

PARENT-IMPLEMENTED BEHAVIOR INTERVENTIONS VIA TELEHEALTH FOR
OLDER CHILDREN AND ADOLESCENTS

by

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DISSERTATION ABSTRACT

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Title: Parent-implemented Behavior Interventions via Telehealth for Older Children and Adolescents.

Children and adolescents with intellectual and developmental disabilities (IDD) are more likely to engage in challenging behavior than their typically developing peers. Challenging behavior has been linked to many negative outcomes including educational and social implications. The most effective interventions to address challenging behavior in children and adolescents with IDD incorporate function-based assessments. The results of these assessments are then used to develop individualized interventions. Functional communication training (FCT) is an evidence based practice to decrease challenging behavior. Natural change agents have served as effective interventionists for FCT. Parents are ideal interventionists because of the amount of time they spent with their children. Parents are also present for a variety of routines such as mealtimes, chores, and personal care, which may elicit challenging behavior. Behavioral parent training (BPT) can effectively teach parents to intervene on their child's challenging behavior, which can result in decreased frequency of challenging behavior and increased socially appropriate replacement behavior. There are limited skilled professionals who can provide function based intervention or train parents to do so. The use of telehealth can enable greater access to trained professionals and can decrease barriers to accessing services for parents

of children and adolescents with IDD. This study used withdrawal designs to determine whether BPT increased parent fidelity of implementation of function-based intervention which then resulted in decreasing rates of child challenging behavior while increasing rates of appropriate replacement behavior. Four participants aged 8-17 were included in the study with their parents serving as interventionists. The routines of concern were mealtime, toothbrushing, and room cleaning with various topographies of challenging behavior impacting the quality of these family routines. Each parent achieved high treatment fidelity with one session of BPT and bug-in-ear coaching. Three participants had an immediate decrease in challenging behavior upon the introduction of the intervention. Three participants showed reliable reversals to their challenging behavior with the withdrawal of the intervention and corresponding decreases in challenging behavior when the intervention was reintroduced. All parents reported high acceptability, ease of use, and contextual fit pre- and post-intervention. Results and implications for practice and future research were discussed.

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TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION AND LITERATURE REVIEW	1
Intellectual and Developmental Disabilities	2
Prevalence and Chronicity of Challenging Behavior.....	2
Common Topographies of Challenging Behavior	5
Impact on Individuals with IDD	6
Impact on Others.....	7
Evidence-based Assessment and Intervention for Challenging Behavior in IDD.	9
Functional Behavior Assessment.....	10
Experimental Functional Analysis.....	12
Function Based Interventions	14
Functional Communication Training.....	15
Behavioral Parent Training.....	17
Effectiveness of Behavioral Parent Training	18
Barriers to Accessing Effective Assessment and Intervention	19
Telehealth in the Field	20
Statement of Study Purpose	23
Research Questions.....	25
Conceptual Model.....	26
II. METHODS.....	27
Inclusion Criteria, Recruitment Procedures, Attrition	27
Inclusion Criteria	27

Chapter	Page
Recruitment Procedures	28
Attrition.....	29
Participants and Settings.....	29
Joe (Child) and Gina (Mother).....	30
Maddie (Child) and Catherine (Mother).....	30
Lucas (Child) and Catie (Mother).....	31
Henry (Child) and Daniel (Father).....	32
Settings	33
Interventionist	34
Target Routines and Behaviors.....	34
Joe	34
Maddie	35
Lucas	36
Henry	37
Equipment and Materials	39
Hardware.....	39
Software	40
Behavior Intervention Plan Materials.....	41
Experimental Phases.....	41
Phase 1: Functional Behavior Assessment	42
Procedures.....	42
Questions About Behavioral Function (QABF)	42

Chapter	Page
Functional Analysis Interview (FAI) – Young Children/Adolescents	43
Results.....	44
Phase 2: Experimental Evaluation of Intervention	45
General Procedures	44
Baseline Assessment.....	45
Intervention Strategies	46
Behavioral Parent Training (BST) on Behavior Intervention Plan.....	48
Parent-implemented Intervention.....	50
Experimental Design and Data Analysis	50
Experimental Design.....	50
Data Analysis	50
Response Measurement, Interrater Reliability, Treatment Fidelity.....	52
Dependent Variables and Response Measurement	53
Treatment Fidelity.....	54
Reliability.....	54
Interventionist Procedural Fidelity - Interview, Parent Training, and Coaching..	55
Procedural Fidelity.....	56
Social Validity Assessments	56
III. RESULTS	58
Joe and Gina.....	58
Maddie and Catherine	58
Lucas and Catie.....	59

Chapter	Page
Henry and Daniel	60
Visual Analysis	60
Joe and Gina.....	61
Child Challenging Behavior	61
Child Appropriate Behavior.....	61
Tau-U	62
Maddie and Catherine.....	62
Child Challenging Behavior	62
Child Appropriate Behavior.....	63
Tau-U	63
Lucas and Catie.....	64
Child Challenging Behavior	64
Child Appropriate Behavior.....	65
Task Analysis Completion.....	65
Tau-U	66
Henry and Daniel	67
Child Challenging Behavior	67
Child Appropriate Behavior.....	68
Time with Toothbrush in Mouth.....	68
Tau-U	69
Non-experimental Results.....	72
TARF-R Scores.....	72

Chapter	Page
Summary of Results.....	73
Research Question 1	73
Research Question 2	73
Research Question 3	74
Research Question 4	75
IV. DISCUSSION.....	76
Limitations	89
Conclusion	90
APPENDICES	91
A. EXPERIMENTAL PROCEDURES.....	91
B. SCREENING AND BEHAVIOR ASSESSMENT	93
C. PROCEDURAL FIDELITY CHECKLISTS.....	95
D. CHALLENGING BEHAVIOR AND FCT DATA SHEETS.....	108
E. BEHAVIOR SUPPORT PLANS	111
F. PARENT TRAINING PRESENTATIONS	119
G. SOCIAL VALIDITY ASSESSMENTS	130
REFERENCES CITED.....	133

LIST OF FIGURES

Figure	Page
1. Conceptual Model.....	26
2. Challenging Behavior and Appropriate Replacement Behavior (Joe).....	62
3. Challenging Behavior and Appropriate Replacement Behavior (Maddie).....	64
4. Challenging Behavior and Appropriate Replacement Behavior (Lucas)	66
5. Room Cleaning Task Analysis Completion (Lucas)	67
6. Challenging Behavior and Appropriate Replacement Behavior (Henry).....	68
7. Duration of Time with Toothbrush in Mouth (Henry).....	69

LIST OF TABLES

Table	Page
1. Participant Characteristics	38
2. Parent Characteristics.....	39
3. Summary of Results by Participant.....	70
4. Modified Treatment Acceptability Rating Form - Revised Results	73

CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Individuals with intellectual and developmental disabilities (IDD) are at increased risk for challenging behavior such as externalizing challenging behavior, which has the potential for harm to self or others (Amiet et al., 2008; Esbensen & Schwichtenberg, 2016; Rimmer et al., 2010). Challenging behavior is “any behavior that interferes with a child’s learning, engagement, and social interactions with their peers or adults” (Smith & Fox, 2003). Common topographies of challenging behavior include aggression (e.g., hitting, kicking, biting) and self-injurious behavior (SIB; e.g., head-banging, body hitting, self-biting; Brosnan & Healy, 2011; Kahng, Iwata, & Lewin, 2002). These challenging behaviors put them at risk for poor outcomes including residential, educational and employment opportunities (Lee, Harrington, Louie, & Newschaffer, 2008; Matson & Neal, 2009). Challenging behavior also negatively impacts parents by increasing risk for stress and depression (Blacher & McIntyre, 2006; Hastings & Brown, 2002). A recent review of the autism spectrum disorder (ASD) intervention literature found that studies addressing challenging behavior were the third most often studied ($n = 158$), behind social skills ($n = 165$) and communication ($n = 182$; Wong et al., 2015). The remainder of this introduction provides a summary of background literature about IDD, challenging behavior, effective interventions, the use of natural change agents to implement effective interventions, and the use of telehealth for the implementation of behavioral parent training.

Intellectual and Developmental Disabilities

ASD is an early emergent neurodevelopmental disorder characterized by social communication delays, and rigid and repetitive behaviors, interests, and activities (RRBIs; American Psychiatric Association, 2013). People with ASD may also have intellectual disability. Intellectual disability is a generalized neurodevelopmental condition characterized by deficits in intellectual functioning (IQ of less than 70) and adaptive functioning in two or more areas that manifest in the early period of development (American Psychiatric Association, 2013). Many individuals with ASD and other developmental disabilities (e.g., Down syndrome, Rett syndrome, Fragile X syndrome) also have co-morbid intellectual disability (La Malfa, Lassi, Bertelli, Salvini, & Placidi, 2004; American Psychiatric Association, 2013). People with IDD have an increased risk of developing challenging behavior. A population survey across the lifespan found that 10% of individuals with ID engaged in uncontrolled challenging behavior that caused harm to self or others (Lowe, Allen Jones, Brophy, Moore, & James, 2007). Another study of individuals with ASD found that adults with limited adaptive skills were less likely to participate in community and social activities (Felce, Peery, Lowe, & Jones, 2011).

Prevalence and Chronicity of Challenging Behavior

The prevalence of challenging behavior such as self-injury and aggression for individuals with IDD is between 5-52% based on varying sample populations (residential, general population sample, and treatment groups) and methods of assessment (direct observation or various questionnaires; Luiselli, 2012). The topographies of rapid eating, inappropriate mealtime behavior, and verbal aggression, physical refusal, and

noncompliance were of particular concern in this study. These behaviors impacted family routines and activities of daily living such as mealtimes, completing chores, and brushing teeth.

Prevalence estimates for non-compliant behavior in typically developing populations of adolescents is between 25 and 65% and reports of noncompliance in 4- to 7-year-olds is 50-85% (McMahon & Forehand, 2003). The presence of noncompliant behavior has been linked to aggression and psychiatric referral later in life and can affect teacher-child and parent-child relationships (Kalb & Loeber, 2003).

For individuals with IDD, noncompliant behavior during self-care routines that are escape maintained can carry risks for the individual in their future. Dental issues are prevalent for individuals with IDD with many requiring general anesthesia to undergo teeth cleaning and routine care. Individuals with IDD are more likely to have oral disease and experience adverse events post-operatively (Rada, 2013). A case review of individuals with IDD who received general anesthesia for treatment of dental needs found that they needed a higher level of treatment than their typically developing peers. These authors suggest a greater focus on preventative oral care such as daily toothbrushing for individuals with IDD (Lim & Borromeo, 2019).

Another aspect of noncompliance addressed in this study focused on activities of daily living, specifically the completion of household chores. Griffin and Copeland (2018) used a changing criterion design to assess the efficacy of a self-monitoring intervention on task completion and arguing for an adolescent with fetal alcohol syndrome. The authors found that the use of a checklist and differential reinforcement resulted in decreased arguing behavior and increased task completion.

