's not how I would follow through typically with a kid. So I think that was really challenging for me to be able to separate – ok, this is what we're doing. Like, this isn't you being a teacher right now, you know?

Much like the other educators in this research, it appears that there was an important link between the social validity of the TBFA and the results of the intervention. Once students' behaviors changed, their attitudes towards the TBFA tended to become more positive.

***Functionally relevant intervention*.** Across the three educators, treatment acceptability ratings were somewhat variable (see Figure 16). Emily's responses to the questionnaire indicate very high ratings of the effectiveness, usability, and acceptability of the intervention. Catherine's responses suggest high ratings of effectiveness, and acceptability, but moderate ratings related to usability. She agreed that there were disadvantages with the intervention, and with the statement that the intervention would interfere with classroom routines. Finally, Nicole's responses indicate moderate ratings across categories, with the lowest social validity related to the effectiveness of the intervention. She did not agree or disagree with six of the 15 items, and disagreed with the statement, "I am willing to alter my daily routines to implement this intervention," implying that sustained implementation was not likely to occur.

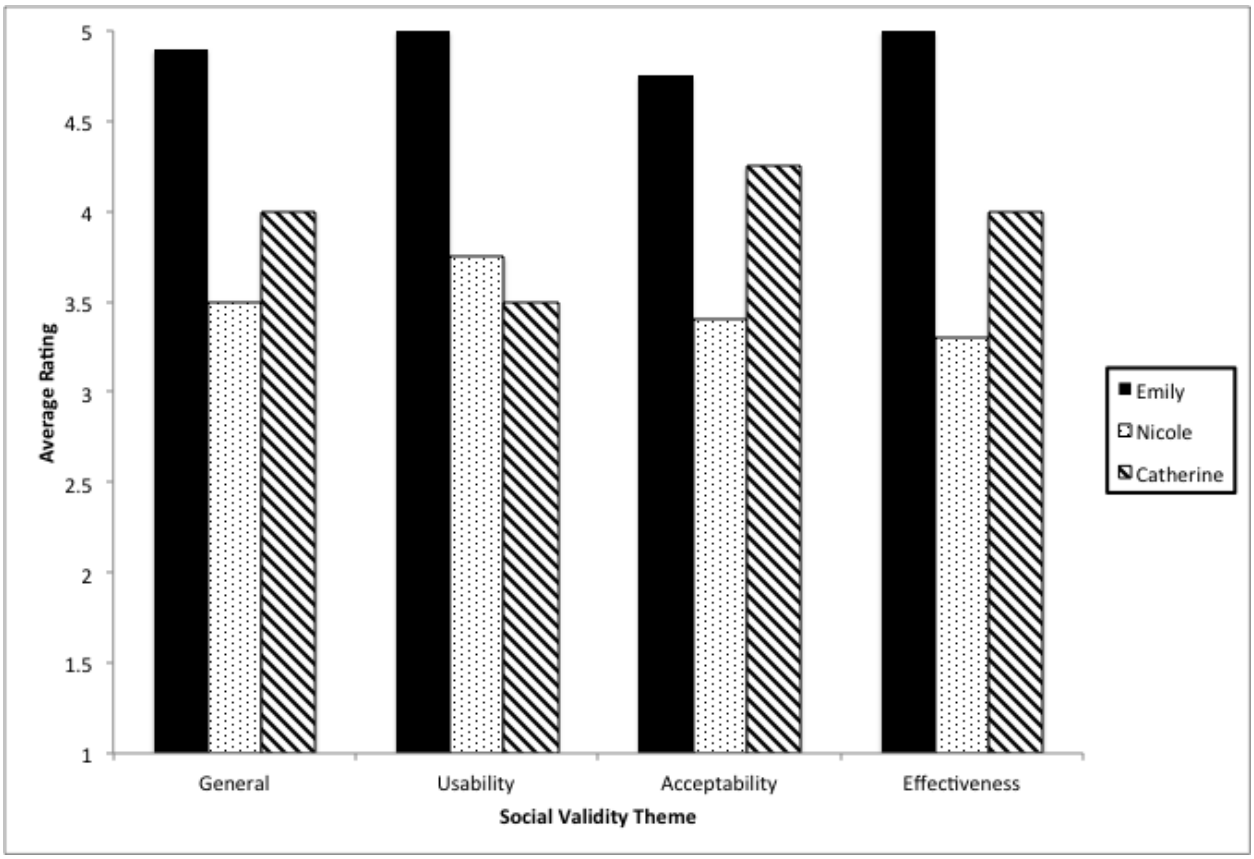


Figure 16. Social acceptability results for the functionally relevant intervention, presented by social validity theme.

Emily's high treatment acceptability ratings, compared with somewhat lower ratings from Catherine and Nicole correspond with the effects of the intervention. Of the three students, Suhash's behavior decreased most significantly with intervention. While the implementation of the intervention resulted in decreased levels of challenging behavior for Catherine and Nicole's students, the behavior continued to occur at low levels.

Educators' statements throughout the second and third semi-structured interviews (after the implementation of intervention) reflect the findings from the treatment acceptability questionnaires. Emily made several comments related to the effectiveness of the functionally relevant intervention as it related to Suhash's challenging behavior. For example, in her third interview she talked about changes in the frequency of the challenging behavior and the impact of these changes on Suhash's general demeanor at school: "he just seems more happier and

going with the flow than he has before. So I feel like we have better longer stretches of time here he's not showing his challenging behavior." She also discussed the decreases in severity of the challenging behaviors compared to before the intervention, saying,

> I think that especially with the amount of times that he would just try to escape and leave the room and there was that phase where he was climbing the door to get into [the special education teacher's] room. I really don't feel that it gets to that level very often. He tends to stay with us. And if he does leave again, it's a quick turn around. He comes pretty much back in.

Also related to the effectiveness of the intervention, Emily reported that the intervention had positive effects on Suhash's desired behavior (i.e., following instructions and being flexible). She shared, "in terms of earning his stars, I feel like he does earn them pretty well now and I noticed that he seems more flexible with doing [activities] the modeled way." Emily's comments also indicated high acceptability of the intervention, as she commented on the general changes in her classroom: "I feel that the whole classroom seemed calmer – that the energy didn't get disrupted." Finally, Emily's comments around the sustainability of the intervention indicate high usability. For example, when asked if she would continue to use the intervention, she said, "definitely. Especially because [Suhash] asks for it, too. Like, if we're not doing it, he asks for it. And I think that you can easily pass it on to the next teacher." She also reported that she felt successful implementing the intervention, and stated that it was "easy to implement." These comments correlate with the findings of the treatment acceptability questionnaire.

Catherine's comments also generally reflected her responses on the questionnaire, which indicated moderately high perceptions of the social validity of the functionally relevant intervention. Her responses suggested that she found the intervention to be acceptable and

effective. In her fourth interview, she said, “I think, you know, he’s been transitioning way better. And he comes in and gets started. You know, he finishes his work. He enjoys when other students come in – he interacts with them appropriately.” Throughout sessions when the intervention was being implemented, Catherine expressed concern over allowing continued access contingent on Gabriel’s alternative behaviors (e.g., asking for more time). Anecdotally, increases in challenging behavior during the sixth and ninth sessions of the initial intervention phase in the treatment evaluation were directly related to the failure to reinforce mands for sustained access. This is also reflected in her discussion of the acceptability and usability of the intervention. In her third interview, she said, “I don’t mind if it’s you know, changing something slightly so he can get [access to preferred items] right away, but I think the challenging part is he could be doing it for half an hour and I’m like, ‘OK.’” This comment is also related to her ‘disagreement’ with the questionnaire item related to whether she would be willing to alter her routines to implement the intervention in her classroom.

Of the three educators, Nicole’s responses to the questionnaire indicated the lowest levels of usability, effectiveness, and acceptability of the intervention. During interviews, she did not speak to the acceptability of the intervention procedures, but she did comment on usability. She shared that the felt it may not be a sustainable intervention in her classroom, saying, “I think that sometimes we can and sometimes we can’t prime,” and “we’re not always going to be able to honor everything but we will try to honor him when he is using [the mand].” This was also reflected in intervention sessions, when Nicole and the classroom staff decided not to use the intervention when Sebastien transitioned to the restroom, instead relying on previous strategies of having him bring items with him when he transitioned. Interestingly, Nicole’s responses on the social validity questionnaire that were related to the effectiveness of the intervention did not

correspond to her comments in interviews. Her responses on the questionnaire suggested that she neither agreed nor disagreed that the intervention was effective in addressing her student's challenging behaviors. However, her comments about the effects of the intervention indicated that she felt it was effective. For example, in her fourth interview, she said, "I feel like we have a better idea about how to support Sebastien in the classroom." And when asked about how Sebastien's behavior was, compared to before intervention, Nicole stated, "I feel like it's definitely improved. I feel like it's a lot better." Nicole also spoke to specific changes in Sebastien's behaviors, saying, "I feel like it is working because I do see him using his words and going to that before screaming, which is really cool." Finally, and also somewhat in contrast to her responses on the social validity questionnaire, Nicole shared that the intervention had broader implications for Sebastien in the classroom. She said, "I see him interact with kids more, I think. Which is really cool." Nicole's comments should be considered with the understanding that she was minimally involved in the implementation of the treatment evaluation phase of this research, and that she had limited classroom experience at the time of this research. It should also be noted that the classroom team adopted the intervention for use in the classroom following the end of research activities.

Chapter 4

Qualitative Findings

Research Question 2: Educator Perspectives on Working with Challenging Behavior

The purpose of this qualitative analysis was to explore shifts in educators' perspectives related to working with challenging behaviors as they participated in the implementation of the trial based functional analysis (TBFA) and subsequent treatment evaluation. Findings indicate that when working with students who engage in challenging behaviors, educators' agency (i.e., feelings that they are able to control and thus able to affect change in students' behavior) may be positively influenced by their experiences in implementing assessment and successful interventions for their students. In order to add confidence to the qualitative findings of this research, educators completed pre- post- questionnaires. Findings from these questionnaires generally support qualitative findings and can be seen in Appendix K.

During each of the interviews that she participated in across the scope of this research, Catherine shared some version of the following statement:

> I always say to people, I really think anybody could teach, but its not like anybody can deal with challenging behaviors and really you have to be able to deal with the challenging behaviors to be able to teach.

Catherine's statement, and her reiteration of this sentiment speaks to the impact of challenging behaviors on educators' ability to teach, but perhaps more important is the question that it raises: how does an educator become 'able to deal' with challenging behaviors?

Educators' development of agency occurred in three ways as they participated in this research. They developed an understanding of the rationale for strategies that they had previously used, which increased their ability to be successful in their implementation of those strategies. The educators also experienced shifts in their beliefs about the causes of challenging behavior as they identified function and successfully implemented intervention. Finally, educators' comments reflected that they began to find power in the lawfulness of behavior. In other words, educators began to see challenging behavior as predictable, which increased their feelings about their abilities to be proactive as they worked with challenging behavior within their classrooms. Findings related to each of these themes are shared below.

Understanding the rationale for common strategies. While the educators reported having a multitude of strategies available to them, they also reported that these strategies were only intermittently effective in addressing challenging behaviors. They shared that this was frustrating and as Emily stated, resulted in feelings of "helplessness." Describing attempts to address Sebastien's behaviors, Nicole shared, "there was a whole lot that we tried – lots of things didn't really make a difference, which was hard." Similarly, speaking about Suhash's challenging behaviors at the start of the school year, Emily shared, "We had no plan, like what's going on? And so then I think because we were at a loss of what to do, that we weren't being consistent in how we were intervening."

As they progressed through the phases of the research, Emily and Catherine reflected on why the strategies they had used previously had not been effective. Catherine had been using a token economy at the start of the research, and that intervention strategy was incorporated into the FCT-based treatment package that was implemented for Gabriel within the treatment evaluation. She said, "you know, I've had a star chart. But I didn't really – I was just saying, you

know, ‘here – you’re listening, you’re following directions - you know, you get a star.’ But now I have it more specific, I think that really helps.” Emily also talked about the token economy when she reflected on past strategies, sharing,

> I can see the difference because we weren’t specific on how he’s earning his star, right? … So like it could be anything, and then he doesn’t have that specific goal but he’s working towards it… So I think that’s why it wasn’t working in the fall – because we had so many different variables for what he was earning them for and he didn’t know what he was [getting] them for or sometimes he got them and sometimes he didn’t…

In contrast, Nicole did not necessarily reflect on flaws in previous implementation of strategies, but she did compare the intervention used in this research to previous strategies related to the function of the behavior. She stated,

> I think that something that I usually [did] is – kind of judging like is this the time to follow through or is this the time to just let the kid chill, and, like being able to make that call. But this is a little bit different, because we actually took the behavior that we wanted to change and figured out a way to kind of shape [the topography of the behavior] in the classroom.

This statement seems to indicate a potential shift from a reliance on non-functionally relevant consequence strategies that Nicole had previously described relying on (e.g., time out, physical pressure), towards an appreciation for more proactive teaching interventions such as the functional communication training that was implemented as part of this research. It is important to note that Nicole did not use the term “shaping” as it is typically used in the behavioral lexicon. Throughout the research, she referred to the process of teaching a functionally equivalent response to replace the challenging behavior as “shaping.”