Individual characteristics such as having a diagnosis of ASD or limited communication skills can increase the likelihood that certain topographies of challenging behavior such as aggression will emerge (Rojahn et al., 2001). Challenging behavior can emerge early in children with IDD, with research suggesting that stereotyped behavior in toddlers is likely a precursor for self-injurious behavior (SIB; Rojahn, Barnard-Brak, Medeiros, & Schroeder, 2016). Soke and colleagues (2016) reported that 27.7% of a sample of 8-year-old children with ASD receiving clinical services engaged in SIB. Existing prevalence estimates are based on specific groups within the population and population-based estimates have a wide range due to differences in assessment tools and sample populations (Luiselli, 2012).

Despite varying prevalence estimates, research supports the assertion that challenging behaviors are stable and chronic across early to middle childhood and into adolescence for individuals with ASD and ID (Matson, Mahan, Hess, Fodstad, & Neal, 2009). Certain topographies of challenging behavior are more likely to be chronic, such as self-injurious behavior, frequently occurring stereotypy, and aggression (Totsika, Toogood, Hastings, & Lewis, 2008). This may be due in part to the type of reinforcement gained by engaging in these behaviors. For example, stereotypy is maintained by automatic reinforcement, which makes it difficult to find a competing behavior or a behavior that can result in the same reinforcement. Totsika and colleagues suggest that caregiver behavior in response to SIB and aggression may be part of the reason these behaviors persist over time (2008). This indicates that socially mediated reinforcement available for these behaviors may be part of their persistence over time (Totsika et al., 2008).

Common topographies of challenging behavior. Challenging behavior can include topographies that cause harm to self and others such as self-injury (head-banging, scratching, and skin picking) and aggression (hitting, kicking, and biting; Drew, Machalicek, & Erturk, *in preparation*; Lowe et al., 2007). Other topographies may result in damage to property or disruption to social interactions with family, peers, and community members such as spitting, yelling, and stomping feet. Individuals may display many topographies of challenging behavior ranging from severe (self-injury and aggression) to less severe (no harm to self or others; Jang, Dixon, Tarbox, & Granpeesheh, 2010). These behaviors may also occur in a reliable hierarchy and may or may not exist within in the same response class. Behaviors in the same response class are defined as having the same antecedent and resulting in the same consequence (Cooper, Heron, & Heward, 2007).

Some individuals with specific diagnoses are more likely to develop certain topographies of challenging behavior due to the behavioral phenotype of the disability (Lord, Bishop, & Anderson, 2015). For example, individuals with ASD were more likely to engage in aggression than typically developing individuals or other etiologies of IDD such as Down syndrome (Blacher & McIntyre, 2006). Additionally, there are individual characteristics that can influence the development of challenging behavior such as gender. For example, males with ASD are more likely to engage in aggression than females with ASD (Matson & Adams, 2014). This behavioral phenotype can influence the development of challenging behavior. In addition, there are some individual factors that increase the likelihood of the development of challenging behavior, such as IQ and communication skills (Matson & Shoemaker, 2009). These individual factors, behavioral

phenotype, and other environmental factors can influence the development of challenging behavior. There are also operant learning and neurochemical factors of the individual that influence the maintenance of challenging behavior. Operant learning is the history of consequences that follow behavior in the individual's life (Cooper et al., 2007).

Neurochemical factors include the biofeedback mechanisms that result from the challenging behavior. Some studies have shown that over time, an individual's brain chemistry can change in reaction to prolonged exposure to self-injurious behavior (Summers et al., 2017). Research shows that the occurrence of early onset of repetitive behavior increases the likelihood of developing self-injurious behavior in the future and can be an early risk marker for children with ID (Oliver, Petty, Ruddick, & Bacarese-Hamilton, 2011). Health issues, especially conditions involving chronic pain, may also manifest as challenging behavior. Thus, it is important to evaluate medical histories and health concerns prior to the delivery of behavioral interventions.

Impact on individuals with IDD. Individuals with IDD who engage in severe challenging behavior have increased risks for their own physical health and quality of life outcomes. Children with ASD have greater risk of physical injury when compared to other populations, including typically developing children, children with medical conditions, and children with specific learning disabilities (Lee, Harrington, Chang, & Connors, 2008). These individuals may also have decreased quality of life, higher levels of educational segregation, and decreased time in community settings (Matson & Neal, 2009; Lee, Harrington, Louie, & Newschaffer, 2008). Even for less serious challenging behavior, social and learning outcomes may be affected. For example, engagement in frequent vocal stereotypy or other behaviors that compete with learning opportunities can

decrease time on task and present as a major barrier in educational and social settings. With these behaviors, there may also be an increase in challenging behavior when the behaviors are redirected (Rispoli et al., 2016; Scalzo & Davis, 2016). Moreover, the relationship between challenging behavior and social skills is complex. One study found that children with ASD who had higher levels of challenging behavior also had lower levels of social skills and that challenging behavior adversely affected the acquisition of social skills (Matson, Hess, & Mahan, 2013). Additionally, challenging behavior may lead to the use of intrusive interventions such as physical restraint and the use of protective equipment, and has also been shown to increase the off label use of psychotropic medications. Medication use in this population has many complications including the use of polypharmacy, overmedication when compared to the general population, and the potential negative side effects of medications (Marshall, 2004).

Impact on others. Challenging behavior also affects the lives of caregivers, siblings, and teachers who interact with individuals with IDD. Parents and siblings of individuals with ASD and other IDD diagnoses are more likely to have elevated symptoms of emotional distress and depression (Neece, Green, & Baker, 2012; Yorke, White, Weston, Rafla, Charman, & Simonoff, 2018). Additionally, there is evidence that stress for parents and siblings is directly related to challenging behavior exhibited by the child/sibling (Shivers, McGregor, & Hough, 2019). Studies have shown that elevated child problem behavior exacerbated parent stress over time accounting for the most variance in parent stress in a transactional relationship (Lecavalier et al., 2006; Neece et al., 2012). These effects are differential across disability category, race/ethnicity, family context, and parent's coping strategies with some parent groups reporting differing stress

levels across groups. For example, a study of caregivers of adolescents with ID found differential stress levels based on ethnic group. Latina mothers experienced significantly higher depression symptoms and scored lower on morale indicators than their white counterparts even though both groups did not differ on the behavior disorder measures. Additionally, Latina mothers also scored higher on “Positive Impact” indicators independent of child diagnoses (Blacher & McIntyre, 2006). Another study found that mothers of children with ASD who scored higher of measures of externalizing challenging behavior experienced family dysfunction used more disengaged coping strategies, and were more stressed than other mothers of children with ASD (Zaidman-Zait et al., 2017). At a 2-year follow up, the mothers who experienced more stress at the first time point were also more likely to experience increased stress.

Disability and challenging behavior can also have an impact on the stress experienced by siblings as well. One study found that siblings of children with ASD, when compared to siblings of children with Down syndrome, attributed a significantly larger amount of their stress to their sibling independent of challenging behavior levels (Shivers, McGregor, & Hough, 2019). Other studies found that challenging behavior did significantly predict anxiety in siblings (Shivers, Deisenroth, & Lounds Taylor, 2013). A recent meta-analysis found that siblings of children with ASD have worsened outcomes when compared to siblings of children with other IDD categorizations such as Down syndrome and children with non-disabled siblings, which may be linked to autism-specific characteristics including challenging behavior. The areas of significant difference include worsened internalizing (anxiety and depression) and externalizing challenging

behavior, social functioning, and sibling relationships (Shivers, Jackson, & McGregor, 2019).

Evidence-based Assessment and Intervention for Challenging Behavior in IDD

Evidence-based practices for individuals with IDD are deemed “efficacious or likely efficacious” at addressing challenging behavior based on reviews conducted by researchers (Warren et al., 2015; Wong et al., 2015). These evidence-based practices include functional assessment and using these assessments to design behavioral interventions that address the function of the challenging behavior (National Autism Center, 2015; Wong et al., 2015). Topography of challenging behavior is not related to function and must be appropriately assessed to determine appropriate function-based treatment (Cooper et al., 2007). Function-based behavioral interventions have been shown to be more effective than non-function-based interventions across settings and functions (Machalicek et al., 2016). These behavioral interventions can address motivating operations, antecedents, or consequences of the challenging behavior (Cooper et al., 2007). The interventions may also teach a new behavior for the individual to engage in that matches the function of the challenging behavior. The function of a behavior is the “why” of behavior and related to the type and quality of reinforcement obtained immediately after engaging in challenging behavior. The most common functions of challenging behavior for both typically developing children and youth and those with IDD are: (a) negatively reinforced challenging behavior in the form of escape from or avoidance of demands, activities, settings, adult or peer attention that the person finds relatively aversive (e.g., academic task), (b) positively reinforced challenging behavior in the form of access to highly preferred items, activities, places, or attention

from adults or peers, and (c) automatically reinforced challenging behavior in the form of physiological or perceptual reinforcement obtained through sensory input (Luiselli, 2012). These consequences (attention, access to tangible, escape from social demand) follow one or more behaviors and increase the likelihood of the same behavior occurring in the future through operant conditioning (Cooper et al., 2007). Many behavioral interventions such as differential reinforcement, extinction, and antecedent-based interventions have met the research thresholds for evidence-based practices for individuals with IDD and can be used in accordance with the individual's right to effective treatment (Wong et al., 2015). The appropriate selection of intervention strategies that match the operant function of the individual's challenging behavior is reliant on the implementation of a technically adequate functional behavior assessment (FBA).

Functional behavior assessment. Operant behavior occurs as part of a four-term contingency which consists of motivating operations, antecedents, behaviors, and consequences (Cooper et al., 2007). These contingencies are one component assessed during an FBA and as such, are briefly defined in the section that follows. Motivating operations refer to internal states such as deprivation or satiation, such as relative deprivation of sleep or satiation of food. Motivating operations temporarily increase both the value of a reinforcing consequence and the frequency of the behavior that has resulted in reinforcement in the past and can exist to both establish behavior (establishing operation) or abolish behavior (abolishing operation; Cooper et al., 2007).

Antecedents are stimuli preceding any behavior that signal that a reinforcing or punishing consequence is available. For example, observing a plate of apples on the table

may serve to signal that the snack is available if a child says, “*I want apple.*” Behavior is “observable activity of an organism; anything an organism does that involves action and/or response to stimulation” which can include private events or thoughts (Wallace et al., 1991); however, in relation to the current discussion, challenging and adaptive behavior are discussed during an FBA. Consequences are changes in the environment or in physiological states that occur immediately after a behavior. Consequences are reinforcing or punishing stimuli that increase or decrease the future likelihood that the individual will engage in the behavior (Cooper et al., 2007).

The purpose of an FBA is to provide the best hypothesis for the operant function of an individual's challenging behavior and gather information about possible motivating operations, antecedents, topographies, frequency, intensity of challenging behavior, and the type, frequency, and quality of consequences typically following challenging and adaptive behavior (Matson, 2012). Common functions of challenging behavior are: escape, tangible, automatic, and attention. Each operant function requires interventions designed to address the consequence(s) maintaining the challenging behavior. The term FBA is inclusive of both indirect and direct forms of assessments. For example, the FBA often begins with indirect assessments such as interviews with parents, teachers, and the individual about daily routines, the circumstances under which the challenging behavior is most likely and least likely to occur, the topography of the challenging behavior, and any medications or health concerns that may affect the occurrence and non-occurrence of challenging behavior (O’Neill et al., 1997). Other structured questionnaires such as the Questions About Behavioral Function (QABF) have also been shown to produce valid

functional assessments (Paclawskyj et al., 2000) when compared to direct FBA assessments such as experimental functional analysis.

Following indirect assessment, the FBA process may then move into more direct assessment methods such as direct observation data collection on antecedent, behavior, and consequence (A-B-C) data, frequency and duration of challenging behavior across or within routines. A trained staff member, service provider, or behavior analyst can use the data gathered during this process to hypothesize the function of the challenging behavior and to design an intervention that addresses the environmental factors around the challenging behavior such as motivating operations, antecedents, and consequences. The intervention may also require the parent or teachers to teach the individual a new behavior to engage in to receive the same consequence as the challenging behavior (Matson, 2012).

Experimental functional analysis (FA). The results of an FBA can only serve as a hypothesis about the operant function of challenging behavior. The experimental FA requires the careful arrangement and systematic manipulation of antecedents and consequences within an experimental single-case research design such as an alternating treatments design (Ledford & Gast, 2018) such that a hypothesized operant function can be experimentally tested. Generally, experimental FA methodology uses 10 min test and counter test conditions alternated with control conditions (Matson, 2012). The standard set of conditions are: play/control (no demands, free access to toys, and attention on a fixed interval schedule and challenging behavior has no programmed consequence), demand (developmentally appropriate demands are presented on a fixed interval schedule and each instance of challenging behavior results in a 30 s withdrawal of the demand and

demand materials), diverted adult attention (interventionist asks the child to play by themselves with neutral items while the interventionist averts their attention (each instance challenging behavior results in brief physical contact and verbal interaction from the interventionist), and tangible (items or activities the child likes are presented for a predetermined amount of time, the interventionist removes the items and each instance of challenging behavior results in 30 s access to the tangible item; Iwata, Dorsey, Slifer, Bauman, & Richman, 1994). This methodology may also require other conditions such as divided attention in which the therapist talks to another person after telling the individual to play by themselves or alone or minimal attention conditions which tests for the automatic or sensory function. FA methodology is not always socially valid or appropriate dependent on contextual factors such as the setting of the assessment, interventionists' skill, and the severity of challenging behavior. There are modified versions of the FA methodology that may be more appropriate and have been empirically tested such as brief functional analysis, latency functional analysis, and trial-based functional analysis (Lambert et al., 2017; Larkin, Hawkins, & Collins, 2016; Fee, Schieber, Noble, & Valdovinos, 2016). These methods may be more feasible for parents in homes to carry out due to their brief format, the complexity of the assessment, and parent concerns about the FA methodology. These methods have varying levels of concurrent validity with Iwata-style FAs and can be used as alternatives. The operant function of challenging behavior can be determined by identifying the condition with the highest levels of challenging behavior. High levels of challenging behavior across conditions could indicate an automatic reinforcement function or multiply maintained challenging behavior (Cooper et al., 2007). The use of FA methodology can strengthen

the effectiveness of an intervention and help narrow the treatment parameters. Research supports training parents to conduct FAs via telehealth (Wacker et al., 2013b). Wacker and colleagues coached parents to high fidelity in conducting FAs. Coaching sessions took place at regional clinics and 18 out of 20 cases resulted in the identification of the maintaining variables of challenging behavior.

Function based interventions. Once the operant function of the target challenging behavior has been hypothesized, intervention design can begin. Function-based interventions are specifically focused on addressing the function(s) of the challenging behavior and when possible allowing the individual to access reinforcement in a more socially appropriate way than by engaging in challenging behavior. For example, for an individual who engages in verbal aggression such as making threats to escape demands to complete homework, the intervention may include teaching the individual to verbally request a delay in the start of the homework routine or a break during the demand activity. For an individual whose SIB is automatically maintained, a function-based intervention may involve blocking the self-injurious behavior using safety equipment and providing tangible reinforcement for engagement in an incompatible behavior (differential reinforcement of incompatible behavior). For example, for a child who engages in face slapping, a teacher or parent may place their hands between the child's hand and face and reinforce the child for playing with a toy. Function-based interventions may include motivating operations manipulations such as increasing the frequency, duration, or intensity of a particular consequence available to an individual or by changing the discriminative stimulus that signals the availability of a reinforcing consequence. This could mean allowing for free access to a tangible item for a time

before teaching sessions leading to habituation to decrease the motivation to engage in challenging behavior to obtain the object (Davis et al., 2006; Rispoli et al., 2011; Rispoli et al., 2014; O'Reilly et al., 2009).

Stimulus control type interventions are a type of antecedent strategy that alter environmental stimuli that signal the availability of reinforcement for challenging or appropriate behavior such as creating a visual schedule for the individual to decrease challenging behavior during transitions (Lequia, Machalicek, & Rispoli, 2012). Lastly, there are consequence-based interventions to address reinforcement or punishment contingent on the occurrence and non-occurrence of challenging behavior (Brosnan & Healy, 2011). This includes differential reinforcement procedures, which is the reinforcement of lower levels of challenging behavior (DRL), behaviors incompatible with challenging behavior (DRI), alternative behaviors (DRA), and other behavior (DRO). Another intervention procedure that does not fit readily into these other categories is extinction, or the separation of behavior and consequence through repeated lack of reinforcement for a behavior (Cooper et al., 2007). For example, if a child screams to be allowed to leave the table during dinner, the parent can block their attempts to leave the table (extinction) and prompt them to say, "Play now", or some variation of a response and reinforce the new response (DRA).

Functional communication training. One evidence based practice to address challenging behavior includes teaching a new response to obtain the same consequence as previous challenging behavior called functional communication training (Wong et al., 2015). This intervention has been used with individuals across the lifespan to address functions of challenging behavior in many settings and with both natural change agents

and clinicians (Wong et al., 2014). Functional communication training (FCT) involves teaching the individual to engage in a more socially appropriate communication response to obtain the same reinforcement as was previously gained by engaging in challenging behavior. The new response or functional communication response (FCR) needs to be easier for the individual to engage in than the challenging behavior and must be reinforced heavily during the beginning of the intervention. The individual is taught the FCR and then the new response is reinforced (Luselli, 2012). There are many variants on this intervention with various reinforcement fading procedures such as the use of multiple schedules both signaled and unsignaled (Greer, Fisher, Saini, Owen, & Jones, 2016; Hagopian, Boelter, & Jarmolowicz, 2011). These variations have been effective in achieving clinically significant decreases in challenging behavior.

FCT can be readily packaged with other interventions and is most commonly used in conjunction with extinction due to increased effectiveness (MacNaul & Neely, 2018). As previously noted, there are various methods of thinning reinforcement schedules including moving quickly to the terminal schedule of reinforcement, using multiple schedules of reinforcement, and signaling the availability and unavailability of reinforcement (Hagopian et al., 2011). FCT paired with extinction is a powerful and effective intervention for addressing challenging behavior (Wong et al., 2015). Research shows that this procedure has been effectively conducted by parents, teachers, and other natural change agents. For example, Fisher, Rodriguez, and Owen (2013) implemented an FCT intervention to address perseverative speech in a clinical setting that was then generalized to the home setting for a 14-year-old boy with ASD. Similarly, Hanley, Jin, Vanselow, and Hanratty had parents serve as interventionists for 8- and 11-year-old boys

who engaged in challenging behavior related to being told “no” and parents not complied with idiosyncratic requests (2014). These findings support the use of FCT with clinicians or parents in clinical settings that FCT can be generalized into the natural environment.

Behavioral Parent Training

Behavioral parent training (BPT) has been designated an established treatment to address many types of disruptive behavior disorders including attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder, and conduct disorder (Chacko et al., 2016). Behavioral parent training is behavior skills training used with parents and includes four required components: didactic instruction and discussion, modeling of targeted skills, rehearsal of targeted skills with role play and with own child, and performance feedback (Dib & Sturmey, 2012). BPT has also been used to address early social emotional skills such as joint attention, and to teach Pivotal Response Treatment (PRT) for children with ASD (Hansen et al., 2017; Machalicek, Lang, & Raulston, 2015; Tarbox, Garcia, & St. Clair, 2016). When addressing child challenging behavior, didactic teaching allows the parent to learn the reasoning for function-based intervention and for their child’s individualized intervention. The practice opportunities allow the parent to implement the intervention in a controlled setting using role play and receive feedback on their use of skills from a trainer or expert while they practice with their own child.

BPT has also been used to address challenging behavior in for individuals with IDD specifically. Many studies have addressed the use of behavioral interventions for young children both in vivo and via telehealth (Machalicek, Raulston, Drew, & Ruppert, 2015; Machalicek et al., 2016; McDuffie et al., 2016). Gerow and colleagues taught

parents of young children with developmental delays to successfully implement FA and FCT procedures in home settings (2017). Parents were able decrease child challenging behavior and maintain high treatment fidelity; however, generalization to new routines showed mixed effects (Gerow, Rispoli, Ninci, & Hagan-Burke, 2017). A recent review of studies with parent-implemented FCT included 26 studies that implemented this procedure with 69 child participants and 78 parent participants. Of the child participants, only 10 (15%) were older than 5 years of age. This demographic skew highlights the need for extending the literature to include older individuals. The authors of the review also expressed concerns about the single case quality indicators for the included studies. The researchers used Horner (2005) and Reichow (2008) standards and the studies only met about half of the social validity indicators ($M = 5.7$; range = 4 - 9) out of 10 indicators. The authors also concluded that while parent-implemented FCT has sufficient evidence to support its efficacy for young children, there is not enough research to support its use with older populations (Gerow, Hagan-Burke, Rispoli, Gregori, Mason, & Ninci, 2018).

Effectiveness of behavioral parent training. Research into the use of BPT has shown that parents are able to attain high levels of treatment fidelity for some interventions and clinically significant decreases in child challenging behavior. A review of FCT found that few studies ($n = 9$; 35%) of studies reported parent treatment fidelity. For the studies that did include treatment fidelity data, the majority of parents performed at 80% or higher (Gerow et al., 2018). Parent treatment fidelity should be more thoroughly reported because if there is the potential to see gains in child behavior with lower than 80% fidelity, this information would be helpful for clinicians and researchers

and inform practice guidelines. Child challenging behavior results showed significant decreases in each of the 26 included studies reviewed by Gerow and colleagues.