All three educators described their use of strategies that are commonly associated with functionally relevant interventions (i.e., reinforcing requests for breaks or access to preferred items), but they did not appear to understand the rationale for implementing these strategies (i.e., functional equivalence) prior to participating in this research. Catherine, reflecting on how the intervention implemented for Gabriel (i.e., FCT for retained access to preferred items and activities) was different from previous strategies she'd used, said, "I've known about 'more time' but then you realize, you know – [the TBFA] kind of brings you back to like why are you using that and you know, how can you use it." Similarly, Emily had been honoring Suhash's requests for breaks without fully understanding the rationale for doing so, which was problematic considering that his challenging behaviors were tangibly maintained and not escape maintained. She shared, "I'd always hear that when they asked for a break to give them a break so we would just give him a break." She also tied this strategy of giving breaks to her uncertainty around working with challenging behavior, saying that "I think we were just so uncertain as to what was triggering it so when he said he wanted a break – oh well then we're going to give you a break, right?" While Nicole often tied challenging behaviors to social functions (i.e., tangible, escape, attention), her description of strategies did not appear to be functionally relevant. For example, she described one student's behaviors as serving an attention function, and named providing a break (i.e., escape) as the strategy used:

> His challenging behaviors would be very attention seeking. So he really wants to earn teacher time because he really wants that adult attention. He wants an adult. So I guess I'll see [the challenging behavior] starting and I'm like, 'it looks like you're frustrated, you can take a break…'

Access to functionally equivalent outcomes is an important element of functionally relevant interventions. It is important that educators understand the rationale for these interventions in order to design and implement effective interventions.

Once educators had progressed through the implementation of the TBFA and the treatment evaluation, their language highlighted the importance of understanding students and their behaviors. One example of this is seen in Emily and Catherine's reflections on the understanding that they gained through implementing the TBFA. Catherine described the relative advantage of implementing the TBFA herself rather than having outsiders make recommendations for strategies to implement in her classroom. She said,

> You know, when I've done other [functional] assessments I haven't really been a part of it. So it's kind of nice to be a part of it. I think somebody comes in and they just kind of observe and they'll ask me a few questions but not like this. Being a part of it – it makes [strategies] more helpful, I think, and more understandable about the situation and what the needs are of the kids.

She later reiterated the importance of the understanding that she'd gained through participating in the implementation of the TBFA and subsequent intervention: "It's really helpful to understand why they're doing it so that I can anticipate and plan ahead for triggers and know what to expect." Similarly, Emily shared that she did not think that she would have been able to implement the intervention package for Suhash without first implementing the TBFA. When asked if she would have been able to implement the intervention if someone else had conducted a functional assessment, she replied,

> No, I don't think so because [the TBFA] painted the picture that gives you the background information that you need to know - why this intervention was created. Like, what's the backstory to it? Why is this going to work?

The importance of understanding the rationale for interventions, and the behaviors that intervention strategies are meant to address was an important perspective shift for the educators in this research.

One way that Emily and Catherine reflected on their use of strategies prior to understanding the rationale for those strategies was in relation to the sustainability of the behavior change. Both Emily and Catherine lamented the momentary effectiveness of their previous strategies. Catherine said,

> You know, I mean, its just like kind of like trying to fix it at the moment. Not really getting to the point of what the problem is, and you know, these are the steps to fix that. So it was just kind of like, here – try this – use this. Not really, this is the reasoning.

Emily shared a similar sentiment when reflecting on her ability to affect permanent or long lasting behavior change for her students. As she discussed seeing her former students continue to engage in challenging behaviors as they progressed through elementary school, she said:

> I see the students that I've had with what I consider challenging behaviors and see that they're still doing them in the other grades. So it's one of those things where you wonder if they stayed in my class over two or three years. If they – if those behaviors would actually change… or again, we're just trying to do a quick fix so we're never getting to the heart of what's making those behaviors happen in the first place.

In one of her final interviews, Emily made a statement about attempting to address challenging behaviors without a thorough understanding of the reason for those challenging behaviors

occurring. Reflecting on her ability to effectively address challenging behaviors without first understanding why they were occurring, she stated,

> I think I would try different interventions but because I didn't know what the actual cause was, they wouldn't work. So then you're trying to put a band aid – a small band aid – on a big wound. So I think that before this, I was just going through the motion.

Nicole's comments did not indicate the same level of value placed on the TBFA as a learning opportunity. When asked to reflect on the intervention in the third interview (after completion of the TBFA and following the initial implementation of the intervention), she shared, "I didn't think it would necessarily work…" When asked what she felt made an intervention successful in her final interview, she identified communication among classroom staff as the most important factor in the success of an intervention to address challenging behavior. Additionally, she when asked what she would do if she encountered another student who engaged in challenging behaviors, she replied, "I think, maybe ask somebody to observe." It is possible that Nicole's lack of involvement, or her lack of experience compared to Emily and Catherine, was a factor in this difference in the importance placed on understanding a behavior for the outcomes of an intervention.

Shifts in beliefs about the cause of challenging behavior. At the start of this research, each of the participating educators identified a myriad of causes for their students' challenging behaviors that, early on in the research, were either within the child, or due to factors that were outside of their experiences in the classroom. As the educators progressed through the phases of this research, they began to refer to the cause of challenging behavior as being related to the environment in which the behavior occurred.

In her initial interview, Catherine made 13 comments related to cause of challenging behavior. Of those 13 statements related to cause, only two were directly related to the environment in which the challenging behaviors occurred. One recurring theme related to cause was the students' histories with adverse experiences. Catherine suggested that it was easier to affect change in the behaviors of younger students because they did not have extensive histories of engaging in challenging behaviors. She said, "I think because they're younger and they haven't had all this experience – all these years of school having, you know… trauma in school." She also cited students' past home experiences as being responsible for students' challenging behaviors: "I think there's a lot more going on than just we see and we know… probably at home. And you know, there's his background between being born and five years old." Catherine also indicated that the cause of students' challenging behaviors was related to the characteristics of the child, including their gender, age, and diagnosis. When describing older students who she had worked with who engaged in more severe challenging behaviors, she said, "I think those kids might have had some other mental issues… more mental issues." Each of these perceived causes of challenging behavior (i.e., history of trauma, home life, characteristics of the student) that Catherine described in her first interview are similar in that they are related to issues outside of the classroom and school environments, and thus outside of educators' control. That said, she did mention – to a lesser extent – the broader environment as being a causal factor in students' challenging behaviors, saying, "it just seems like they want – there's something they want that they're either not getting and they're not getting it from their parents or they're not getting it from their friends or from their teacher. There's something missing." This theme around the cause of behavior became more apparent as the research progressed, especially following implementation of the TBFA.

In her later interviews, Catherine continued to cite factors outside of her control as causal for challenging behavior, but to a lesser extent. Across the second, third, and fourth interview, Catherine made a total of 12 comments in which she either alluded to or directly identified a cause for students' challenging behaviors. Of those 12 comments, 11 were directly related to the environment in which the challenging behavior occurred. Her comments relating the cause to the environment were both direct and housed within anecdotes about her students' behaviors. In the second interview, she commented on the benefits of the findings of the TBFA, saying, "I think it was definitely clear what causes is problem behavior, which is nice because I would assume it isn't always that way." In one comment related to cause in which she suggested that the students' home life was responsible for challenging behavior, she related this to environmental factors around consequences for challenging behavior. When asked to explain why children engage in challenging behavior, she explained, "I think, you know, some of them have a background. They get – that's how they get what they want from family members. It's worked for them. You know, they get out of what they want to get out of." By her final interview, at the end of this research, Catherine's comments about the cause of challenging behaviors were wholly related to the environment in which they occurred.

Emily's conceptualization of the cause of challenging behavior also appeared to shift as she participated in this research. In her first interview, she made eight comments related to the cause of challenging behavior, and of those eight comments, five were related to issues outside of her control within the environment in which challenging behaviors occurred. She described Suhash's challenging behaviors as being related to task demands, and in particular the increase in the difficulty of demands from kindergarten to first grade:

> The spitting and the hitting, he was not doing that and I don't know if it's just kindergarten is a lot different than first grade and that maybe is his way of expressing that everything is too overwhelming or too hard for him.

Similarly, she also described challenging behavior more broadly as being an "attention getter" in that first interview. However, the majority of her comments related to the cause of challenging behavior were issues beyond the classroom environment. When asked to define challenging behavior, Emily said that it is "where your amygdala has been hijacked and you are no longer able to make sense of a conversation like someone is trying to talk to you but you can't get your body calm." Like Catherine, Emily also talked about the cause of challenging behavior as it was related to students' histories. She described the cause of a former student's challenging behavior in the following way:

> I think he had a mistrust of adults. Adults hadn't been there for him and he was, you know – mom was in jail and he didn't really have a dad and so he didn't trust that they were going to be there for him.

She also attributed the cause of challenging behavior to students' personalities in a discussion of defiance, which she found particularly challenging because she was "not that type of person."

Across the three interviews following the implementation of the TBFA, Emily made a total of 10 comments related to the cause of challenging behavior. Of those comments, only one was not directly related to the environment in which the challenging behavior occurred. In her second interview, which occurred directly following the TBFA but before the implementation of the intervention, Emily talked about Suhash's challenging behaviors, saying, "but I guess I think I still struggle with – how – like, is that just who Suhash is? Like he is very stubborn and wants to do it his way." Even in this comment, where she implies that the challenging behavior may be

caused by Suhash's personality, she is tying this to his behavior in the environment, which may indicate that she is in the process of shifting her perspective on the cause of challenging behavior. Perhaps the clearest example of the shift that occurred in Emily's beliefs about the cause of challenging behavior occurred in Emily's third interview, as she discussed the challenging behavior of a different student in her classroom. As she processed through the student's challenging behavior, she first stated that the student struggled to remain on task during independent work due to her lack of confidence, and quickly began to attribute the cause of behavior to elements in the environment, including the staff's behavior. At first, Emily said,

> It's not that she can't do it – she just doesn't have the confidence in herself… I mean she's capable of it but she won't. She doesn't believe in herself an takes so much reassurance. So that attention – so that can be my next goal…"

After Emily made this statement, the researcher asked whether Emily would complete a functional assessment to address the student's challenging behavior, and Emily replied, "I feel like it would be the attention – if you're not giving her the attention she's not going to work…" Emily then proceeded to describe an intervention in which she would provide adult attention to this student contingent on her engagement in on task behavior.

In Nicole's first interview, she made ten comments related to the cause of challenging behavior. Of those ten comments, seven were related to factors outside of the environment. Similar to Catherine, Nicole cited the students' disability as a potential cause of challenging behavior: "I think sometimes it's because they have, like, a disability and they need help figuring out how to have positive [behaviors], you know?" Her comments related to the cause of challenging behavior were also similar to Nicole and Catherine's in that she identified students' home life as a cause of challenging behavior observed in the classroom: "I think some of the

time it's because things are happening at home that are outside of their control." She also identified students' histories, or lack thereof, related to school as causal, which was similar to Catherine's suggestion that students' educational histories were related to the cause of challenging behaviors. One example of this was when she described challenging behavior broadly in her classroom, saying, "they're still learning, you know, what school is all about. A lot of them haven't been in school before." Nicole did attribute the cause of challenging behavior to environmental factors in three comments, all of which indicated that her students engaged in challenging behaviors in order to access adult or peer attention. She described one student's challenging behaviors as being "very attention seeking."

In each the second and third interviews, eight of Nicole's 11 comments that were related to the cause of challenging behavior described factors outside of the environment in which challenging behavior occurred. These comments followed the same themes as those in the first interview, with a focus on mental health diagnoses, disability, home life, and histories. In the final interview, Nicole made two comments indicating that the cause of challenging behavior was within the environment, and two comments indicating that the cause of challenging behavior was outside of the environment (i.e., trauma, history). These findings present an interesting contrast to the patterns observed in Emily and Catherine's language related to the cause of challenging behavior. When considering these findings related to Nicole's experience, it is important to note that she was only minimally involved in the implementation of the TBFA and subsequent treatment evaluation, and that she was in her second year as an instructional assistant.

Discovering the predictability of behavior. The conceptualization that behavior is predictable, or based on previous patterns of behavior, is fundamental to the logic of functionally relevant intervention. Once one understands the function that a behavior serves, it stands to

reason that the behavior would become predictable. Educators' comments during interviews and observations indicated that as they participated in implementation of functional assessment and subsequent intervention, they began to perceive challenging behavior as predictable.

Prior to the implementation of the TBFA, Catherine and Emily discussed the unpredictable nature of challenging behavior as source of perceived difficulty of working with students. In her first interview, Catherine made five separate statements directly related to this notion of challenging behavior being unpredictable and therefore difficult to address. She stated, "you just never know what – what will set him off. I mean, you just never know with him. That's always the hardest part." Emily's comments about Suhash's challenging behavior indicated similar relations between the difficult nature of challenging behavior and the predictability of that behavior. In her first interview, she said, "the hardest student I have is Suhash because of the unpredictability of when and what it is that's going to have him engage in those challenging behaviors." Nicole did not directly mention predictability as a factor related to challenging behaviors during her initial interview.

Following their participation in the TBFA, the educators began to describe their ability to anticipate changes in their students' behaviors rather than describing behavior as being unpredictable, as stated in their initial interviews. Emily's statements showed clear growth from her initial statements, indicating a shift her perspective about the predictability of Suhash's behavior: "when I think about the day to day with Suhash and what his day looks like with me, he's fairly predictable with when he's going to do those challenging behaviors." Furthermore, Emily stated, "I see myself trying to – or being stronger and finding a pattern with, 'when do I notice the student doing these behaviors.'" Catherine's statements also indicated a shift towards seeing Gabriel's behaviors as predictable, when she said,

> Well I think now I know I can hone in on that it's attention and things, right? So before, you know, I had an idea it was [tangible] but I wasn't completely positive. So this way the data really shows that and it's interesting.