Barriers to Accessing Effective Assessment and Intervention for Challenging Behavior

While there is growing recognition of behavioral services and the use of evidence based practices to address challenging behavior, there are still substantial barriers to obtaining services (Kogan et al., 2008). First, there are limited professionals and specialists who are trained in behavioral interventions and have the skills to carry out parent training and these professionals are concentrated in metropolitan areas of the country and specific states (BACB). There are often waitlists for appointments with diagnostic personnel and to access service providers which can be complicated by insurance requirements (Gordon-Lipkin, Foster, & Peacock, 2016). An additional burden may be placed on families who live in rural areas. One survey found that rural residents reported driving longer distances and experiencing longer wait times to access services than their non-rural peers. Respondents also reported lower utilization of behavior supports such as home and school behavior supports as well as parent supports like workshops, support groups, or speaking with other parents (Mello, Urbano, Goldman, & Hodapp, 2016). For other service providers (occupational therapy, private and school-based speech language) the gaps between rural and non-rural service utilization are smaller than for behavior supports (Mello, Urbano, Goldman, & Hodapp, 2016). While 46 states in the U.S. required that insurance companies cover applied behavior analysis (ABA) services, some states also only cover ABA for individuals with ASD or individuals with self-injurious behavior (National Conference of State Legislatures,

2018). This leaves individuals diagnosed solely with intellectual disability and other topographies of challenging behavior to pay out-of-pocket costs (Oregon Health Plan). There is also a limited number of qualified ABA service providers depending on the location of the client (BACB). Children with IDD who are unable to obtain ABA services may then be only receiving services through their local school district or state programs. One strategy for increasing access to evidence based practices for challenging behavior and other autism-related characteristics is telehealth.

Telehealth in the Field

Telehealth has been used in the medical and healthcare fields to address shortages of qualified personnel, provide supervision to medical, mental health, and educational professionals, and assist individuals needing support with complex procedures (Delaigue, Morand, Olson, Wootton, & Bonnardot, 2014; Hilty et al., 2013). Specialists of all kinds, including speech language pathologists, occupational therapists, and board certified behavior analysts, have successfully used telehealth modalities to serve clients and train others. Telehealth is in use in state programs like Part C which serve many families (Cason, Behl, Ringwalt, 2012; Mashima & Doarn, 2008). In special education, teachers have been trained to conduct assessments and implement behavioral interventions and early intervention programs for children with ASD (Boivert, Lang, Andrianopoulos, & Boscardin, 2010). Telehealth has also been used to train parents in the Early Start Denver Model of intervention (Vismara, McCormick, Young, Nadhan, & Monlux, 2013). Eight out of nine dyads completed the weekly online trainings. The authors found that increased parent engagement with the telehealth online program and coaching sessions increased parent's responsivity and positive affect. Preliminary research supports a 6-

month intervention program via telehealth to address behavioral concepts and interventions (Bearss et al., 2017). Bearss and colleagues found that many child outcomes showed improvement including scores of social withdrawal, stereotypies, hyperactivity, and inappropriate speech on the Aberrant Behavior Checklist (ABC; Aman & Singh, 2017; Bearss et al., 2017) and 11 out of the 14 participants were rated as “much improved” or “very much improved” by an independent evaluator on the Clinical Global Impression: Improvement Scale (CGI-I; Guy, 1976). There was no effect on Vineland Adaptive Behavior Scales scores (Bearss et al., 2017; Burger-Caplan, Saulnier, & Sparrow, 2017). There is also research on behavioral parent training for parents of very young children targeting imitation skills (Wainer & Ingersoll, 2015). A systematic review of telemedicine for use for individuals with ASD found 35 studies that met inclusion criteria (Knutsen et al., 2016). The studies included behavioral interventions delivered via telehealth that successfully addressed challenging behavior.

There has been a substantial amount of research on the use of telehealth to address challenging behavior in individuals with ASD. This research has addressed a wide range of topographies, but has focused mostly on young children. Machalicek and colleagues (2016) and Sues and colleagues (2016) included participants over the age of four in their telehealth studies. These studies found that parents could implement challenging behavior assessments and interventions effectively via telehealth with clinically significant decreases in challenging behavior. Behavioral interventions such as FCT have been used successfully by parents to treat challenging behavior via telehealth (Wacker et al., 2013a; Boisevert et al., 2010; Wainer & Ingersoll, 2015).

At this time, there is limited research addressing the use of BPT with older children with ASD/IDD via telehealth. While FCT has been shown to be an evidence based practice along with BPT and has been delivered via telehealth, the participants have been mostly young children. One example is the work of Sues and colleagues who delivered BPT via telehealth to intervene on challenging behavior (2014). All 5 participants were younger than 8 years of age. Families of older children and adolescents may face additional barriers to accessing services including parent stress and more complex scheduling needs (Jose et al., 2017); however, they have a right to effective treatment and may also benefit from these interventions. Previous research has shown that telehealth treatment for young children with ASD is a more cost-effective way to address the needs of this population in terms of family expenses and professional staff costs while effectively decreasing challenging behavior and maintaining high parent social validity ratings (Lindgren et al., 2016).

BPT studies also have a history of high attrition, and researchers should focus on why participants drop out and concrete steps to decrease the threat of these factors during BPT (Chacko et al., 2016). A recent study on BPT for parents of children with ASD found facilitators of BPT that increase participation are supportive and individualized feedback from professionals, increased accessibility, affordability, flexibility, and social-emotional support and connection with a community (Raulston, Heineman, Caraway, Pennefather, & Bhana, 2018). The current research provided individualized and supportive feedback, used telehealth to address transportation and distance barriers, was free to the participants, and had flexible scheduling to meet the needs of family obligations. Additionally, telehealth enables service provision in family homes which can

ameliorate barriers parents face living in rural areas or areas where specialist availability is limited.

While there has been one very recent study that addressed FCT and BPT with school aged children with IDD via telehealth, this study was conducted with only two participants and focused exclusively on self-injurious behavior. Further, social validity was not addressed and parents were not able to choose the routines to target (Benson, Dimian, Elmquist, Simacek, McComas, & Symons, 2018). The current research study included four parent-child dyads and assessed the social validity of the intervention to determine parents' views on the behavior support plans created by the interventionist.

Statement of Study Purpose

Many children and adolescents with IDD engage in challenging behavior. Individuals who engage in these challenging behaviors are at risk for subsequent adverse effects including decreased quality of life, increased use of polypharmacy, and decreased time spent in community settings (Hastings & Brown, 2002; Lee et al., 2008; Matson & Neal, 2009). Child challenging behavior can also contribute to parent stress and the relationship may be bidirectional (Gallagher, Pilch, & Hannigan, 2018; Zaidman-Zait et al., 2014). As an additional concern, parents of children and adolescents with challenging behavior have an increased risk of negative outcomes such as depression and burnout. These factors may serve as barriers to implementation of assessments and interventions and retention in research studies (Blacher & McIntyre, 2006; Hastings & Brown, 2002; Jose et al., 2017; Raulston et al., 2018).

Challenging behavior requires function-based assessment and intervention (Davies & Oliver, 2013). BPT is an effective means to increase parent implementation of

behavioral interventions with children with IDD and decrease rates of challenging behavior (Wacker et al., 2013). There are gaps in the current research on challenging behavior. These gaps include the limited number of studies conducted in natural environments employing natural change agents such as parents and teachers, and the limited use of BPT to address the needs of the adolescent population with IDD (Drew, Machalicek, & Erturk, in preparation; Erturk, Machalicek, & Drew, 2017; Gerow et al., 2018). The insufficient number of studies addressing this population result in a gap in evidence based practice that leaves researchers and practitioners without enough information to make treatment decisions. Challenging behavior is not likely to diminish over time without intervention, and even with intervention by professionals, families and practitioners are faced with issues such as resurgence, reinstatement, and renewal (Falcomata, Hoffman, Gainey, Muething, & Fienup, 2013; Hoffman & Falcomata, 2014).

Current research literature has some support for the use of telehealth with families of school age children with ASD who engage in challenging behavior (Machalicek et al., 2016). Telehealth may also address local shortages of trained behavior professionals and meet the needs of this population (Knutsen et al., 2016). One area in the literature in need of further study is the use of telehealth to address challenging behavior in older children and adolescents. Most telehealth research included only young children. This study increased the generalizability of previous findings on the efficacy of telehealth to address challenging behavior in older populations.

This single-case research study aimed to address challenging behavior exhibited by children with IDD through a telehealth-delivered behavioral intervention implemented by parents using A-B-A-B design. Functional behavior assessments (FBA) composed of

questionnaires, interviews, and observational methods were used prior to the collaborative development of a function-based behavior intervention plan with the participating parent and implementation of BPT via telehealth. A-B-A-B withdrawal designs and modified Treatment Acceptability Rating Forms (Reimers & Wacker, 1988) were used to answer the following research questions:

1. Does behavioral parent training (BPT) delivered via synchronous telehealth (i.e., videoconferencing) result in increased parent treatment fidelity of a function-based intervention with their child during naturally occurring routines? (Non-experimental question)
2. Is there a functional relation between increased parent implementation of a function-based intervention and a decrease in rate of target challenging behavior displayed by a child with IDD during naturally occurring routines? (Experimental question)
3. Is there a functional relation between increased parent implementation of a function-based intervention and an increase in the rate of adaptive/replacement behavior displayed by a child with IDD during naturally occurring routines? (Experimental question)
4. Do parents find the procedures of the function-based intervention delivered via synchronous telehealth (i.e., videoconferencing) beneficial and acceptable to the target child with IDD and their family? (Non-experimental question)

Figure 1 below illustrates the conceptual model for the current study.

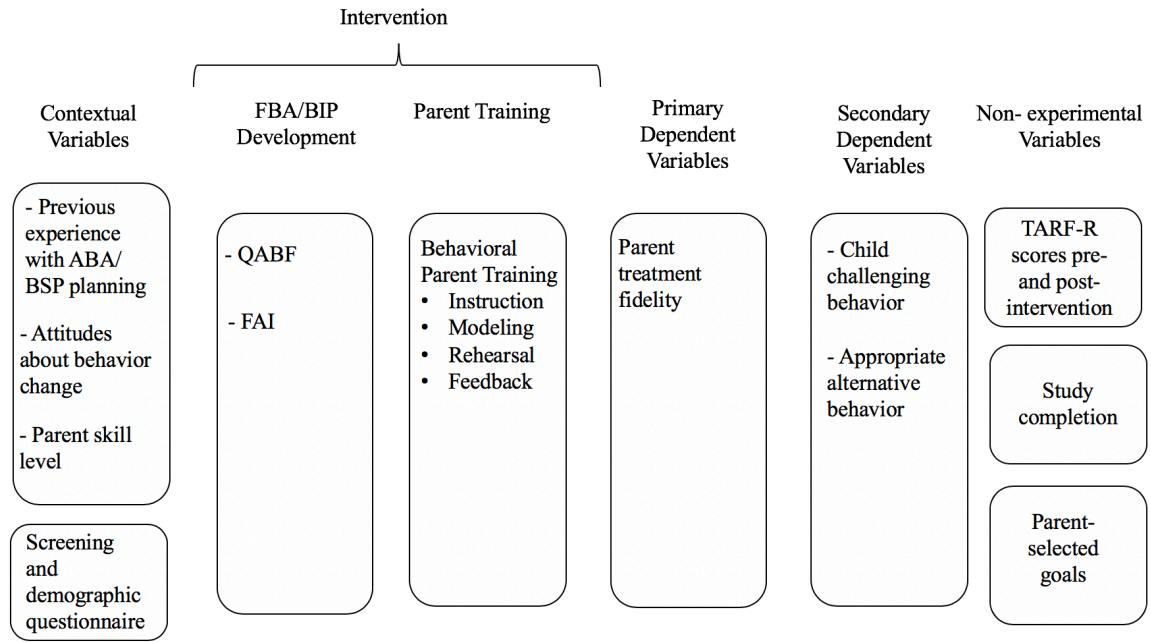


Figure 1. Conceptual model

CHAPTER II

METHODS

The following section includes information about recruitment, attrition, participant characteristics, settings, target routines and challenging behavior, indirect and direct assessments, data collection, experimental design and procedures, and data analysis.

Inclusion Criteria, Recruitment Procedures, Attrition

Inclusion criteria. Children were (a) between 7 and 18 year of age and had a researcher-confirmed diagnosis of a developmental disability from a developmental pediatrician; (b) exhibited mild to moderate challenging behavior (verbal aggression, whining, flopping onto the floor, yelling, task refusal, and pushing items) that did not cause physical harm to self or others. Examples of serious challenging behavior included self-injury, aggression, or elopement from safe areas. If the child engaged in such serious challenging behavior, the interventionist used the Functional Analysis Interview (FAI) to collect information on the circumstances under which these topographies of challenging behavior occurred (O'Neill et al., 1997) and to create decision rules if serious challenging behavior occurred; and (c) spent at least 2 hours in their home setting at least 5 days a week with the participating parent. Parents were (a) at least 25 years old; (b) had access to at least one internet-capable mobile device with a video camera, microphone, speaker, and Bluetooth™ connectivity (see materials section) with regular WiFi access; and (c) were willing to participate in behavioral assessment and intervention 2 - 3 times a week for 30 minutes minimum and 60 minutes maximum (depending on type of session conducted) for 15 – 20 weeks.

Recruitment procedures. Local service providers including developmental pediatricians and speech and language pathologists were contacted via email. These service providers then spoke with families who met the inclusion criteria for the study (age range, mild to moderate challenging behavior, diagnostic criteria, etc.) and with parent permission signed a release of information form. The service provider then gave the parent's contact information to the interventionist. The interventionist used information from the service provider and reached out via phone to families. Seven families were referred by service providers. All responded to a phone call from the interventionist.

Once the parent responded to initial contact by the interventionist, a phone screening was conducted prior to obtaining consent. This included the following questions: (a) Do you have access to the internet and either a personal desktop/laptop or smart device with video capabilities? (b) Is your child between 7 and 18 years old? (c) Does your child have a medical or educational diagnosis of autism/ASD and/or intellectual disability? (d) Does your child engage in challenging behavior on a daily basis that interferes with the quality of one or more routines? (e) Are you willing to participate in training that involves videotaping your interactions with your child in your home and participating in regular online coaching? (f) Is this behavior dangerous to themselves, others, and/or important property? If the parent answered "yes" to each question and "no" to the last question, then they moved into Phase I of the study. If they answered "no" to any question except for the last question, then they were referred to the College of Education HEDCO Autism Clinic for assessment. If they answered "yes" to the last question, they were asked these follow up questions: (a) How often does the

challenging behavior occur? (b) Describe the behavior to me (c) Are there times when you can be sure the challenging behavior will occur? (d) Are there times when you can be sure the challenging behavior will not occur? and (e) Are there any “warning” behaviors that may happen before the severe challenging behavior? If the parents were able to specify exactly when the behavior occurred or stated the behavior occurred less than 3 times a month or has not occurred in 6 or more months, then they were included in the study.

Attrition. Of the seven dyads initially referred, six dyads met screening inclusion criteria. The dyad that did not meet initial inclusion criteria was referred to an assessment clinic at the University of Oregon. Based on the completed assessment, this dyad was included in the study. All seven dyads consented to participation. Four dyads completed the entire study and three were lost to attrition. Two dyads left the study because the child demonstrated decreased challenging behavior prior to or during baseline observations. A third dyad was lost following baseline assessment due to the parent failing to respond to phone, email, and text communication for two months. At the conclusion of the study, the parent reported that their work and school schedule made appointments unsustainable.

Participants and Settings

Joe (child) and Gina (mother). Joe was a 15-year-old white male with ASD and ID diagnosed by both a school-based IEP team and a developmental pediatrician. He attended a local public high school self-contained program for students with significant needs and was in the 10th grade. He communicated using idiosyncratic signs, one-word verbal utterances, leading, pointing, and touching his caregivers’ shoulders and arms and items to ask for items or activities that he wanted. Gina reported that Joe enjoyed

spending time with his mother in the community and communicating about his favorite activities: elevators, escalators, and tractors. Joe lived with his biological mother (Gina) and father, and his biological younger brother. Gina was a white female who worked part time as a registered nurse. She reported the family had an income with “lots of extra” money and “always” having money to buy nice things. Joe's mother reported that he engaged in challenging behavior such as eloping in public places, pinching caregivers and peers, and tapping and touching inanimate objects and people. Joe took Sertraline (selective serotonin reuptake inhibitor) for anxiety (100 mg) and Clonidine (alpha two adrenergic blood pressure medication) for sleep (0.3mg) daily for the past 2 years, and Gina reported no medication changes during the study. Joe was under the care of a developmental pediatrician who approved him for participation in this intervention. The interventionist periodically updated the developmental pediatrician on the progress of the intervention.

Maddie (child) and Catherine (mother). Maddie was a 15-year-old white female with ASD, ID, mild cerebral palsy, low vision, and thyroid vestibular syndrome diagnosed by a developmental pediatrician. She attended a local public high school self-contained program for students with significant support needs and was in 9th grade. She communicated in short sentences via vocal verbal speech and pointing. She did not have a reliable way to request a break or indicate confusion. Catherine was a white female and a registered nurse who worked as a home healthcare provider. Catherine reported that the family had an income level of “a little extra income” and that the family “often” had money to buy nice things. The household consisted of the participant, her biological mother, and her two biological younger sisters. Maddie engaged in challenging behavior

such as aggression toward caregivers and siblings, damaging property, verbal refusal (“No, I’m not going to school”), screaming, cursing, and eloping within and outside of the family home. Maddie took Risperidone (antipsychotic dopamine antagonist mood stabilizer) to reduce aggression (0.5 mg) twice a day and Topiramate (anticonvulsant for migraines, seizure, and self-injury) used as a mood stabilizer and to treat hunger caused by other medications twice a day. This medication was decreased after intervention to just once a day and then completely withdrawn. Maddie also took Buspirone (anxiolytic) for anxiety (2 mg) three times a day, Guanfacine (alpha two anergic) for calming, impulsivity, and tics (1 mg) once a day, Clonidine (alpha two adrenergic blood pressure medication) for sleep (0.1 mg) once a day, and Levothyroxine (300 mcg) once a day for low thyroid levels. Her medication had been stable for a year prior to this study. During the study, her mother reported the removal of Risperidone and the addition of Aripiprazole (antipsychotic) for irritability starting at 0.25 mg twice daily and then increasing to 0.5 mg twice a day. This occurred during the withdrawal phase of the research study and did not correspond with any behavioral changes during intervention. Maddie was under the care of a developmental pediatrician who approved her participation in this study around mealtime behavior. The interventionist periodically updated the developmental pediatrician on the progress of the intervention.

Lucas (child) and Catie (mother). Catie was a white female who was unemployed during the study. She had finished high school. Catherine reported that the family had an income of “just enough” and that the family “sometimes” had money to buy nice things. Lucas was a 17-year-old multiracial (black and white) male with ASD, ID, and fetal alcohol syndrome diagnosed by a developmental pediatrician. He attended a

local public high school self-contained program for students with significant support needs and was in the 11th grade. He communicated using vocal verbal speech including full sentences to meet his daily wants and needs and used body language and facial expressions to indicate confusion. Lucas lived with his biological mother (Catie) and his younger half-brother. Lucas enjoyed playing video games, making YouTube videos, and text messaging with friends (hypothesized reinforcers). Lucas engaged in challenging behavior such as shoplifting, setting fires, yelling, cursing, stomping his feet, pica, slamming doors, making verbal threats, and throwing items. Lucas took Fluoxetine (40 mg SSRI) for anxiety daily, Dextroamphetamine (stimulant) for ADHD symptoms (60 mg) twice a day, Hydroxyzine (antihistamine) for sleep, calming, and allergies (50 mg) daily, Clonidine (alpha two adrenergic blood pressure medication) for sleep (0.4 mg), and Zafirlukast (anti-inflammatory) for allergies (10 mg) daily for the duration of the study. Catie reported that there were no changes to his medications during the course of the study.

Henry (child) and Daniel (father). Daniel was a white male and was a woodworker. He served as the interventionist. Henry’s biological mother, Kelley, served as the respondent for the FAI and QABF (O’Neill et al., 1997). Kelley reported that the family had an income level of “a little extra income” and that the family “rarely” had money to buy nice things. Henry was an 8-year-old white male with ASD, ID, hearing loss, and a speech disorder diagnosed by a developmental pediatrician. He attended a local public elementary school self-contained program for children with intensive support needs in the 2nd grade. He communicated rarely by single manual signs and relied primarily on whining, shouting, leading adults to objects, grabbing, reaching, and

changing proximity to parents and objects to indicate interest or rejection. Henry also engaging in aggression and self-injury to communicate his wants and needs. He did not have a reliable communication method and often engaged in challenging behavior. Henry lived with his biological mother, biological father, and a younger foster brother. Henry enjoyed playing with action figures, water, water beads, and vacuuming (hypothesized reinforcers). Henry engaged in challenging behavior such as falling to the ground, head banging, punching his genital area, flailing his arms, hitting objects, and headbutting, kicking, scratching, and hitting caregivers. Henry took Cyproheptadine (antihistamine) for sleep and as an appetite stimulant daily (4 mg), Amitriptyline (antidepressant) for sleep (25 mg), Melatonin for sleep (6 mg) daily, and Loratadine (antihistamine) for allergies (10 mg) daily. His medication had been stable for a year prior to this study. To address a potential risk of mouth pain serving as the function of challenging behavior, Kelley reported that Henry had general anesthesia so that he could have his mouth examined. The dentist removed three problematic baby teeth that had been ground down due to nocturnal bruxism. One of these teeth had an abscess. One baby tooth was removed due to blocking the adult tooth from growing. He also had cleaning and fluoride treatment. The dental surgery was completed during baseline with no change in level of challenging behavior after resolving the medical issues with his teeth.

Settings

All assessment and intervention took place in family home settings in the Pacific Northwest. The interventionist conducted sessions on a university campus in a clinic office. The participants lived an average of 27 miles (range = 11 – 68 miles) from the university. Experimental sessions were conducted during family routines selected by

parents and stimuli that were typically present in the home environments were used such as toys the child engaged with, furniture, and smart devices.

Interventionist

The primary interventionist/principal investigator was a white female Board Certified Behavior Analyst and a doctoral candidate in the special education program with 5 years' experience teaching children/adolescents with IDD in public school and experience serving as primary interventionist in previous studies addressing challenging behavior.