In contrast, Nicole's statements did not directly show this shift towards thinking that behavior was predictable, but her experience was substantially different than that of the other participants because she was not the primary implementer of the TBFA or the intervention.

An important byproduct of the educators' shift in perspective about the lawfulness of behavior was that they tied their ability to predict behavior to their ability to implement interventions to target those behaviors. For example, after initial implementation of the functionally relevant intervention, Emily shared,

> I think that I probably mentioned in my first interview that [Suhash] was unpredictable – I didn't know what would set him off. It could be anything. And really its not – I mean, it's very specific. So in a way you can kind of see it coming or you know, detour it from coming or prep him because you know what those triggers are going to be before, 'bye Suhash.

Similarly, Catherine reflected on the positive impact of the predictability of challenging behavior saying, "and then really, in the back of everybody's mind knowing that these are his triggers. I think it helps for everybody working with him…"

Nicole also reflected on the importance of being able to predict the challenging behavior of her student in her post-intervention interviews. Reflecting on why she thought the intervention was effective, she specifically discussed the importance of reminding Sebastien of the alternative behavior before implementing the establishing operation (i.e., priming), saying, "I think just being able to, really calmly be like, this isn't going to happen and I'm giving you an extra

warning." These statements by the educators reflect the importance of being able to predict challenging behaviors in order to be successful in their work with their students.

Conclusions

The educators who participated in this research each developed agency related to their work with challenging behavior. Findings from this qualitative analysis suggest that direct participation in the TBFA and treatment evaluation aided the development of agency. While there are certainly other factors at play (e.g., previous experience, education and training, building supports, level of perceived need for intervention and/or assistance), findings from this research suggest that direct, supported experience with assessment and intervention lead to an understanding of rationale for common strategies, shifts in perceived cause of challenging behaviors, and development of control related to the understanding that behavior is lawful (i.e., predictable).

Chapter 5

Discussion

The purpose of this research was to extend the literature on trial based functional analysis (TBFA) methods in two ways. First, this research sought to add to the current knowledge by evaluating the effectiveness of the TBFA in classroom settings and to extend the literature evaluating the social validity of the TBFA procedures. Second, this research represents a methodological extension of the current literature on TBFA methods as it included a qualitative analysis of educators' perceptions of challenging behavior as they participated in the implementation of the assessment and subsequent intervention.

Findings suggest that TBFA is an effective assessment strategy in classroom settings. The results of the TBFAs resulted in interventions that were successful in decreasing the rates of challenging behavior for all three participants. Additionally, the findings of this research around the social validity of the TBFA are extensive and while they suggest that teachers are able to complete the assessment, there are contextual variables that deeply impact the acceptability and sustainability of this assessment strategy. Finally, qualitative findings suggest that teachers' perceptions of challenging behavior, including their feelings of autonomy around affecting change in students' behaviors are positively impacted by the experience of working closely with a researcher to implement the TBFA and intervention process. These findings, and their implications for practice and future research are discussed in this chapter.

Important Findings and Implications

Identification of function using TBFA methods. Each of the three TBFAs in this study resulted in clear identification of function that informed the development of effective and functionally relevant intervention. TBFAs have been demonstrated to be an effective

modification of traditional Functional Analysis (FA) methods in previous literature (Rispoli, Ninci, Neely, & Zaini, 2014; Ruiz & Kubina, 2017). This research adds to evidence supporting the use of TBFAs as the basis of intervention to address challenging behavior.

One characteristic of the TBFA that makes it a particularly valuable modification to traditional FA methods is its adaptability to participants, their behaviors and their environments. To date, literature has demonstrated that the TBFA is effective in identifying the function of various topographies of challenging behavior ranging from aggression and property destruction to speaking out of turn in classrooms (Rispoli et al., 2015; Ruiz & Kubina, 2017). However, existing literature has demonstrated that the TBFA identifies isolated social functions (i.e., attention, tangible, and escape). Limited research exists to support the effectiveness of the TBFA in identifying automatic functions (Rispoli et al., 2018), and only one study has identified an idiosyncratic function (Vasquez et al., 2017; i.e., a function specific to a particular child). This study adds to the current body of research on TBFA by identifying an idiosyncratic function in one participant, Suhash, and implementing a successful intervention that directly addressed that function.

For the purposes of this research, Suhash's challenging behavior was determined to maintain a tangible function, meaning that he engaged in challenging behaviors with the purpose of maintaining access to preferred items and activities. However, the actual variables surrounding Suhash's behavior that appeared to evoke the behavior was more complex and specific to Suhash. Suhash's behavior was most reliably evoked when an adult interrupted and/or redirected an activity that he was engaged in, whether or not that activity was preferred (e.g., drawing) or non-preferred (e.g., completing a writing assignment, participating in group reading). This is different from the traditional conceptualization of a tangible function, which

focuses on the removal or denial of access to preferred items and activities. While the interruptions that evoked the challenging behaviors were often paired with demands (e.g., demands to stop, erase, and redo in a different way), challenging behavior rarely occurred when demands were placed outside of the context of an interruption. This suggests that it was not the demand itself that was evoking the challenging behavior, but rather the interruption of the process, routine, or "plan" that Suhash was engaged in at the time. This finding that the TBFA is effective in identifying idiosyncratic variables maintaining challenging behaviors is similar to findings from Vasquez and colleagues (2017), who implemented a TBFA in a home setting and found that a young girl's challenging behaviors were consistently evoked by interrupted activities. The broader literature focused on FA has several examples of the identification of idiosyncratic functions, and the subsequent development and successful implementation of interventions that specifically address those functions (Hanley, 2003). However, this is an emergent theme in the literature focused on TBFA methods.

Implementation of TBFA across diverse settings. This research contributes to a growing body of literature focused on the implementation of TBFAs in educational settings. All three participating students in this research attended public schools. Gabriel and Suhash attended a public elementary school and Sebastien attended preschool affiliated with both the local school district and the local university. Of the existing research that has focused on evaluating the effectiveness of TBFA procedures (n = 15; see Table 3), only six were conducted in public educational settings (Austin et al., 2015; Bloom et al., 2013; Lambert et al., 2012; LaRue et al., 2010; Lloyd et al., 2015; Rispoli et al., 2013). The present research adds to the growing body of literature supporting the use of TBFA in public schools.

Additionally, two participants (Suhash and Sebastien) were students in inclusive classrooms that served as the setting for their TBFAs. Only four studies published to date have been implemented in classrooms where students with disabilities were included with their peers (Austin et al., 2015; Bloom et al., 2013; Lloyd et al., 2015; Rispoli et al., 2015), and of those one was specifically focused on training educators as opposed to evaluating the effects of the TBFA (Rispoli et al., 2015).

In the present research, all participants attended schools that valued and practiced inclusion to some extent. While Gabriel was primarily educated in a self-contained setting, his teacher was committed to ensuring his access to the general education and by the end of this research he was successfully included for a large part of his school day. Suhash, along with three other peers with autism, were included in the general education setting with their typically developing peers. Sebastien attended a preschool where students with and without disabilities were educated together, and while Sebastien did not have a diagnosed disability at the time of this research, he was a member of a classroom community in which six of the 15 students received services based on individual education programs. The implementation of the TBFA and treatment evaluation for two of the three participants in the present research adds to the current literature that demonstrates the effectiveness of the TBFA in inclusive settings. Because experimental analysis is the only way to identify a functional relation (i.e., causal relation) between environmental variables and challenging behavior, such methods are considered to be the most precise and reliable forms of functional assessment (Hanley, 2012). This finding suggests that is not necessary to remove students from their educational contexts in order to experimentally assess function of behavior.

The flexibility inherent in the TBFA methodology (i.e., short trials implemented across routines and activities) supports its use in classroom settings. In the present research, the number of trials implemented per day varied. Catherine, a special education teacher who worked one on one with Gabriel in a self-contained setting, implemented the TBFA in five, one-hour sessions, with one session occurring per school day. She implemented between five and seven trials per session. In contrast, Emily, a general education teacher with 22 students, implemented the TBFA across eight sessions, with one session occurring per day. The number of trials that she implemented varied, with anywhere from two to six trials implemented per day, and this number was largely based on her availability to work directly with the student. Additionally, Emily coached her classroom instructional assistant to implement trials in order to increase the number of trials per day. Nicole, with support from the researcher, implemented the TBFA within 10-minute sessions that occurred 1-2 times per day, three days per week. An average of four trials were implemented each day. The researcher implemented the majority of TBFA trials, and Nicole's colleagues implemented several trials when Nicole was not available. These differences did not affect the effectiveness of the TBFA in identifying the function of each student's challenging behaviors, and suggest that the TBFA is flexible enough to be used by educators in diverse types of classroom settings. That said, it should be noted that the efficiency of the TBFA varied across participants. The demands of educators' settings likely impacted the time required for TBFA implementation.

The differences across participating educator student dyads in this study related to setting (e.g., self-contained vs. inclusive general education), educator experiences and knowledge (e.g., veteran teacher vs. novice instructional assistant, general vs. special education teachers), and student characteristics (e.g., target behaviors, age) are representative of the diverse nature of

public education. In this research, educators in classroom settings implemented the TBFA. Emily (general education teacher), and Catherine (special education teacher) implemented the TBFA with limited support. They participated in an initial training, were provided with a "cheat sheet" describing the trials, and the researcher was available for questions. Nicole (instructional assistant) received substantial support from the researcher, with ongoing coaching occurring across trials. The researcher implemented several trials for Nicole, as she was often occupied with other students in the classroom and was reluctant to implement trials herself. TBFA represents an opportunity for educators from diverse backgrounds, working in various educational settings with differing levels of resources (e.g., time, staff) to directly impact their students' challenging behaviors that adversely affect access to educational and social opportunities. As such, it is important that replication of these methods across environments and with diverse participants continue.

Effectiveness of functionally relevant intervention. All three of the functionally relevant interventions that were designed based on the findings of TBFAs were effective in decreasing students' challenging behaviors. Functional communication training (FCT) based treatment packages were implemented across participants. Within each intervention, trials were implemented in which the establishing operation (EO; i.e., removal or interruption of access to items or activities) was implemented and differential reinforcement was provided contingent on whether the student engaged in challenging, alternative, or desired behaviors defined by the educators. These results add to the vast literature demonstrating the efficacy of FCT based interventions (e.g., functional communication training) as a method of decreasing challenging behavior in applied settings (Durand & Moskowitz, 2015), and to the more modest literature base

in which practitioners implemented FCT procedures (Andzik, Cannella-Malone, & Sigafoos, 2016).

In this research, procedural fidelity was measured in 100% of treatment sessions. The researcher provided ongoing coaching and feedback related to implementation across all intervention sessions, and was the primary implementer for Sebastien. Educators were reminded of the elements of the intervention at the start of each session, in the moment corrective feedback was delivered based on educators' availability, and educators' questions were answered when asked. The level of procedural fidelity across dyads was variable (see Table 8), and it appears that honoring the functional communicative response was the most salient element of the intervention related to decreases in challenging behavior. When these mands were not honored, all students were more likely to engage in challenging behavior. Despite variable levels of procedural fidelity, reductions in challenging behavior were observed across all participants. This research suggests that FCT-based interventions can be successful in decreasing challenging behavior with only moderate levels of procedural fidelity, which is a positive finding for implementation in classroom settings where high fidelity may not always be possible.

Correspondence between traditional and trial based functional analysis. Of the published research focused on evaluating TBFA methods, five studies have evaluated the validity of the TBFA by comparing the results to those of traditional FAs of the same behavior (Bloom et al., 2011; Hodges et al., 2018; Lambert et al., 2017; LaRue et al., 2010; Rispoli et al., 2013). The extant research has indicated mixed correspondence between FA and TBFA results. In the present study, there was no exact correspondence. In this research, the researcher implemented FAs in controlled settings within students' school buildings, and educators implemented the TBFA with the same students in their classrooms. For Gabriel, the FA showed

a dual function of attention and tangible, but his TBFA results indicated a strong tangible condition only. Finally, Sebastien's FA showed a dual attention and tangible function, but the TBFA indicated only a tangible function in his classroom setting. One possible explanation of this discrepancy is related to the context in which the assessments were implemented.

Traditional FAs were implemented in empty rooms at the students' schools. During attention conditions in the FA, the students had limited access to activities. Moderately preferred items were available in the room, but were limited in number and variety. In contrast, when attention was restricted in the TBFA, the students had access to materials and activities that were naturally available in their classrooms. These findings raise important questions as to whether FAs are over-identifying attention functions and TBFAs are under-identifying attention functions. Intervention in this research was based on the findings of the TBFA, and for both Gabriel and Sebastien, the challenging behaviors were never completely extinguished. This may suggest that the attention function was, in fact, present but not as strong as the tangible function in the context of the classroom environment.

There was also no correspondence between the FA and TBFA for Suhash. In Suhash's FA, no behavior was observed and thus no function was identified. This was surprising given the severity of the behavior (tantrums) reported by teachers and observed by the researcher prior to the FA. During Suhash's TBFA, an idiosyncratic tangible function was identified. This finding indicates the importance of contextual relevance in functional analyses. When functional analyses fail (i.e., no behavior is observed), but teachers and caregivers report severe challenging behaviors in the natural setting, it is important to consider whether the behavior serves an environment-specific function that is not identifiable in highly controlled clinical settings. The findings of this research suggest that the TBFA may identify the complex environmental

variables maintaining challenging behavior in applied settings due to the fact that the assessment is implemented in the contexts in which the behaviors occur.