Target Routines and Behaviors

Joe. Gina selected the family dinner as the routine of focus for the intervention. The dinner routine consisted of family prayer, serving food, family conversation, and then asking to leave the table. Gina reported that Joe had a reliable pattern of challenging behavior that consisted of: tapping a chair/stool where Gina usually sat, saying "*Mama,*" and then approaching Gina and tapping on her shoulder. Gina also reported that he often touched other family member's food, plates, and glasses and ate with his hands instead of using a fork or spoon. Gina reported during that a year prior to starting the current study the family hired a local behavioral service provider which had resulted in the worsening of Joe's challenging behavior. After beginning behavioral services, Joe began throwing food and plates during the dinnertime routine if his mother did not sit next to him, respond to his verbalizations and signs, and provide attention at a high rate in the form of praise. For the purpose of this study, the challenging behaviors targeted were: touching others' plates and food items, eating with hands, tapping his mother and furniture, and turning away from the table. Touching plates and food items belonging to others was

defined as reaching one or both hands toward and touching items that were not Joe's utensils, plates, napkin, glass, and food. Eating with hands was defined as using hands for non-finger food items such as spaghetti, salad, and scrambled eggs as dictated by family rules. Tapping his mother and furniture was defined as reaching out and using one or more fingers to make contact with his mother's shoulder or objects like the table, the stools, and chairs in the kitchen. Turning away from the table was defined as turning his body away from the table while seated and bringing his legs out from the edges of the chair. Appropriate behavior was defined as the use of a communication application on an iPad to mand for attention, more food, and help.

Maddie. Catherine selected the family dinner as the routine for intervention. The dinner routine consisted of Catherine serving Maddie her dinner and then the rest of the family serving themselves dinner and sitting down. The behavior of concern during dinner was rapid eating, which had been present since early childhood. At times, she would vomit after eating certain foods like rice. Catherine also reported that she had concerns about the fast eating because Maddie did not ever seem full after meals. Maddie regularly requested food after two servings at meals and often requested food between mealtimes. By the time Maddie was finished with dinner, her family had usually not finished or sometimes not even begun eating. Catherine reported that she had previously tried reminding Maddie to slow down which was very occasionally effective, but that as soon as Catherine walked away, Maddie would revert to fast eating. Maddie also sometimes responded with negative verbalizations such as telling her mother "*You suck a***," saying "*No*" loudly, and calling family members "*You f***** idiot*" when told to slow down.

Lucas. Catie selected the room cleaning routine for the intervention context. The room cleaning routine consisted of Lucas being asked to make his bed, clean up plates and food wrappers, pick up dirty laundry, put away clean laundry, and sweep the floor. For this study, the behavior targeted was negative vocalizations which included saying no, screaming, yelling, making threats, growling, screeching, and telling his mother what to do. Saying no was operationally defined as vocal verbal speech like the word no after being asked to complete a task or concerning a task. Non-examples include his mother asking him a yes or no fact-based question for which no was an appropriate response. Screaming and yelling were defined as raising his voice above the volume of his mother's speaking voice. Making threats included any verbal statements about his future actions that were negative such as, "*You'll be sorry*" or "*I'll throw the cat out the window*". Growling was defined as a low noise made in the throat. Screeching was defined as a high-pitched loud whining noise. Telling his mother what to do was defined as being directive toward his mother's actions such as telling his mother to leave his room, leave him alone, or not to touch items. Negative statements were defined as statements about his situation or the routine that were socially inappropriate such as "*I hate my life*", "*I should just go join my father*" (who was deceased), and "*I'd be better off in a zombie apocalypse because I wouldn't have to clean my room.*" Appropriate behavior was defined as completing tasks on a predetermined list of chores. This was coded as percentage of total tasks completed. Catie reported that previous behavior specialists and personal support workers had created plans to address room cleaning including making lists of tasks for cleaning. She reported that none of these plans had been effective at decreasing problem behavior or increasing his completion of the room cleaning tasks.

Catie reported that the conflict that resulted from the room cleaning impacted her relationship with Lucas, that she worried about his younger brother observing the problem behavior, and that she had considered residential placements for him outside of the home (therapeutic foster care).

Henry. Kelley and Daniel decided to address toothbrushing in this intervention. Previous challenging behavior during the toothbrushing routine led to Daniel and Kelley brushing Henry's teeth in bed while holding his arms and legs down. Kelley expressed dissatisfaction with the routine and wanted to increase Henry's independence. The behavior of concern during toothbrushing was turning his face away from the brush, pushing the toothbrush or his father's arm away, flopping to the ground, stomping his foot, and rare incidents of self-injury and aggression. Turning away from the brush was defined as moving his head to the left, the right, or backwards when the brush was moved toward his face. Pushing was defined as force applied to his father's hand and arm. Flopping was defined as falling to the ground to either a sitting or laying position on his front or back. Self-injury was defined as forceful movements toward his crotch area and bringing his head into contact with the wall or floor. Appropriate behavior was defined as the use of break cards to access a 15s break from toothbrushing activities. Kelley reported that the family had not tried any formal interventions to address this routine but that at school the class practiced brushing teeth by giving him a toothbrush and allowing him to put it in his mouth at will. Tables 1 and 2 summarize participant and parent characteristics.

Table 1

Participant Characteristics

Name	Age	Race	Gender	Routine of concern	Challenging behavior
Joe	15	White	M	Dinner	Inappropriate mealtime behavior: Eating food with hands, touching mom on shoulder or hand, and touching other people's plates and food Appropriate replacement behavior: FCR mands for attention, help, and more food items
Maddie	15	White	F	Dinner	Rapid eating: Consuming food at a fast rate sometimes resulting in vomiting after meals Appropriate replacement behavior: Consuming food with 15 or more seconds between bites
Lucas	17	Mixed race: White and Black	M	Room cleaning	Negative vocalizations: Saying no, screaming, yelling, making threats, screeching, and telling parent what to do Appropriate behavior: Mands for help and breaks Secondary appropriate behavior: room cleaning task completion

Table 1 (Continued)

Name	Age	Race	Gender	Routine of concern	Challenging behavior
Henry	8	White	M	Toothbrushing	Physical refusal: Pushing parent hands away, pushing body away from sink area, stomping foot, and dropping to floor Self-injury: Hitting crotch area and head banging Aggression: Hitting, kicking, and scratching parents Appropriate replacement behavior: FCR for break from tooth brushing Secondary appropriate behavior: Allowing toothbrush to be placed in his mouth

Table 2

Parent Characteristics

Name	Race	Gender	Occupation	Relationship to Participant
Gina	White	F	Surgical nurse	Mother
Catherine	White	F	Home health nurse	Mother
Catie	White	F	Unemployed	Mother
Daniel	White	M	Woodworker	Father
Kelley	White	F	Housekeeping supervisor	Mother

Equipment and Materials

Hardware. The interventionist used a university-issued 13-inch 2017 MacBook Pro™ laptop with an internal video camera and speakers, 3.1 GHz Intel Core i5, and 8 GB of DDR3 memory. The parent used their personal laptop, tablet, or smart phone equipped with an internal or external web camera and internal speaker. Minimum

requirements were that VSee was downloaded and physical placement of the device allowed for sufficient visual coverage of the room and participants. The laptop computer, desktop, or smart device were arranged on a flat surface to display both the parent and child engaged in the activity. A Jabra™ Bluetooth™ headset such as the Boost™ or Mini™ was mailed to the parent so that the interventionist could coach and give immediate performance feedback to the parent during telehealth consultation sessions without distracting the child. For the interventionist, sound was transmitted through her computer's internal camera, microphone, and speakers. For the parent, sound was transmitted through the Bluetooth™ wireless headset. The researcher conducted a videoconferencing session prior to baseline assessment to assist with equipment and software set up including a trial simulated run of the equipment. During the initial set-up visit, the parent was trained by the researcher on how use the Bluetooth™ headset. Parents were also be trained on how to use video-conferencing software to start and end a video call for their telehealth sessions. VSee software recorded audio and video of both the parent and child's behavior and also simultaneously captured video and audio of the interventionist's behavior.

Software. Videoconferencing calls to the parents were initiated by the interventionist or the parent using the free version of VSee software (<http://vsee.com>). This software was chosen because it is federal Health Insurance Portability and Accountability Act of 1996 (HIPAA), Pub. L. 104-191, 42 U.S.C. §§ 1320d et seq. approved; which means it protected data privacy in that all audio/video communication was securely encrypted and transmitted from point-to-point such that even VSee did not have access to any identifiable health information that may have been communicated.

Also, VSee only needs between 80 - 120 kbps bandwidth internet connection (about 50% less bandwidth needed by Skype or Polycom) and had instantaneous screen share capability that can be used by either party during assessments and training.

All video recordings of sessions were uploaded to Box™ or Office 365™, a secure information storage cloud-based hosting website. Both Box and Office 365 met Health Insurance Portability and Accountability Act (HIPAA) compliance standards for data based on encryption at rest and during transfer. These videos were used for interobserver agreement (IOA) coding only and the only individuals who had access were research personnel approved to assist with the study by the Institutional Review Board at the University. All videos were stored on a password protected laptop until uploaded. That laptop remained in the possession of the interventionist or it was securely stored. All information was coded using participant numbers and date of the appointment, and no identifying information was linked to the participants.

Behavior Intervention Plan Materials

Parents were provided with all training materials by mail including: Copies of the individualized behavior intervention plan for their child, headsets for bug-in-ear coaching, and any additional materials (i.e., token board, tokens with Velcro, laminated task analysis list, MotivAider) needed to implement the behavior intervention plan.

Experimental Phases

This study consisted of (a) functional behavior assessment (FBA), (b) experimental evaluation of the intervention using an A-B-A-B withdrawal design consisting of baseline assessment conditions, parent training, and parent implemented intervention conditions, and (c) social validity assessment (pre- and post-intervention).

All phases of the study took place in the families' homes via synchronous video conferencing. The parents were present for all sessions, and the child was present for all experimental sessions (i.e., baseline assessment and parent implemented intervention conditions). Appendix A provides an outline of the procedures for the research, the measures and materials used, and the research questions assessed during each phase. Experimental procedures are described in detail in the sections that follow.

Phase 1: Functional Behavior Assessment

Procedures. During a telehealth session, a FBA interview (FAI; O'Neill et al., 1997) and a 25-item QABF was completed with the participating parent by the interventionist to provide information about (a) the topographies, frequency, and intensity of target challenging behavior, (b) adaptive behavior repertoires, (c) the antecedents and consequences immediately preceding and following target challenging behavior, preferences for items and activities that might be used as reinforcers during intervention, and to select baseline condition procedures.

Data were collected on the function of challenging behavior using the Questions About Behavioral Function (QABF) and the Functional Analysis Interview (FAI) via parent interview (Matson, & Vollmer, 1995; O'Neil et al., 1997).

Questions About Behavioral Function (QABF). The QABF is a 25-item rating scale that has been used to determine initial hypotheses for the function of challenging behavior (Matson & Vollmer, 1995). Challenging behavior was described in detail at the beginning of the assessment, then operationally defined, and parents responded to statements about the potential function of the challenging behavior. These behavioral statements were rated on a scale of 0 - 3: 0 (never); 1 (rarely); 2 (some); 3 (often).