Social validity of the TBFA and relevant intervention. Two interesting findings emerged from the evaluation of social validity. Educators' reports related to the social validity of the procedures appeared to be related to their involvement in the implementation. Social validity was highest for Emily, who was the most involved in implementation, and lowest for Nicole, who was minimally involved. It is also possible that the differences in social validity ratings were related to educators' previous experiences. Catherine and Emily had 22 and 17 years of teaching experience, respectively, and Nicole was in her second year as an instructional assistant. This disparity may have resulted in differences in educators' motivation to participate in research activities and in their readiness to learn new behaviors related to functional assessment. Additionally, social validity results for the TBFA appeared to be related to the effects of the interventions. Emily's reports of social validity were highest, and her student's behavior decreased to the lowest levels of the three participants. Social validity measures the acceptability of assessment and intervention procedures and holds important implications for ongoing implementation.

Educators' development of agency. At the start of this research, educators consistently discussed their work with challenging behavior in terms of strategies. As they progressed through the phases of this research, they began to reflect on the ineffective nature of those strategies when they did not understand the rationale supporting their use with challenging behaviors. After implementation of the TBFA and subsequent intervention, educators' language shifted from talking about tools and strategies that they had tried, to the importance of identifying intervention strategies based on their own understanding of the student's behavior

and of the rationales for various intervention strategies. Additionally, two of the participating educators in this research began to apply their experiences with the student participants in this research to other students in their settings. Adding merit to this finding is the fact that Nicole, who did not participate in the implementation of the TBFA and the treatment evaluation to the extent that Emily and Catherine did, did not show the same shifts towards approaching challenging behaviors based on understanding, as opposed to available strategies. That said, this finding should be taken with caution considering the differences between Nicole's previous experiences and those of the other two participants.

Along with practical shifts in educators' perspectives on working with challenging behavior, educators' language also reflected shifts in their causal beliefs related to challenging behaviors. At the start of the research, educators often described the cause of challenging behavior as being related to factors that were outside of their control. They described students' previous traumatic experiences, disability status, home life, age, and gender as being the cause of their challenging behavior. After the assessment and intervention phases, Emily and Catherine more frequently attributed the cause of challenging behavior to environmental issues such as specific "triggers" that evoked challenging behavior. The exception to this was Nicole, who continued to primarily identify internal causes or students' histories as primarily responsible for their challenging behaviors in the classroom setting. Interestingly, as the educators started to talk about the cause of challenging being behavior as being related to the environment or specific 'triggers' in the students' classroom contexts, they also talk about their ability to affect behavior change.

A final theme related to the educators' development of agency surrounding their work with challenging behavior was a shift towards approaching challenging behavior as something

that was predictable in the environment. Prior to engaging in the assessment and intervention processes, the educators consistently described challenging behavior as 'unpredictable' and they related the perceived unpredictability of behavior as directly related to the level of difficulty of working with that challenging behavior. After participating in the assessment and intervention process, the educators consistently reflected on their newfound ability to predict the behaviors and that the predictability of the challenging behaviors positively influenced their ability to work with those challenging behaviors.

Findings associated with educators' development of agency in their work with challenging behavior suggest that when educators directly experience the relative advantage of an intervention, as well as the adaptability (i.e., the degree to which an intervention can be adapted to meet local needs) and trialability (i.e., the ability to test the intervention on a small scale) of that intervention to their context, their knowledge, beliefs, and feelings of self-efficacy are positively impacted (Damschroder et al., 2009). These findings suggest that practitioners who collaborate with classroom-based educators to address students' challenging behavior should consider directly involving educators in the assessment process, and supports the use of testing hypotheses and interventions in the classroom environment due to the impact on educators' understanding and self-efficacy. Educators who participated in this research directly experienced the effects of their own behavior on the behavior of their students. It is likely that this experience not only increased their understanding of why the interventions were effective, but also led to the shifts in beliefs and perceptions related to the predictability – or ability to control – challenging behavior in their classrooms.

Revised Conceptual Framework

The initial conceptual framework for this research focused on two constructs of the Consolidated Framework for Implementation Research (CFIR; Damschroder, 2009): intervention characteristics and characteristics of the individual (see Table 2). Recognizing that providing an evidence based assessment and intervention strategy does not in itself promote implementation of those practices, the conceptual framework of this research suggested that through participating in the implementation of the TBFA and treatment evaluation (e.g., withdrawal design), characteristics of the educators would shift in ways that promoted implementation.

The findings of this research indicate that educators' experiences with the TBFA and treatment evaluation did affect variables related to the CFIR constructs in ways that likely promoted implementation. The educators who participated in this research reflected on the trialability, adaptability, cost, and relative advantage of the TBFA and intervention, as well as their own knowledge, beliefs, and self-efficacy, as they progressed through the phases of the research (see Figure 2). For Emily and Catherine, who participated in the full scope of the research, shifts in perspectives on working with challenging behavior were observed. In contrast, Nicole's limited participation in implementation did not appear to lead to the same shifts.

While the phenomenon hypothesized in the initial conceptual framework was confirmed by the findings of this study, qualitative and single case findings suggest that additional factors

related to the CFIR are relevant. Definitions of each additional construct are listed in Table 9.

Table 9

Consolidated Framework for Implementation Research: Additional Relevant Constructs

Domain	Construct	Short Description
Inner Setting	Culture	Norms, values, and basic assumptions of a given organization.
	Leadership Engagement	Commitment, involvement, and accountability of leaders and managers with the implementation.
	Available Resources	The level of resources dedicated for implementationand on-going operations, including money, training, education, physcial space, and time.
Process	Executing	Carrying out or accomplishing the implementation according to plan.
	Reflecting	Quantitative and qualitative feedback about the progressand quality of implementation accompanied with regular personal and team debriefing about progress and

Note. Adapted from CFIR Constructs. Retrieved from www.cfirguide.org/constructs.html

First, the inner setting in this research cannot be ignored. Educators and administrators within participating school sites were committed to inclusion and to the implementation of school-wide positive behavior interventions and supports (SW-PBIS), suggesting that the culture of the organization was particularly well suited to host this kind of research and that the methods would be compatible with the settings. Additionally, these schools had extensive resources in terms of staff and materials. Second, constructs related to process emerged as important to the intervention. Specifically, both executing and reflecting and evaluating emerged as important constructs; findings of this study suggest that the experience of implementing the assessment and intervention to plan, and the feedback about the intervention provided by the single case design during treatment evaluation were both important to educator shifts in perspectives.

A visual depiction of the revised conceptual framework (Figure 17) illustrates the processes related to implementation that are suggested by the finding of this research. Taken together, the characteristics of the individual and the intervention characteristics influence whether the stakeholders are willing to participate in the implementation of the intervention (or, in the case of this research, the assessment and intervention process). When stakeholders engage in this implementation, they gain experience that directly impacts shifts in perspectives (e.g., knowledge and beliefs, self-efficacy) that lead to improved likelihood of sustained implementation. In contrast, when stakeholders do not participate in the implementation, they do not experience these direct shifts in perspectives. That said, the findings of this research suggest that if an outside expert steps in and implements the intervention in such a way that it positively impacts student outcomes, some shift in perspectives still occur that promote implementation.

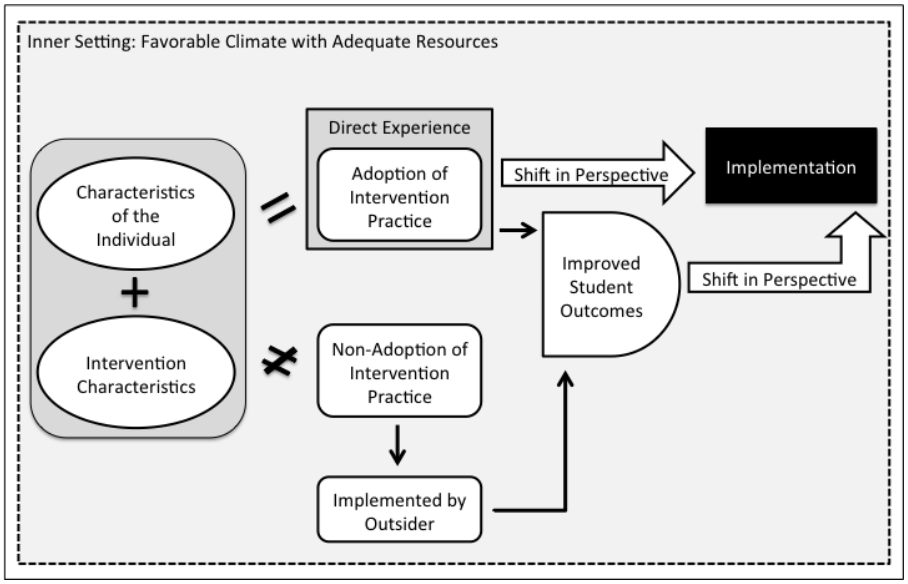


Figure 17. Revised conceptual framework, illustrating the processes leading to successful implementation in this research.

Limitations

There were several limitations to this research that were related to both the internal and external validity of the research findings. First, only two sessions were conducted in the return to baseline phases during the treatment evaluations for each of the three student participants. While

this is problematic in the sense that the designs do not meet the evidence standards put forth by Kratochwill and colleagues (2010), extending the baseline beyond this number of sessions would have resulted in a loss of buy in among educators. During the return to baseline phase, Emily and Nicole openly expressed their dissatisfaction with the procedures and requested that baseline sessions not continue due to the effects of the challenging behaviors on the classroom environment. Gabriel's return to baseline session was abbreviated due to the significant increase in the severity of the challenging behavior compared to that observed in the initial baseline phase. In the final session of the return to baseline phase, he threw a metal chair at Catherine and she requested that we return to intervention due to potential risk of injury and property damage.

A second limitation to the findings of the single case research was related to the many external factors that may have influenced student behavior. First, and across all participants, the researcher was available to the educator participants and answered questions about the procedures and other behavioral practices and concepts. This may have affected the behavior of Gabriel and Suhash in particular, as the educators were the primary implementers of the education and were observed to implement strategies that were not included in the treatment package, such as ignoring challenging behaviors that were not necessarily triggered by the removal of preferred items and activities. The concern over the impact of these responses to challenging behavior is mitigated by the fact that they were implemented to some extent across all phases of the research. However, this may be responsible for variability in levels of challenging behavior for the students.

An additional confounding variable for Gabriel was that peers were intermittently present during intervention sessions, but not in any baseline sessions. The researcher did not have control over whether peers were present, and they were in the room during sessions 6, 7, 8, 13, 14, and

15. While the levels of challenging behavior did not appear to be affected by the presence of peers, Gabriel's desired behaviors occurred at higher levels when they were present. Gabriel's traditional functional analysis (FA) showed an attention function, but the TBFA did not. Findings related to the increased engagement in desired behaviors in the presence of peers may suggest that his behavior was maintained in part by adult attention but that this function was related to diverted attention to peers, which was not addressed in his TBFA because no peers were educated in Catherine's classroom at the time of the assessment.

Each phase of this research (FA, TBFA, and treatment evaluation) relied on educator reports of student preferences to identify potential establishing operations and items to be used as reinforcement. Formal preference assessments were not conducted, which is a limitation of the findings of this research. While the removal of items that the educators identified as highly preferred consistently evoked challenging behavior for all three student participants, indicating that they were in fact preferred, the items selected as potential reinforcement for desired behaviors during intervention did not appear to act as reinforcement across the students. The variable levels of desired behaviors for both Gabriel and Sebastien may have been related to this issue.

Treatment evaluation showed that the FCT-based intervention package was effective in decreasing challenging behavior for all student participants in this study. Catherine and Emily were the primary implementers of the intervention for their students. While these findings suggest that classroom teachers with varying backgrounds can implement intervention within their existing routines, the extent of the educators' independence in implementation was not measured. Anecdotally, support was provided minimally for both the TBFA and the intervention for both Emily and Catherine.

Two factors related to the settings of this research limit the external validity of qualitative findings. First, the schools where this research was conducted were actively implementing SWPBIS and were committed to inclusive education. This limits generalizability of the findings of this research to buildings that also cultivate inclusive communities and are committed to implementing preventative approaches to challenging behavior. Second, both schools were located in affluent areas of the United States and were well funded. This limits generalizability in that the same findings may not be reached in schools in rural or low-income regions that have fewer resources.

Methodological Implications

This research used a mixed methods approach to evaluate the effectiveness of the TBFA, while exploring the effects of educators' participation in the research activities on their perspectives on working with challenging behavior. Qualitative and quantitative methods were implemented in a sequential nature for three distinct cases. While the findings from each design are important in their own right, each is strengthened by the presence of the other.

The single case methods in this research added to literature that supports the effectiveness of the TBFA as measured by the success of related treatment in decreasing students' challenging behavior. However, this method did not provide information about educators' experiences, and thus did not provide insight into the broader contextual issues surrounding the intervention. In contrast, the qualitative research alone provides powerful information about the perspective shifts and knowledge gains that educators experienced as they implemented the TBFA and intervention, but provide little information on the impact of those experiences on student outcomes. Taken together, the mixed methods approach provides valuable information about

both student and educators' experiences with functional assessment and intervention, and how those experiences are related to each other.

Findings from research that combines qualitative and single case research methods have important implications for implementation in that it provides a deeper exploration of factors that may hinder or promote implementation (e.g., intervention characteristics, characteristics of the individual, setting; Damschroder et al., 2009), while maintaining focus on effects of interventions on student outcomes. Implementation of practices that are ineffective for the educators and students is not useful. It is important that as educational and behavior analytic research continues to seek solutions to the chronic problem of implementation, it does so without losing sight of the impact of interventions on students. Combining single case and qualitative methodologies in applied research provides the opportunity to do this, as demonstrated in this research.

Implications for Future Research

This research evaluated the effectiveness of the TBFA in identifying the function of challenging behavior based on the effects of a functionally relevant intervention implemented in classroom settings. While FAs were implemented, the results were not used to develop intervention and there was a lack of correlation between assessment results. Future research should determine the comparative effects of interventions based on FA and TBFA results when the FA methods indicate different functions. Future research should also evaluate the differential effects of the TBFA when implemented by novel and familiar adults in the environment.

Educators were intended to be primary implementers of the TBFA and subsequent treatments. Findings from this research suggested that these experiences were important for educators' shifts in perspectives on working with challenging behaviors, but did not directly

evaluate the extent to which differing involvement yielded different findings. Future research should systematically evaluate differences in qualitative findings based on educator involvement in assessment and intervention practices, and on educators' previous levels of experience and training. Future research may also explore the impact of educator participation in different types of functional assessment (i.e., indirect, descriptive, experimental), different types of functional analysis (e.g., TBFA, FA), and intervention with and without involvement in the assessment.

Along these lines, this research did not directly involve the educators in the development of the intervention. While they were asked for feedback, the researcher dictated the basic structure of the intervention (i.e., functional communication training). Future research should evaluate educators' ability to develop interventions based on assessment results, and explore the processes by which they do so. Additionally, future research should evaluate the effectiveness of educator-designed interventions based on functional assessment results.

Two participants who initially participated in this research did not complete the TBFA and were subsequently excluded from the research. The circumstances surrounding each student's exclusion differed and have important implications for future research. First, Sajiv's elopement behavior may have been automatically maintained (based on the findings of the FA). Evidence supporting the effectiveness of the TBFA with elopement and with behaviors that are automatically maintained is limited. Lambert and colleagues (2017) successfully implemented a TBFA to identify the function maintaining elopement, but did so in a controlled clinical setting. Rispoli and colleagues (2018) used a TBFA to identify an automatic function of vocalizations and implemented a successful intervention based on these results, but other studies have not been published that implement treatment when TBFAs indicate an automatic function. Future research

should continue to evaluate the effects of TBFA for elopement and automatically maintained challenging behavior.

Ultimately, Sajiv did not complete the TBFA because his teacher independently implemented an intervention due to the difficulty of conducting the TBFA with her student's behavior (i.e., elopement). That said, she did independently implement an intervention that appeared to be related to the findings of the TBFA that was indicating a dual tangible and automatic function (this was also the finding of the latency based FA). Future research should explore the number of trials necessary to inform intervention.

Chase was excluded from this research after completion of an undifferentiated FA and TBFA. He did not engage in the target challenging behavior in any sessions of the FA and only one instance of the behavior was observed in the TBFA. Interestingly, he would engage in challenging behaviors when the researcher and the educator debriefed trials. This observation may indicate that his behavior was maintained by an attention function, and raises the question of whether the TBFA masks attention functions due to the increased adult attention provided within the trials themselves. This hypothesis may also be relevant to the results of Gabriel and Sebastien's TBFAs, which did not correlate with the findings of the FAs due to a failure to indicate an attention function in the classroom setting. Future research should further investigate this issue.

Conclusions

This research showed adds to current literature demonstrating the effectiveness of TBFA procedures in developing effective and reinforcement-based interventions. It extends current literature by using a mixed methods research design in order to determine how educators' perspectives on working with challenging behavior are impacted by their direct implementation

of the TBFA and treatment evaluation. The general findings suggest that engaging educators directly in the functional assessment and subsequent intervention testing can result in positive indicators for implementation, which may have important implications for sustainability of intervention practices.

Appendix A: Knowledge of Behavioral Principles as Applied to Children

Pre-Questionnaire Version (Odd Numbers Only)

Read each question and each of its four possible answers. Sometimes more than one answer could be correct under some circumstances; however, you should select the *best* answer or the answer that is most generally true. Place an X next to the correct answer.

- Please do not consult others while deciding how to answer the question.
- Be sure to select only one correct answer for each question.
- Be sure to answer every question, even if you must guess.

1. Desirable and undesirable behavior are most alike in that they are:
- ☐ The result of emotions and feelings
- ☐ Habits and therefore difficult to change
- ☐ Ways the child expresses himself
- ☐ The result of learning

2. Most problem behavior in young children is probably:
- ☐ A reaction to deeper emotional problems
- ☐ Due to lack of communication in the home
- ☐ Accidentally taught by the child's family
- ☐ Due to a stage which the child will outgrow

3. Which of the following is most important for parents in controlling their child's behavior?
- ☐ The rules the parents make about behavior
- ☐ The parents' understanding of the child's feelings
- ☐ The behaviors to which the parents attend
- ☐ Being Strict, but also warm and gentle

4. Which of the following is the least likely way for children to react to the person who punishes them?
- ☐ The child will try to avoid the punisher
- ☐ The child will have admiration and respect for the punisher
- ☐ The child may copy the punisher's methods and do similar things to playmates
- ☐ The child will associate the punishment with the punisher

5. If you are trying to teach a child to talk, you should first:
- ☐ Reward the child after speaking a sentence
- ☐ Reward the child for saying a word
- ☐ Reward the child for any vocalization
- ☐ Punish the child if he did not speak

6. A child has been rewarded each time he cleans his room. In order to keep the room clean without having to use a reward, the net step should probably be to:
- ☐ Have a talk about how pleased you are and then stop giving the reward
- ☐ Give the reward about one out of five times

- ☐ Give the reward almost every time
- ☐ You must always reward it every time

7. When should a child who is just learning to dress himself be praised the first time?
- ☐ When he gets his foot through the first hole in his underwear
- ☐ When he gets his underwear completely on
- ☐ When he asks to do it himself
- ☐ When he as completely finished dressing himself

8. Three of the following responses refer to forms of punishment, which are mild and effective. Which one is not?
- ☐ Ignoring the undesirable behavior
- ☐ Sending the child to a dull room for a few minutes
- ☐ Taking away something the child likes (such as dessert)
- ☐ Scolding

9. Which of the following is the most effective form of punishment in the long run for reducing a child's undesirable behavior
- ☐ Scolding him every time he does it
- ☐ Occasionally spanking him when he does it
- ☐ Sending him to his room for five minutes every time he does it
- ☐ Sending him to his room all afternoon every time he does it

10. A good rule to remember is:
- ☐ Do not reward with money if possible
- ☐ Catch a student doing something right
- ☐ Reward good behavior and always punish bad behavior
- ☐ Punishment is always unnecessary

11. Which of the following is true about punishment?
- ☐ Punishment teaches respect
- ☐ Punishment should be delayed until it can be carefully determined that it is really necessary
- ☐ Punishment can teach a child new behaviors
- ☐ Some punishments can result in a child becoming aggressive

12. A boy loves football. What is most likely to happen if, each tie he is playing nicely with his sister, his father invites him to play football?
- ☐ He will always be asking for his father to play football
- ☐ He will play nicely with his sister more often
- ☐ He will be annoyed with his father for interfering with his activities
- ☐ He will be encouraged to teach his sister to play football

13. A father is teaching his son to hit a thrown ball with a bat. Which of the following methods will probably most help his son to learn to hit?
- ☐ Let him try to hit the ball without saying anything, so the child can learn on his own.

- ☐ Occasionally tell him what he is doing wrong
- ☐ Occasionally tell him what he is doing right.
- ☐ Tell him almost every time he does something right.

14. Punishment, as a way to get rid of an undesired behavior is beast use when
- ☐ You are very upset
- ☐ You want to teach the child the right way to behave
- ☐ The behavior may be dangerous
- ☐ Scolding doesn't seem to be effective

15. If you want your student to develop proper study habits, you should:
- ☐ Encourage him to do his homework
- ☐ Help him to see school as pleasant
- ☐ Reward him whenever he studies
- ☐ Give him good reasons why he will need school

16. A child often cries over any small matter that bothers her. How should her parents react to best reduce her crying?
- ☐ Reward when she reacts without crying
- ☐ Use a mild punishment when she cries
- ☐ Try to find out what is really troubling the child and deal with that
- ☐ Provide her with something interesting to do so she will stop crying

17. If you want your child to say "please" and "thank you" at the table, it is probably most important to:
- ☐ Reprimand him when he forgets to say them
- ☐ Explain why good manners are important
- ☐ Remember to compliment him when he remembers to say them
- ☐ Praise other members of the family when they use these words

18. A major problem has been getting Leon to bed in the evening. His mother has decided to change this and wants to measure the relevant behaviors. Which is the best way for her to do this?
- ☐ Each evening, record whether or not he goes to bed on time
- ☐ Chart his behavior all day long, up to an including bedtime to try to fid out what causes his not wanting to go to bed
- ☐ Each week, make a note of how easy or difficult it has been to get him to bed
- ☐ Ask Leon to keep his own record each week

19. A father tells a child she cannot go to the store with him because she didn't clean her room like she promised. She reacts by shouting, crying and promising she will clean the room when she gets home. What should the father do?
- ☐ Ignore her and go to the store
- ☐ Take her to the store by make her clean her room when they return
- ☐ Calm her down and go help her clean her room together
- ☐ Talk to her and find out why she doesn't take responsibility

20. In changing a behavior it is most important to use:
- ☐ Methods which have been tested by others
- ☐ Consequences which are rewarding to the child
- ☐ Consequences which are punitive to the child
- ☐ Rewards which do not bribe the child.

21. Stan is doing a number of things that really disturb his parents. It would be best for them to:
- ☐ Try to quickly eliminate all of these undesirable behaviors at once
- ☐ Select just a few behaviors to deal with at first
- ☐ Select the single behavior they find most disruptive and concentrate on changing that
- ☐ Wait for 28 to 30 days before beginning to try to change his behaviors to make certain they are stable and persistent

22. Listed below are four methods used to change behavior. Which is usually the best technique to get Frank to stop sucking his thumb?
- ☐ Punish the desired behavior
- ☐ Ignore the behavior
- ☐ Reward him for desirable behavior in the situation in which he usually misbehaves
- ☐ Explain to the child why the behavior is undesirable

23. If you want to make a behavior a long-lasting habit, you should:
- ☐ Reward it every time
- ☐ First reward it every time and then reward it occasionally
- ☐ Promise something the child wants very much
- ☐ Give several reasons why it is important and remind the child of the reasons often.

24. The most likely reason a child misbehaves is because:
- ☐ He is expressing angry feelings, which he often holds inside.
- ☐ He has learned to misbehave
- ☐ He was born with a tendency to misbehave
- ☐ He has not been properly told that his behavior is wrong

25. A baby often screams for several minutes and gets his parents' attention. Which of the following is probably the best way for his parents to reduce his screaming?
- ☐ If there is nothing physically wrong with the child, ignore his screaming even though the first few times he screams even louder
- ☐ Distract the child with something he finds interesting whenever he screams
- ☐ Ignore all noises and sounds the child makes
- ☐ None of the above, Babies usually have good reasons for screaming

Post Questionnaire Version (Even Numbers Only)

Read each question and each of its four possible answers. Sometimes more than one answer could be correct under some circumstances; however, you should select the *best* answer or the answer that is most generally true. Place an X next to the correct answer.

- Please do not consult others while deciding how to answer the question.
- Be sure to select only one correct answer for each question.
- Be sure to answer every question, even if you must guess.

1. Probably the most important idea to keep in mind when first changing behavior is:
   - ☐ To use both reward and punishment
   - ☐ To reward every time the desired behavior occurs
   - ☐ To be flexible about whether or not you reward
   - ☐ To be sure the child understands why you want the behavior to change

2. A child begins to whine and cry when his parent explains why he can't go outside. How should the parent react?
   - ☐ Ask the child why going outside is so important to him
   - ☐ Explain that it is a parent's right to make such decisions
   - ☐ Explain again why he should not go outside
   - ☐ Ignore the whining and crying

3. In changing a child's behavior a parent should try to use
   - ☐ About one reward for every punishment
   - ☐ About one reward for every five punishments
   - ☐ About five rewards for every punishment
   - ☐ Practically all rewards

4. Which of the following statements is most true?
   - ☐ People usually fully understand the reasons for their actions
   - ☐ People are often unaware of the reasons for their actions
   - ☐ People's actions are mostly based on logic
   - ☐ It is necessary to understand the reason for a person's behavior before trying to change the behavior

5. If punishment is used for a behavior such as playing football in the house, which type is probably best to use?
   - ☐ Make the child do extra homework
   - ☐ Clearly express disapproval
   - ☐ Remove the child to a boring situation each time
   - ☐ A reasonable spanking

6. Parents who use lots of rewards for good behavior and few punishments will probably tens to have children who
   - ☐ Do not understand discipline
   - ☐ Will not cooperate unless they are "paid"

- ☐ Take advantage of their parents
- ☐ Are well-behaved and cooperative

7. Which of the following is most effective in getting a child to do homework?
- ☐ "When you finish your homework, you can watch TV"
- ☐ "You can watch this show on TV if you promise to do your homework when the show is over"
- ☐ "If you don't do your homework tonight, you can't watch TV at all tomorrow"
- ☐ Explain the importance of schoolwork and the dangers of putting things off.