Examples of statements included: Engages in behavior more frequently when he/she is ill or Engages in behavior when you take something away from him/her (Paclawskyj et al., 2000). All answers were then scored using a rubric and added up by category (physical, non-social, escape, tangible, or attention). The function category or categories that had the highest total scores corresponded to the most likely function for challenging behavior. The QABF has been found to be valid, reliable, and the subscales have been confirmed using factor analysis. This scale has the strongest psychometric properties of those available at this time (Matson, Tureck, & Rieske, 2012). Studies on the reliability of the QABF that included the implementation of function-based interventions derived from the results of the QABF showed statistically significant improvements when compared to a standardized control condition across participants (Matson, Bamburg, Cherry, & Paclawskyj, 1999). The QABF has also been shown to correspond with the results of experimental functional analyses across participant diagnoses, topographies of challenging behavior, and function (Healy, Brett, & Leader, 2013).

Via telehealth, screen sharing was used with the interventionist reading the questions and/or answers choices out loud for the parent to answer for each topography of challenging behavior.

Functional Analysis Interview (FAI) – Young Children/Adolescent. This structured interview-based functional assessment uses information from parents to describe characteristics of challenging behavior (i.e. topography, frequency, duration) and collects information about daily routines, medications, and medical conditions that may have impact challenging behavior. There are questions about the communication modalities used by the child (e.g., short vocal verbal phrases, manual sign, speech

generating device, Picture Exchange Communication System) and how frequently and effectively the child used the method. The FAI has two forms that may be used depending on the age and activities of the participants in this study. This interview generally took 45-60 minutes to complete. Examples of questions are: Are the above behaviors more likely, less likely, or unaffected if you interrupt a desired event (eating ice cream, watching TV), and what amount of physical effort is involved in the behaviors (e.g., prolonged intense tantrums vs. simple verbal outbursts, etc.). The results of the assessment are statements of likely function for the challenging behavior exhibited by the child based on parent report of factors that influence challenging behavior including putative motivating operations (MO), antecedents, and consequences (O'Neill et al., 1997).

Results. Assessments were completed in less than 2 hours for each parent. The interviews indicated the potential of (a) challenging behavior maintained by positive reinforcement in the form of access to adult attention (Joe) or preferred tangibles (Joe), (b) challenging behavior maintained by negative reinforcement in the form of avoidance or escapes from a demand found to be aversive by the child (Lucas and Henry), and (c) challenging behavior maintained by automatic reinforcement (Maddie). For each participant, the FAI findings corroborated the QABF scores.

For Joe, interview results supported the functions of divided adult attention and tangible for his target challenging behavior (attention = 11, escape = 7, nonsocial/automatic = 4, physical = 6, and tangible = 10). For Maddie, interview results suggested a nonsocial/automatic function (attention = 6, escape = 6, nonsocial/physical = 8, physical = 5, and tangible = 2). For Lucas, both escape and access to tangibles were the most

likely operant functions of his target challenging behavior (attention = 9, escape = 13, non-social/automatic = 12, physical = 4, and tangible = 15). For Henry, interview results suggested escape and physical functions (attention = 0, escape = 12, non-social/automatic = 3, physical = 11, and tangible = 0).

Phase 2: Experimental Evaluation of Intervention

General procedures. In this phase of the experiment, the effects of individualized behavioral interventions derived from the results of FBAs were evaluated during parent-selected routines in their family home. The interventionist worked collaboratively with each parent to develop a multicomponent behavior support plan (BSP). Parent use of indicated BSP strategies and child target challenging and adaptive behavior were evaluated during baseline assessment, and subsequently, the interventionist provided each parent with parent education and coaching in implementation of the BSP strategies with their child during the selected routine. The parent then implemented the individualized intervention with their child with the interventionist providing coaching as needed. The effectiveness of the parent-implemented interventions was examined using an A-B-A-B reversal design where the parent implemented intervention was withdrawn during the second baseline phase followed by reintroduction of the intervention in the final intervention phase.

Baseline assessment. At the start of each baseline assessment session, the interventionist provided a verbal and visual overview of the baseline procedures using the screen share feature of videoconferencing software as well as a short verbal description of the purpose of the baseline condition. During this phase, no stimuli associated with the behavior intervention plan (e.g., timers, visuals) were present. The parent began the

routine of concern with an antecedent (e.g., “*Time to clean your room,*” or “*Time to brush your teeth,*” or “*I’m going to talk to your brother right now.*”). The parent ran through the entire routine or re-presented the antecedent multiple times depending on the topography of the child’s challenging behavior. The interventionist provided prompts as needed via the Bluetooth™ headset worn by the parent. During the baseline assessment sessions, the interventionist monitored the parents’ behavior to ensure that they were not inadvertently incorporating pieces of the behavior intervention plan during the baseline sessions. If the parent used any of the procedures included in the behavior intervention plan, the interventionist provided a verbal prompt to remind them of the expectations during the baseline condition (e.g., “I know in the behavior plan, we are giving him reminders, but we can’t do that right now. Instead, you can stand outside the door while he cleans his room”).

Intervention strategies. The hypothesized function(s) and child communication or adaptive skills were used in conjunction with family preference and feedback to: (a) design a contextually valid, multicomponent behavior support plan including antecedent, teaching, and consequence strategies matched to the functions of child behavior identified during the FBA interview; and (b) choose a functional communication response (FCR) for use during functional communication training (FCT). Antecedent-based, proactive strategies were used to manipulate motivating operations. These strategies included environmental arrangement, statement of contingencies, or ensuring that a reinforcer was only used during the problematic routine to increase the reinforcing value of the item or activity. Teaching strategies were used to teach and practice new and appropriate behaviors. Teaching allows the child to contact reinforcement for the appropriate

behavior and become fluent in the behavior. Each parent taught the targeted response or skill to their child using most-to-least prompting (Joe, Maddie, and Henry) and task analysis (Lucas) and time delay. Teaching sessions were structured so that motivating operations was in place for appropriate behavior, contingencies were verbally stated by the parent, and most-to-least prompting (e.g., physical prompt, verbal prompt, gestural prompt) was implemented. For each dyad, specific skills were taught relevant to the routine. Consequence-based management strategies were used to increase the future likelihood of appropriate replacement behavior for the targeted challenging behavior. These strategies included altering the schedule of reinforcement, such as providing a break contingent on the child touching a break card or providing help with a task contingent on the child asking for help. This also included verbal reinforcement for appropriate behavior and withholding previously delivered reinforcement for inappropriate behavior (extinction).

The behavior intervention plan for Joe included a review of expectations for family dinner, role play of the use of the aided augmentative and alternative communication (AAC) application on the tablet, reinforcement for FCRs, and prompting Joe to engage in FCRs if challenging behavior occurred. Joe was taught to emit FCRs using an iPad™ with the communication application GoTalk NOW Lite iPad® (Attainment Company) over 4 teaching sessions. Guided access was turned on to prevent Joe from using other iPad® functions.

The behavior intervention plan for Maddie included her mother reminding Maddie that she needed to wait with a verbal prompt and using a vibrating MotivAider tactile prompter as a signal to take a bite, blocking her hand if she attempted a bite prior

to the MotivAider signal, and providing a small food reinforcer for waiting. Specifically, Maddie was taught to wait until the MotivAider™ buzzed to take bites of preferred items at increasing progressively longer intervals (5 seconds, 10 seconds, 15 seconds) for 7 sessions. During the teaching phase of the intervention, Maddie refused to wear the MotivAider. Instead, Catherine used the auditory cue of the buzzing of the MotivAider against the table to indicate it was time to take a bite.

The behavior intervention plan for Lucas included the use of a task analysis checklist, verbal praise for tasks completed, the opportunity to take three breaks and request help with up to three tasks, and reinforcement in the form of accessing his video games and cell phone. Lucas was taught the steps for completing room cleaning using the task analysis for 2 sessions.

The behavior intervention plan for Henry included reminders of contingencies such as *“If you want to play with the vacuum, we need to brush teeth”* and *“If you want a break touch the break card.”* He was prompted to use the break card to mand for a break from toothbrushing if he engaged in challenging behavior, and used the token economy to earn preferred activities. Henry was taught to use the token economy and token board to earn preferred items and to use a break card FCR to mand for ceasing the routine for 15 seconds in the context of an unpreferred task (wearing hearing aids) for 7 sessions.

Copies of the individualized behavior intervention plans with indications of which strategy were antecedent, teaching, and consequence-based strategies are included in Appendix E.

Behavioral parent training (BST) on behavior intervention plan. Each parent was trained using behavioral parent training (BPT), which consists of didactic instruction,

modeling, rehearsal, and feedback (Dib & Sturmey, 2012). The interventionist created the BIP with input from parents, the FCR chosen for the child, and the specific types of the reinforcement provided (i.e. types of edibles, attention, and other tangibles the child prefers). This information was added to the BIP and helped to ensure a good contextual fit for the plan within the family home and routines. The didactic instruction consisted of a PowerPoint™ presentation and written intervention steps and included a brief explanation of the rationale for the intervention. PowerPoint presentations were provided using screen share feature of VSee application. This explanation also included information about functions of challenging behavior and rationale for teaching a replacement behavior to access the same reinforcement as the target challenging behavior. The interventionist reviewed the entire plan with each parent and explained what to do in case of challenging behavior, any teaching procedures required, and the correct response to appropriate behavior. The materials used in these trainings were included in Appendix F.

BPT was completed via videoconference and the role play included the interventionist and the parent viewing each other over the screens of the laptop, desktop, or smart device. The interventionist role played with the parent. First, the parent played the role of the child and the interventionist played the role of the parent. The roles were then reversed and the parent played their role and the interventionist played the part of the child. The interventionist also had the same set of materials (e.g., laminated behavior intervention plan, MotivAider, small food reward) as the parent to demonstrate the steps of the intervention. The interventionist used a combination of verbal and gesture prompts to correct parent errors. The parent also verbalized what the activities were while

enacting the activity (e.g., “And now I’ll give the chocolate to him/her” while pretending to hand over a goldfish). If the parent engaged in an incorrect response, the interventionist provided a verbal prompt for the appropriate response as an error correction procedure. Once the parent reached 100% treatment fidelity for the entire behavior intervention plan, parents completed modified versions of the TARF-R, which asked parents to rate the acceptability of the procedures of the function-based behavior intervention plan for their child (Reimers & Wacker, 1988). The interventionist read all questions and answers aloud and asked the parent to refrain from using the intervention with their child until the next session.

Parent-implemented intervention. Each session, before intervention began, the interventionist reminded the parent to gather all materials needed for the behavior intervention plan and routine. During sessions, the interventionist provided verbal prompts via the Bluetooth headset worn by the parent if the parent omitted a piece of the intervention plan or incompletely implemented an intervention strategy, and praise when a parent engaged in a behavior that was part of the behavior intervention plan. If the parent waited longer than 2 seconds after a response was appropriate, the interventionist used a verbal prompt to tell the parent what action to take. For example, if the child engaged in off topic verbalizations and the parent did not prompt the child to ask for a break or help (Lucas), then the interventionist told Catie “*Remember to ask him if he needs to take a break or wants help.*” Once the parent emitted the correct response, the interventionist provided praise (i.e., “*That’s perfect!*” or “*Exactly right!*”).