8. Each time Mother starts to read, Billy begins making a lot of noise, which prevents her from enjoying her reading time. The best way for Mother to get Billy to be quiet while she reads is to:
- ☐ Severely reprimand him when this occurs
- ☐ Pay close attention and praise and hug him when he plays quietly while she is reading and ignore his noisy behavior
- ☐ Call him to her and carefully explain how important it is for her to have a quiet time for herself each time this occurs
- ☐ Tell him that he won't get a dessert after dinner if he continues

9. A young child often whines and cries when he is around his mother. In trying to find out why he cries, his mother should probably first consider the possibility that:
- ☐ He is trying to tell her something
- ☐ He needs more of her attention
- ☐ She is somehow rewarding his crying
- ☐ She is not giving him enough attention

10. If a child very gradually receives rewards less and less often for a behavior, what is most likely to happen?
- ☐ He will soon stop the behavior
- ☐ He will be more likely to behave that way for a long time
- ☐ He will not trust the person giving the rewards
- ☐ None of the above

11. In a reading group, the teacher gives each child candy plus praise for each correct answer. Which of the following statements is most true?
- ☐ The candy is a bribe and doesn't belong in a school setting s
- ☐ At first, the children work to earn the candy and may later work for the praise alone
- ☐ Children shouldn't be "paid" for doing their schoolwork
- ☐ It probably doesn't make much difference whether or not candy is used because the children who want to learn to read will do so and the others won't

12. To record, graph and note the direction of the change of a behavior is:
- ☐ A minor, optional step in a behavior change program
- ☐ An important step in a behavior change program
- ☐ A procedure employed only by scientists for research

- ☐ Time consuming and complicated, therefore, these procedures should only be used in special cases

13. Which of the following is most true about physical punishment?
    - ☐ It should immediately follow the undesirable behavior and at full intensity
    - ☐ It should be mild and immediately follow the undesirable behavior
    - ☐ It should begin in a mild form and, if that doe not work, intensity should gradually be increased
    - ☐ It is ineffective and inappropriate

14. Which of the following is not an important step in a behavior change program?
    - ☐ Make certain the child feels ashamed for his misbehavior
    - ☐ Decide on a particular behavior that you wish to change
    - ☐ If necessary, break the selected behavior down into smaller steps
    - ☐ Select a proper time and situation for measuring the behavior

15. Two brothers fight constantly. Their parents decide to praise them when they play together nicely. However, they still continue to fight. Punishment may be necessary. What is probably happening?
    - ☐ They don't want their parents' praise
    - ☐ The benefits of fighting are stronger to them than their parents' praise
    - ☐ They have too much anger toward each other to control
    - ☐ They are at a stage they will grow out of

16. Mrs. Thomas found out that spanking her seven-year-old son, Bob, did not seem to stop him from using "naughty" words. A friend suggested that rather than spanking him, she should send him to be by himself. The room he is sent to should be:
    - ☐ His own room, so he will still have something to do
    - ☐ Small and dark
    - ☐ As uninteresting as possible
    - ☐ A large room

17. Which reward is probably best to help a 12-year-old child improve his arithmetic skills?
    - ☐ A dollar for each evening he studies
    - ☐ A dime for each problem he works correctly
    - ☐ Ten dollars for each A he receives on his report card in arithmetic
    - ☐ A bicycle for passing arithmetic for the rest of the year

18. Mr. Jones agreed to pay his son, Mike, 25c each day if he carried out the trash. If Mr. Jones forgets to give Mike the money for a few days, what is most likely to happen?
    - ☐ Mike will continue to take out the trash because he realizes how important this is
    - ☐ Mike will stop taking out the trash
    - ☐ Mike will begin to do extra chores, as well as take out the trash, so his father will notice how well he's doing and remember to give mike the money
    - ☐ Mike will start to misbehave to take out his anger about not being paid

19. The first step in changing a problem behavior is to:
- ☐ Reward the child when he is behaving nicely
- ☐ Punish the child for misbehavior
- ☐ Carefully observe the behavior
- ☐ Seek help from someone who is more objective

20. Johnny has just torn up a new magazine. Of the following choices, which is the best way for his mother to discipline him?
- ☐ Tell him he will be spanked by his father when he gets home
- ☐ Punish him then and there
- ☐ Explain to Johnny about the wrongness of his action
- ☐ Angrily scold Johnny so that he will learn that such an act is bad and upsetting to his mother.

21. Which would be the best example of an appropriate way to praise Mary?
- ☐ Good girl, Mary
- ☐ I love you, Mary
- ☐ I like the way you helped me put the dishes away
- ☐ I'll tell your father how nice you were when he comes home

22. Jimmy sometimes says obscene words, but only in front of his mother. She has been shocked and makes her feelings clear to him. How should she react when he uses obscene words?
- ☐ Wash his mouth out with soap
- ☐ Ignore him when he uses obscene words
- ☐ Tell him how bad he is and how she doesn't like him when he uses those words
- ☐ Explain to him the reason such words are not used.

23. Punishment will not be effective unless you:
- ☐ Prevent the child from escaping while you punish him
- ☐ Throw all of your emotions into the punishment
- ☐ Follow it with a careful explanation of your reasons for the punishment
- ☐ Have tried everything else

24. Which of the following is probably most important in helping a child behavior in desirable ways?
- ☐ To teach him the importance of self discipline
- ☐ To help him understand right and wrong
- ☐ Providing consistent consequences for his behavior
- ☐ Understanding his moods and feelings as a unique person

25. How often a behavior occurs is probably mostly controlled by
- ☐ The person's attitude about his behavior
- ☐ What happens to him at the same time the behavior occurs
- ☐ What happens to him just before the behavior occurs
- ☐ What happens to him just after the behavior occurs

Appendix B: Challenging Behavior Attribution Scale

People sometimes engage in what are called *challenging behaviors*. These are behaviors that might be dangerous for the individuals themselves (e.g., biting or hitting themselves, hitting their body against objects), or to others (e.g., kicking, punching, or biting other students or staff). Such behaviors also include other actions that are considered inappropriate within society in general (e.g., sexually inappropriate behaviour, verbal abuse, eating inedible substances/objects, persistent shouting/screaming).

We are interested in why you think that people display challenging behaviors such as those described above. Consider how likely it is that each of the following statements are reasons for people engaging in challenging behaviors. Simply think generally about the most likely reasons for people behaving in this way.

People with developmental disabilities engage in challenging behaviors because… *(Circle one)*	Very Unlikely	Unlikely	Equally Likely and Unlikely	Likely	Very Likely
They are given things that are too difficult for them	1	2	3	4	5
They are physically ill	1	2	3	4	5
They do not like bright lights	1	2	3	4	5
They are tired	1	2	3	4	5
They cannot cope with high levels of stress	1	2	3	4	5
They are bored	1	2	3	4	5
Of the medication that they are given	1	2	3	4	5
They are unhappy	1	2	3	4	5
They have not gotten something that they wanted	1	2	3	4	5
They live in unpleasant surroundings	1	2	3	4	5
They enjoy it	1	2	3	4	5
They are in a bad mood	1	2	3	4	5
High humidity makes them uncomfortable	1	2	3	4	5
They are worried about something	1	2	3	4	5
Of some biological process in their body	1	2	3	4	5
Their surroundings are too warm/cold	1	2	3	4	5
They want something	1	2	3	4	5
They are angry	1	2	3	4	5

People with developmental disabilities engage in challenging behaviors because… *(Circle one)*	Very Unlikely	Unlikely	Equally Likely and Unlikely	Likely	Very Likely
There is nothing else for them to do	1	2	3	4	5
They live in a noisy place	1	2	3	4	5
They feel let down by somebody	1	2	3	4	5
They have a physical disability	1	2	3	4	5
There is not very much space in their house/classroom	1	2	3	4	5
They get left on their own	1	2	3	4	5
They are hungry or thirsty	1	2	3	4	5
They are frightened	1	2	3	4	5
Somebody they dislike is nearby	1	2	3	4	5
People do not talk to them very much	1	2	3	4	5
They want to avoid uninteresting tasks	1	2	3	4	5
They do not go outdoors very much	1	2	3	4	5
They are rarely given activities to do	1	2	3	4	5
They want attention from other people	1	2	3	4	5

Appendix C: Self-Efficacy Questionnaire

Below are several questions that ask about your responses to challenging behaviours displayed by the child or children with developmental disabilities you care for. Please read each question, and place a circle around the number on the scale that reflects your own views. If your views are described best by the end points of the scale, please circle either number 1 or number 7. If your views are somewhere in between the two end points, please select a position on the scale that reflects where you feel your views should be placed. Please select a response for all of the questions.

How confident are you in dealing with the challenging behaviours of the child/children with autism you care for?

1	2	3	4	5	6	7
Not at all confident						Very confident

How difficult do you personally find it to deal with the challenging behaviours of the child/children with autism you care for?

1	2	3	4	5	6	7
Very difficult						Not at all difficult

To what extent do you feel that the way you deal with the challenging behaviours of the child/children with autism you care for has a positive effect?

1	2	3	4	5	6	7
Has no positive effect at all						Has a very positive effect

How satisfied are you with the way in which you deal with the challenging behaviours of the child/children with autism you care for?

1	2	3	4	5	6	7
Not satisfied at all						Very satisfied

To what extent do you feel in control of the challenging behaviours of the child/children with autism you care for?

1	2	3	4	5	6	7
Not in control at all						Very much in control

Appendix D: Qualitative Interview Protocols

Interview Protocol 1

Topic: Participant educational background, teaching experience, experience working with students who engage in challenging behavior, self-efficacy(SE), causal beliefs(CB), and knowledge (K) regarding challenging behavior.

Possible informants: Classroom teacher, instructional assistant

Introduction: Hi, and thank you for meeting with me today for what will be the first of three interviews. In today's interview, I am going to ask you several questions about your background and experience as an educator, and about your experiences working with students who engage in challenging behaviors.

Section I: General Questions

1. Please tell me a little about your professional background *[Probes: How long have you been working in education? What have been your different roles and positions in education? In what kinds of settings have you worked?]*

2. Can you tell me about your education and training? [*Probes: What degrees do you hold and what did you study? For teachers, what credentials do you hold?]*

3. How, if at all, do you feel your education prepared you to work with students who engage in challenging behaviors? *[Probes: Can you recall any specific coursework? What was your student teaching experience?]*

4. How, if at all, have professional development opportunities in your current role affected your work with challenging behavior? Can you give me some examples? *[Probes: How were these opportunities helpful? How were they not helpful?]*

5. Can you tell me about your current position? *[Probes: What is your role in the school? What are your day-to-day responsibilities? What do you like about your job? What makes your job difficult?]*

6. In your current role, can you describe your interaction with students who engage in challenging behavior? *[Listen for: perspectives on challenging behavior, difficulties related to challenging behavior; Probes: How is this similar or different to your previous work with challenging behaviors? How many of your students engage in challenging behavior? What are your responsibilities when challenging behavior occurs?]*

7. Can you give me some examples of challenging behavior that you encounter in your work? What makes it especially challenging? *[Probes: How do you define challenging behavior? What about this behavior is especially challenging? How does it affect your work?]*

8. When your students engage in challenging behavior, how do you typically handle it? *[Listen for: assessment, intervention strategies, referrals; Probes: What strategies do you use? What is helpful about this? What doesn't work?]*

9. Why do you think your students engage in challenging behaviors? *[Listen for: cause]*

10. In your current role, do you feel like you are able to help students who engage in challenging behavior? *[Do you think you can decrease challenging behavior effectively? Do you think that the changes you are making are going to last? Why or why not?]*

11. In what ways are you finding success in your current role? What isn't working as well as you might hope? How so? *[Probes: How does working with challenging behavior affect your feelings of success? How does working with challenging behavior affect your job satisfaction?]*

12. What do you think will happen to the kids in your classroom when they leave here? What do you predict your students' futures will be like? *[Listen for: perspectives on disability; perspectives on outcomes possible for students who engage in challenging behavior; Probe: How will you students' challenging behavior affect their future?]*

<u>Section II: Student Participant</u>

1. Think about the student who we will be working with over the course of this research. Spend a few minutes telling me about his challenging behavior. You can tell me whatever comes to mind, but some ideas might be:
   - Describe the behavior
   - Tell me about why the behavior occurs
   - Tell me about the effect that the behavior has on you and on your classroom
   - Tell me about how you have tried to address the behavior, and how that went.

Interview Protocol 2

Topic: Reflections on working with students who engage in challenging behavior, self-efficacy(SE), causal beliefs(CB), and knowledge (K) regarding challenging behavior; Reflection on experiences Implementing the TBFA.

Possible informants: Classroom teacher, instructional assistant

Introduction: Thank you for meeting with me again for our second interview. Today, I am going to ask you to think about challenging behavior and to reflect on the Trial Based Functional Analysis that you recently completed.

Section I: Trial Based Functional Analysis

1. What do you think was the purpose of the Trial Based Functional Analysis? *[Listen for function, intervention]*

2. Did you feel like you were successful in implementing the Trial Based Functional Analysis? Why, or why not? *[Probes: What was difficult about it? Did you feel like you understood the procedures?]*

3. Was the time and effort necessary to implement the Trial Based Functional Analysis reasonable? Why, or why not? *[Probes: Where you able to attend to your regular job responsibilities while you were implementing the Trial Based Functional Analysis?]*

4. Think about other functional behavior assessments that you've completed. How does the Trial Based Functional Analysis compare to these other strategies? *[Probes: Was this easier or harder? Was this more or less disruptive to your daily responsibilities]*

5. Did you think that the TBFA was helpful in understanding your student's behavior? *[Probes: In what ways was it helpful?]*

6. Would you use the TBFA again, with a different student? Why or Why not? *[Probes: What barriers to do you think exist that prevent you from using this assessment?]*

7. Was your participation in implementing the TBFA with your student beneficial to your own professional development? In what ways? *[Probes: What skills or knowledge did you gain by learning how to implement this?]*

8. *Now that you've completed the TBFA and we've talked about the results, what kind of strategy do you think will be helpful in addressing the student's challenging behavior?*

Section II: Challenging Behavior

1. Can you give me some examples of challenging behavior that you encounter in your work? What makes it especially challenging? *[Probes: How do you define challenging behavior? What about this behavior is especially challenging? How does it affect your work?]*

2. Why do you think your students engage in challenging behaviors? *[Listen for: cause]*

3. In your current role, do you feel like you are able to help students who engage in challenging behavior? *[Do you think you can decrease challenging behavior effectively? Do you think that the changes you are making are going to last? Why or why not?]*

4. In what ways are you finding success in your current role? What isn't working as well as you might hope? How so? *[Probes: How does working with challenging behavior affect your feelings of success? How does working with challenging behavior affect your job satisfaction?]*

5. What do you think will happen to the kids in your classroom when they leave here? What do you predict your students' futures will be like? *[Listen for: perspectives on disability; perspectives on outcomes possible for students who engage in challenging behavior; Probe: How will you students' challenging behavior affect their future?]*

Section III: Student Participant

1. Think about the student who we have been working with over the course of this research. Spend a few minutes telling me about his challenging behavior. You can tell me whatever comes to mind, but some ideas might be:
   - Describe the behavior
   - Tell me about why the behavior occurs
   - Tell me about the effect that the behavior has on you and on your classroom
   - Tell me about how you have tried to address the behavior, and what you might do differently in the future.

Interview Protocol 3

Topic: Reflections on working with students who engage in challenging behavior, self-efficacy (SE), causal beliefs(CB), and knowledge (K) regarding challenging behavior; Reflection on future work

Possible informants: Classroom teacher, instructional assistant

Introduction: Thank you for meeting with me again for our final interview. Today, I am going to ask you to think about challenging behavior and to reflect on the assessment and intervention that you recently implemented. We will also talk about how you see the work you've done over the past weeks affecting your future work.

Section I: Trial Based Functional Analysis & Intervention

1. What do you think was the purpose of the Trial Based Functional Analysis? *[Listen for function, intervention]*

2. Was the time and effort necessary to implement the Trial Based Functional Analysis reasonable? Why, or why not? *[Probes: Where you able to attend to your regular job responsibilities while you were implementing the Trial Based Functional Analysis?]*

3. In what ways was the TBFA helpful in understanding your student's behavior? *[Probes: In what ways was it helpful?]*

4. In what ways was your participation in implementing the TBFA helpful in implementing the intervention? *[Probes: Would you have been able to implement the intervention without having completed the TBFA? Were any skills or knowledge that you gained especially helpful?]*

5. Would you use the TBFA again, with a different student? Why or Why not? *[Probes: What barriers to do you think exist that prevent you from using this assessment?]*

6. What was the most important thing that you learned from implementing the TBFA with your student? *[Probes: Did your thinking around challenging behavior change? Was there any practical knowledge or skillset that you feel you gained?]*

7. Thinking back on your previous educational and professional experiences with challenging behavior, how was the TBFA and resulting intervention different? *[Probes: Was your involvement in the assessment and intervention process different? Did your knowledge change?]*

Section II: Challenging Behavior

1. Can you give me some examples of challenging behavior that you encounter in your work? What makes it especially challenging? *[Probes: How do you define challenging behavior? What about this behavior is especially challenging? How does it affect your work?]*

2. Why do you think your students engage in challenging behaviors? *[Listen for: cause]*

3. In your current role, do you feel like you are able to help students who engage in challenging behavior? *[Do you think you can decrease challenging behavior effectively? Do you think that the changes you are making are going to last? Why or why not?]*

4. In what ways are you finding success in your current role? What isn't working as well as you might hope? How so? *[Probes: How does working with challenging behavior affect your feelings of success? How does working with challenging behavior affect your job satisfaction?]*

5. What do you think will happen to the kids in your classroom when they leave here? What do you predict your students' futures will be like? *[Listen for: perspectives on disability; perspectives on outcomes possible for students who engage in challenging behavior; Probe: How will you students' challenging behavior affect their future?]*

Section III: Student Participant

1. Think about the student who we have been working with over the course of this research. Spend a few minutes telling me about his behavior. You can tell me whatever comes to mind, but some ideas might be:
   - Describe the challenging behavior and how it has or has not changed
   - Describe the alternative behavior and whether it is useful to the student
   - Tell me about why the behavior occurs
   - Tell me about if and how your classroom has changed with the changes in your student's behavior
   - Tell me about how the current intervention is different than previous strategies, and how you will work with this student in the future.

Interview Protocol 4

Introduction: Thank you for meeting with me again for our final interview. Today, I am going to ask you to think about challenging behavior and to reflect on the assessment and intervention that you recently implemented. We will also talk about how you see the work you've done over the past weeks affecting your future work.

Section I: General Updates

1. How have things been going in your classroom? How has the student's behavior been, compared with before we started this process?
2. Have there been any major changes in the student's educational placement? Any major changes socially?

Section II: Trial Based Functional Analysis & Intervention

1. Tell me about the intervention that you've been using to address the student's behavior. *Follow up with pointing out changes* – What made you decide to change the intervention in this way?

2. Do you feel that the intervention is working? How do you know?

3. Would you change the intervention if you were to do it again with another student? What would you change?

4. Now that we are a few weeks out from the study, do you feel that the time and effort necessary to implement the Trial Based Functional Analysis was reasonable? Was it worth it? Why, or why not? *[Probes: Where you able to attend to your regular job responsibilities while you were implementing the Trial Based Functional Analysis?]*

5. Would you use the TBFA again, with a different student? Why or Why not? *[Probes: What barriers to do you think exist that prevent you from using this assessment?]*

6. What was the most important thing that you learned from implementing the TBFA with your student? *[Probes: Did your thinking around challenging behavior change? Was there any practical knowledge or skillset that you feel you gained?]*

Section III: Challenging Behavior

1. What do you think is the most important part about intervening on challenging behavior? What makes an intervention effective?

2. In what ways do you feel prepared to work with challenging behavior with current and future students? Are there some behaviors that you are more comfortable with than others?

3. In what ways do you feel unprepared to work with challenging behavior with current and future students? What professional development opportunities would be most helpful for you to feel more prepared?

Section IV: Summative Questions

1. In what ways have your understanding of challenging behavior changed after participating in the TBFA and intervention?

2. In what ways have your feelings about working with challenging behavior changed after participating in the TBFA and intervention?

Appendix E: Trial Based Functional Analysis Data Collection Tool

Student:_____ Target Behavior:_____

Attention

Date	#	Control	Test	TH

Escape

Date	#	Control	Test	TH

Tangible

Date	#	Control	Test	TH

Additional Instructions:

- Run 10 successful trials of each type
- Draw a line through the trial (row) if a trial is failed (has to be restarted because of error or uncontrollable event).

Data Key:

- Date – MM/DD
- # : Order of TOTAL number of sessions (continuing across conditions)
- TH: Therapist's initials (your initials).
- Control & Test – Mark "0' if no behavior occurs, mark "✓".

Data Summary:

Escape: ____% in control, ____% in test
Tangible: ____% in control, ____% in test
Attention: ____% in control, ____% in test

Failed Trials: _____

Appendix F: Trial Based Functional Analysis Social Acceptability Questionnaire

Social Acceptability of Trial Based Functional Analysis Procedures

Please indicate whether you agree with each statement in the table below by placing an X in the appropriate box. If you have specific concerns that are not addressed in this rating form or have suggestions related to any of the items below, please use the lines below the table to provide the researcher with your specific feedback. Thank you in advance. Your opinions and feedback will help us continue to adapt the TBFA process to be most useful to educators.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
I understand the TBFA procedures					
The TBFA procedures were difficult to implement					
The time and effort necessary to implement the TBFA was reasonable for use in my classroom					
While implementing the TBFA, I was NOT able to address my responsibilities in the classroom					
The TBFA procedures were less disruptive to classroom routines than other functional assessments (e.g., FBA)					
I enjoyed implementing the TBFA in my classroom					
The behavior assessed using the TBFA was serious, compared to other student's behavior					
I would use the TBFA in the future with other students in my classroom					
I find the TBFA to be an acceptable way of assessing my student's challenging behavior					
I believe the TBFA was effective in identifying the factors that cause my student's challenging behavior					
I believe the student experienced discomfort during the TBFA					
I believe the assessment will lead to permanent improvement in my student's challenging behavior					
Overall, I had a positive reaction to this assessment					

Space for additional feedback is on the back of this sheet.

Additional Feedback:

Appendix G: Intervention Social Acceptability Questionnaire

Social Acceptability of Intervention Procedures

Please indicate whether you agree with each statement in the table below by placing an X in the appropriate box. If you have specific concerns that are not addressed in this rating form or have suggestions related to any of the items below, please use the lines below the table to provide the researcher with your specific feedback. Thank you in advance. Your opinions and feedback will help us continue to adapt the TBFA process, including intervention development and implementation, to be most useful to educators.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Given this student's challenging behavior, I find the intervention acceptable					
I am willing to implement the intervention					
I believe there are disadvantages to this intervention					
The time that it takes to implement this intervention is reasonable for my classroom					
I am confident that this intervention will be effective for my student					
I believe that this intervention will make permanent improvements in this student's behavior					
I believe that it will be disruptive to my classroom					
I like this intervention					
The staff in my classroom is willing to implement this behavior plan					
I worry that there will be undesirable side-effects to this intervention					
I believe that this intervention causes discomfort for the student					
I am willing to alter my daily routines to implement this intervention					
This intervention will affect the daily routine in the classroom					
This intervention is a good fit with the daily routing in the classroom					
The intervention will be effective in teaching the student appropriate behavior					

Space for additional feedback is on the back of this sheet.

Additional Feedback:

Appendix H: Functional Analysis Procedural Fidelity Checklists

Functional Analyses –Play Condition

Dates: _____ **Session #s: _____**

Experimenter: _____ **Participant's Initials: _____**

Scorer: _____

	Dates:							
	Sessions:	1	2	3	4	5	6	7
Participant and Experimenter(s) are in the session room. No one else is present.								
Participant has continued access to the highly preferred tangible items.								
Experimenter provides social praise or brief physical contact at least once every 30-seconds.								
Experimenter does not place demands on the participant (this includes questions).								
Experimenter ignores all instances of problem behavior.								
The session only lasts for 5 minutes.								

Functional Analyses – Attention Condition

Dates: _____ **Session #s: _____**

Experimenter: _____ **Participant's Initials: _____**

Scorer: _____

	Dates:							
	Sessions:	1	2	3	4	5	6	7
Participant and Experimenter(s) are in the session room.								
Participant has continued access to the moderately preferred tangible items.								
At the beginning of the session, the experimenter states "I have some work to do. Play with your toy." Or a similar option.								
Experimenter will remove all attention and focus on "work."								
Experimenter provides high quality attention in the form of brief reprimands and/or physical attention, after every instance of problem behavior (e.g., "you look sad." "You look lonely." "It's okay.").								
The session only lasts for 5 minutes.								

Functional Analyses – Demand Condition

Dates: _____ **Session #s: _____**

Experimenter: _____ **Participant's Initials: _____**

Scorer: _____

	Dates:							
	Sessions:	1	2	3	4	5	6	7
Participant and Experimenter(s) are in the session room.								
Experimenter delivers continuous demands.								
If the participant responds correctly, experimenter provides brief praise (e.g., "Great, you colored!").								
If the participant responds incorrectly or does not respond to a demand within 3-seconds the experimenter runs through a least-to-most prompt hierarchy. 1. Vocal prompt 2. Vocal prompt and models behavior 3. Vocal prompt and physical guidance								
Experimenter states "Okay, you don't have to" and provides a 30-second break after every instance of problem behavior.								
If problem behavior occurs during the escape period, no consequence is delivered.								
The session only lasts for 5 minutes.								

Functional Analyses – Tangible Condition

Dates: _____ **Session #s: _____**

Experimenter: _____ **Participant's Initials: _____**

Scorer: _____

	Dates:							
	Sessions:	1	2	3	4	5	6	7
Participant and Experimenter(s) are in the session room.								
The experimenter removes the item from the participant's possession.								
Experimenter allows the participant to access the item for roughly 30 seconds if problem behavior occurs.								
The session only lasts for 5 minutes.								

Appendix I: Trial Based Functional Analysis Procedural Fidelity Checklists

Trial: Attention

Reviewer:
Educator:
Date:

Directions: In the "code" column mark a "+" if the behavior is observed and a "-" if the behavior is not observed

	Description	Code	Code	Code	Code	Code	Code	Code	Code
Control	Educator instructs the participant to engage in independent work or leisure items.								
	Educator does not engage in continuous demands								
	Educator provides participant with attention at least once every 5 s								
Test	Educator explains that he/she needs to complete some work and turns body away from the participant								
	Educator does not speak or look at the participant for 60s unless participant engages in target challenging behavior								
	Contingent upon challenging behavior, educator turns toward participant and provides verbal attention and a statement of concern								

Trial: Demand

Reviewer:
Educator:
Date:

Directions: In the “code” column mark a “+” if the behavior is observed and a “-“ if the behavior is not observed

	Description	Code	Code	Code	Code	Code	Code	Code	Code
Control	Educator tells the student, “you can have a break”, or if the student is not engaged, the educator sits nearby.								
	Educator turns away from child and does not provide attention for 60s								
	No preferred materials are available to the child								
Test	Educator presents task demands once every 10s using least to most prompting (verbal, Verbal + model, and verbal + physical)								
	Educator delivers praise (commenting or compliments) upon successful completion of a trial/task (regardless of the prompt level necessary to complete the task)								
	Educator removes task demands and materials immediately if child engages in target challenging behavior								

Trial: Tangible

Reviewer:
Educator:
Date:

Directions: In the "code" column mark a "+" if the behavior is observed and a "-" if the behavior is not observed

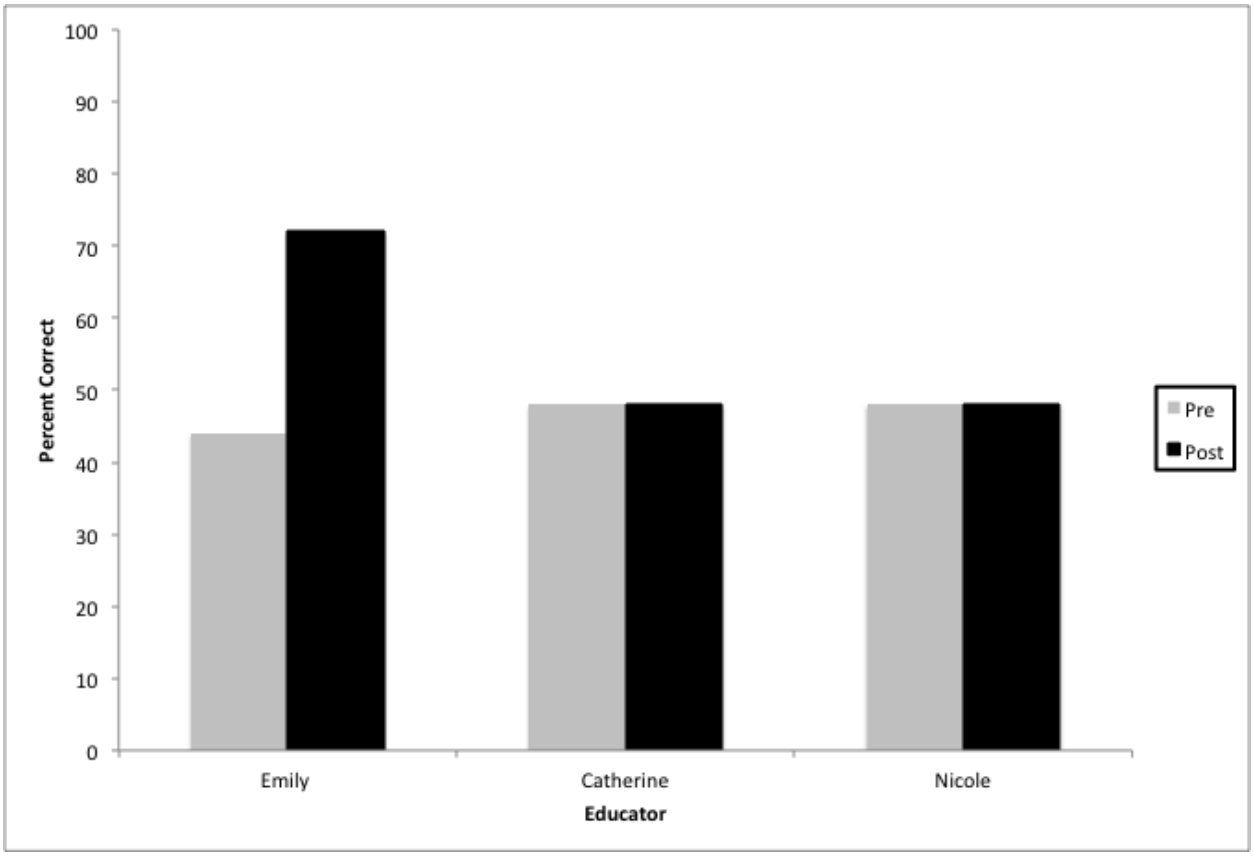
	Description	Code	Code	Code	Code	Code	Code	Code	Code	Code	Code
Control	Educator sits near participant and provides unrestricted access to preferred item for 60s										
	Educator does not provide attention if participant engages in challenging behavior										
Test	Educator sits near participant and places preferred item in sight but out of the participant's reach (more than 2'). Participant access to item is blocked										
	Educator tells participant, "You can have this later"										
	Contingent upon challenging behavior, educator provides immediate access to preferred item for 60s										

Appendix J: Intervention Procedural Fidelity Checklist

Trial	Prompt	Interrupt Access	Consequence for Desired Behavior	Consequence for Alt. Behavior	Challenging Behavior is Ignored/Error Corrected	Notes

Appendix K: Questionnaire Results

Knowledge of Behavioral Principles as Applied to Children



Behavioral knowledge was measured using a 25-item short form of the Knowledge of Behavioral Principles as Applied to Children instrument (KBPAC; O'Dell, Tarler-Benlolo, & Flynn, 1979). This tool was a multiple-choice questionnaire, and educators' scores were determined using the answer key provided with the original instrument. If the educator selected more than one available response, the item was marked incorrect. Percentage of correct responses was determined by dividing the number of correct responses by the total number of questions, and dividing by 100. While educators cited experience as a key source of knowledge development in their work with challenging behavior, and shifts in understanding around behavioral strategies were observed for the two educators who participated fully in the research activities, the findings of the pre- post-measure evaluating behavioral knowledge were mixed across participants. Pre- and post-scores on this instrument are shown in Figure 19. Emily's score on the KBPAC instrument increased from 44% in the pre-test, to 72% in the post-test. Catherine and Nicole each scored 48% on the pre-test, and their scores remained at this level on the post-test. The findings of the KPBAC support qualitative findings that Emily gained knowledge and understanding related to behavioral principles, and that Nicole did not. However, it does not support qualitative findings related to Catherine's shifts in understanding.

Challenging Behavior Attribution Scale

Challenging Behavior Attribution Scale Mean Scores

	Catherine		Emily		Nicole	
	Pre	Post	Pre	Post	Pre	Post
Learned	1.20	1.50	0.66	1.33	0.33	0.50
Emotional	1.40	1.10	0.43	-1.40	0.71	0.86
Biomedical	0.50	0.67	0.33	-0.83	-0.33	0.33
Stimulation	0.33	0.83	-0.50	-0.67	-1.50	0.33
Physical Environment	0.42	1.00	-0.42	-1.10	-0.29	0.57

Causal belief indicated by positive mean score

The Challenging Behavior Attribution Scale (CHABAS; Hastings, 1997) evaluates whether respondents believe that behavior is learned, emotional, biomedical, due to stimulation, or related to the physical environment using a 5-point Likert-scale. Educators' responses on pre- and post-measures were scored using the procedures outlined in Hastings (1997); each rating was assigned a value: (-2) very unlikely, (-1) unlikely, (0) equally likely, or (2) very likely. Total scores were calculated for each subscale (i.e., learned, emotional, biomedical, stimulation, physical environment) by summing the ratings on all related items and dividing this score by the number of items in the subscale. If the total score was above zero, then the relevant causal model was viewed as applicable to the behavior.

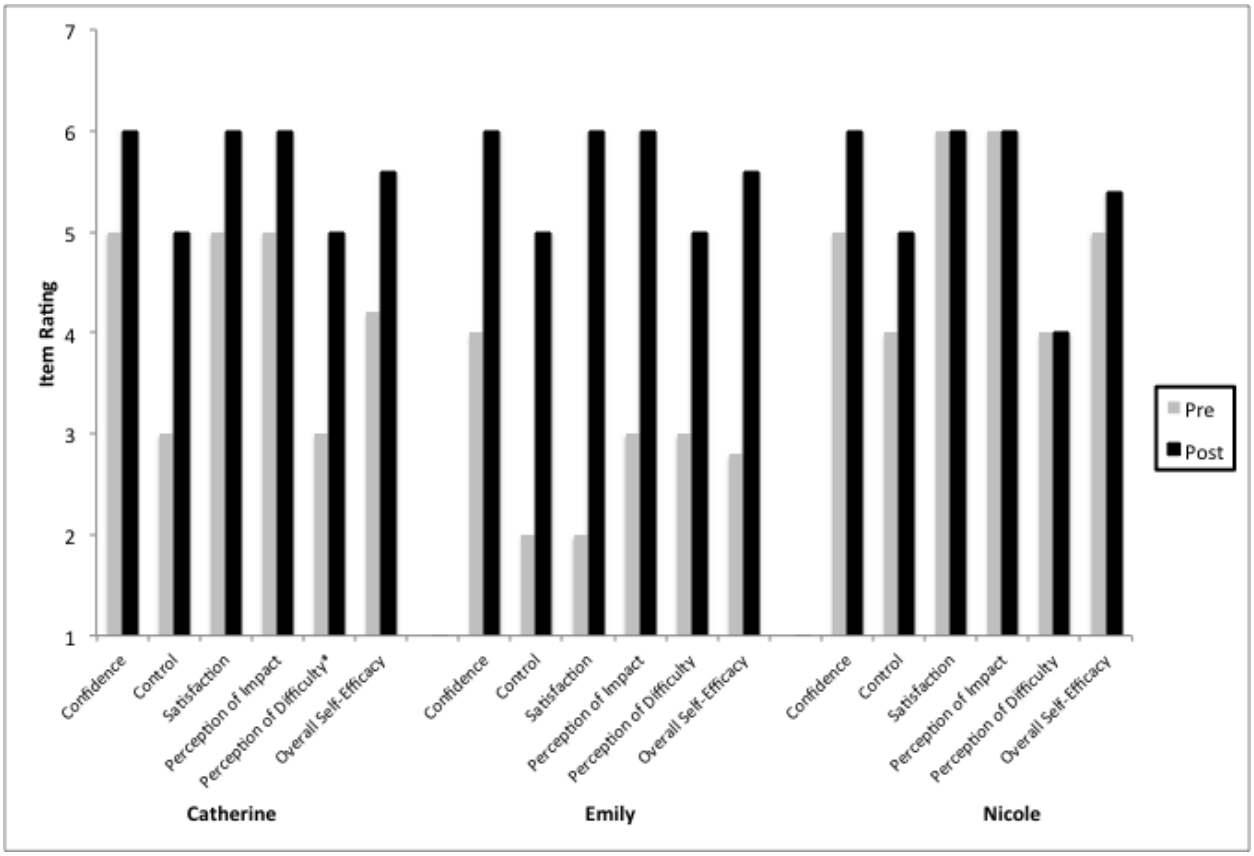
The results of the CHABAS support findings that shifts in beliefs about the cause of challenging behavior occurred for all participants, but these shifts were variably correlated with educators' discussion of cause during interviews. As found in the interviews, educators believed that there were many causes of challenging behavior. For each of the educators, their beliefs that challenging behavior is learned strengthened after they participated in this research. However, shifts in beliefs about other potential causes varied across participants.

At the start of the research, Catherine believed that challenging behavior was the result of learning, emotion, biomedical reasons (e.g., diagnosis), stimulation in the environment (e.g., bright lights), and the physical environment. Her highest rating of attributed cause was emotional. Following her participation in the research, her highest rating of attributed cause was learning. Her ratings of biomedical, stimulation, and physical environment as causes also increased; her rating of emotion as a cause of challenging behavior decreased.

Emily experienced the largest shift in causal beliefs. At the start of the research, she believed that challenging behavior was learned, caused by emotion, and caused by biomedical factors. Following her participation in the research, she only believed that behavior was learned. Her ratings decreased for all other attributed causes.

Nicole's responses to the CHABAS indicated major shifts in beliefs. Before engaging in this research, Nicole believed that behavior was learned and that it was due to students' emotions. Both of these beliefs strengthened slightly after her participation in the research. Interestingly, before participating in this research, Nicole indicated that she did not believe that challenging behavior was caused by biomedical factors, stimulation, or elements of the physical environment. However, she attributed cause to each of these things at the end of her participation.

Self-Efficacy Questionnaire



The self-efficacy measure (Hastings, 1997a) was a five-item Likert-style questionnaire that included questions related to educators' confidence in their ability to work with challenging behavior, perception of the difficulty of their work with challenging behavior, perception of the impact of their work with their students, satisfaction with their work with challenging behavior, and the extent to which they felt that they were able to control challenging behaviors. Catherine and Emily's responses indicate in increase in confidence, control, satisfaction, and perception of impact, and a decrease in perception of difficulty following participation in the implementation of the TBFA and subsequent treatment. Nicole's responses indicated increases in confidence and control, and no change in satisfaction, perception of impact, and perception of difficulty. The findings of this measure that indicate that all educators experienced a positive shift in feelings of self-efficacy are supported by the qualitative findings of this research.

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