Experimental Design and Data Analysis

Experimental design. The effects of parent-implemented intervention on child

challenging behavior and appropriate replacement behavior (all dyads) and secondary dependent variables (Lucas and Henry) were assessed using independent experimental A-B-A-B withdrawal designs with four parent-child dyads where A indicates baseline or return to baseline assessment phases and B indicates intervention assessment phases. This experimental design meets What Works Clearinghouse standards for single-case research (Kratochwill et al., 2013). Withdrawal designs provide opportunities to demonstrate experimental control by conducting repeated baseline measurement of at least five data points in each experimental phase and by introducing the intervention and then removing or withdrawing an intervention. Withdrawal designs with a baseline, intervention, withdrawal, and the reintroduction of an intervention (A-B-A-B) offer the researcher three opportunities to demonstrate a basic experimental effect between introduction and removal of the intervention and changes in the dependent variables (i.e., at each A-B comparison; Ledford, 2018). The use of A-B-A-B designs allows for repetition of the basic effect at three time points, which is the modern standard for demonstrating a functional relation. This involves three comparisons: (1) [A₁-B₁], (2) [B₁-A₂], and (3) [A₂-B₂]. This increases the certainty with which researchers can attribute the change in behavior with the introduction and removal of an intervention rather than potential confounding variables as replication and verification can be demonstrated.

Data analysis. Data for the reversal design were analyzed using visual analysis. Graphed line data were examined for change in level, trend, variability, overlap between experimental phases, immediacy of effect (within three to five data points), and demonstrations of an effect between baseline and intervention, intervention and withdrawal, and withdrawal and intervention phases (Horner, 2005; Kratochwill et al.,

2010). Data were also analyzed using Tau-U, which is a non-parametric overlap index that accounts for positive trend during baseline. Baseline trend control Tau-U can address changes in level and trend, is distribution free, includes all data points in the calculation, and is conservative but not overly so in estimating overlap (Parker, Vannest, & Davis, 2011). Tau-U was found to satisfy five of the seven quality criteria for non-overlap indices and Ordinary Least Squares (OLS) regression and is one of few that include trend and have precision power (Kratochwill & Levin, 2014). These data were used in conjunction with visual analysis as recommended by Carter to determine the effect of the intervention (2013). An online calculator was used to calculate Tau-U from the raw data (<https://jepusto.shinyapps.io/SCD-effect-sizes>). The results were interpreted based on standards for interpreting Tau-U for single case research. A score of 0.65 or lower indicates a weak functional relation; 0.66 - 0.92 is a medium to high relation; and 0.93 or higher is a strong relation.

Response Measurement, Interrater Reliability, Treatment Fidelity

All behavioral observation data collection took place via asynchronous video by the interventionist or trained data collectors using pen and paper or electronic copy, which was compared with synchronous/asynchronous data collection by the interventionist. Telehealth sessions were recorded using VSee for data collection purposes. Trained special education graduate students collected data on the occurrence and nonoccurrence of target child and parent behaviors for each session using event recording procedures (e.g., 10-s partial interval recording, percent of tasks completed). Data collectors attended a 2-hour in person training where they were trained using didactic teaching with a PowerPoint with an overview of the study procedures. Data

collectors then watched and coded three model videos from a pilot study that included examples of (a) child challenging behavior; (b) child replacement behavior (as appropriate); (c) parent treatment fidelity; and (d) behavioral parent training treatment fidelity. Discrepancies were discussed and videos were re-coded by data collectors until they each reached 100% interobserver agreement for each dependent variable.

Assessment sessions occurred via telehealth for a maximum of 10 weeks and no more than 25 min of assessment conditions were completed within any given assessment session.

Dependent variables and response measurement. Dependent variables included (a) child challenging behavior operationally defined at the individual child level (10-sec partial interval, count, or other). Child challenging behaviors are detailed in the participant characteristics section and Table 1; (b) child replacement behavior/functional communication response/appropriate behavior (i.e. pressing button on a speech generating device, touching a card, verbal requests, task completion) operationally defined at the individual child level as described in the participant section and Table 1; and (c) parent treatment fidelity (percentage of opportunities or percentage of BSP tasks correctly completed). Additionally, data were collected on interventionist procedural fidelity for each session of interview, behavioral parent training, and parent coaching. Data sheets, procedural fidelity checklist, and sample treatment fidelity checklists are available in Appendices B and C.

Behavior data were collected using event recording methods appropriate for the topography and characteristics of challenging behavior. For Joe, Lucas, and Henry 10 s partial interval was used for tracking percentage of challenging behavior. For Maddie,

seconds per bite was used for challenging behavior. For appropriate behavior, Joe (iPad touches), 3 (vocal mands), and 4 (break card touches) used frequency of FCRs and for Maddie, frequency of bites with 15 s or greater inter-response time was used. To track secondary dependent variables for Lucas, percentage of task analysis items completed was used, and for Henry, amount of time with the toothbrush in his mouth was used. Sample data collection sheets can be found in Appendix D.

Treatment fidelity. Parent behaviors were operationalized and were coded for each session using a task analysis to obtain a percentage of steps completed (both spontaneous and prompted). Parent treatment fidelity consisted of defined steps for each parent based on the steps of their child's BSP. An example of parent behavior included: (a) not reinforcing problem behavior (extinction), (b) providing reinforcement within 2 seconds of FCR, and (c) allowing 30 seconds of access to attention. For each session, parent's completion of steps of the behavior intervention plan were scored on a scale of 0 - 3 or not applicable. The scores of the number of total steps were divided by the number of possible points for items completed and multiplied by 100 to obtain a percentage ranging from 0 - 100% of steps completed correctly. Copies of the individual BSPs are included in Appendix E.

Reliability. IOA data were collected for 38.88% of baseline sessions (range = 29 - 40%) and 36% of intervention sessions (range = 33 - 40%) across dyads. IOA were collected on child challenging behavior, appropriate replacement behavior, secondary dependent variables, and parent treatment fidelity. The interventionist collected primary data for all sessions and all dependent and independent variables for child and parent. Secondary independent data collectors collected reliability data by watching recorded

sessions asynchronously. IOA was calculated point-by-point, meaning that items with disagreement were subtracted from items with agreement, divided by all items and multiplied by 100 to get a percentage for parent treatment fidelity, child challenging behavior and appropriate behavior, and secondary dependent variables (Ledford & Gast, 2018). For Joe and Gina, challenging behavior IOA was 92% (range = 88 - 94%), FCRs was 100%, and parent treatment fidelity was 90% (range = 82 - 95%). For Maddie and Catherine, challenging behavior IOA was 91% (range = 84 - 96%), appropriate behavior was 89% (range = 87 - 93%), and parent treatment fidelity was 96% (range = 89 - 100%). For Lucas and Catie, IOA for challenging behavior was 92% (range = 82 - 98%), FCR was 100%, task analysis completion was 99% (range = 97 - 100%), and parent treatment fidelity was 94% (range = 90 - 100%). For Henry and Daniel, IOA for challenging behavior was 96% (range = 90 - 96%), FCR was 100%, time spent with toothbrush in mouth was 91% (range = 85 - 96%), and parent treatment fidelity was 88% (range = 84 - 90%).

Interventionist Procedural Fidelity – Interview, Parent Training, and Coaching

The interventionist maintained high levels of fidelity for the interview and parent training procedures. For the FAI and QABF, the interventionist had 96% procedural fidelity (range 85 - 100%). During intervention sessions with Joe and Gina, the interventionist averaged 99.5% procedural fidelity (range = 95 - 100%). For Maddie, procedural fidelity averaged 86% (range = 80 - 88%). While working with Lucas, the interventionist averaged 89% (range = 85 - 100%) procedural fidelity. For Henry, the interventionist averaged 99% procedural fidelity (range = 95 - 100%).

Procedural fidelity. All intervention sessions were coded for interventionist procedural fidelity by a trained data collector. IOA on procedural fidelity was assessed throughout the study for 38% of sessions (range = 36 - 40%). IOA was calculated using the point-by-point method described above. Procedural fidelity for coaching Gina was 99.5% (range = 95 – 100%), coaching Catherine was 83% (range = 81 - 95%), coaching Catie was 89% (range = 85 - 100%), and coaching Daniel was 99% (range = 95 - 100%). IOA on coaching for Gina was 84% (range = 80 - 89%), for Catherine was 92% (range = 89 – 95%), for Catie was 97% (range = 95 – 99%), and for Daniel was 89% (range = 85 – 93%).

Social Validity Assessments

The Treatment Acceptability Rating Form-Revised (TARF-R) was used both before BPT and at the end of the study to assess the acceptability of the intervention including affordability, disruption caused by intervention implementation, and ease of intervention (Reimers & Wacker, 1988). The parents received blank electronic versions of an adapted version of the TARF-R and the interventionist reviewed each question with the parent via videoconference call. Parent responses were recorded synchronously by the interventionist. The original TARF-R contains 20 questions and results in a range of scores from 17-119. The questionnaire has 17 questions on treatment acceptability, two that address problem behavior severity, and one that addresses the parents' understanding of the intervention (Reimers & Wacker, 1988). The assessment is divided into subscales that assess reasonableness, effectiveness, side effects, disruptive/time, cost, and willingness to implement. Responses on the TARF-R assessment were found to be strongly correlated with parent treatment compliance at both 1-month and 6-month

follow ups (Reimers, Wacker, Cooper, & DeRaad, 1992). This questionnaire has been evaluated for validity and reliability and found to be a suitable assessment of the acceptability of treatments in naturalistic settings (Finn & Sladesczek, 2001). A modified version of the TARF-R was used to assess acceptability scores for behavior interventions coached via telehealth. The assessment includes a Likert-type scale with some items reversed and is included in Appendix G.

CHAPTER III

RESULTS

Joe and Gina

During baseline, Gina's use of behavior strategies was 9% for each session. During the first intervention phase, Gina used an average of 92% intervention components (range = 87 - 100%). During the second baseline phase, Gina returned to using 9% of checklist components, and 90% during the second intervention phase (range = 83 - 100%). During baseline, Joe exhibited challenging behavior during 29% of intervals (range = 20 - 50%). During intervention, Joe exhibited 18% of intervals with challenging behavior (range = 10 - 26%). During second baseline, Joe exhibited an average of 25.4% (range = 20 - 33%) intervals of challenging behavior. During the second intervention phase Joe engaged in an average of 8.8% of intervals of challenging behavior (range = 0 - 14%). During baseline, Joe did not exhibit any functional communication responses. During the first intervention phase he averaged 5.2 functional communication responses (range = 1 - 10). During the second baseline phase, Joe engaged in no functional communication responses. Once the intervention was reintroduced, Joe averaged 7.4 functional communication responses (range = 5 - 15).

Maddie and Catherine

During baseline, Catherine used none of the behavioral strategies provided in the intervention. During the first intervention phase, Catherine scored an average of 99% correct responding (range = 96 - 100%). During the second baseline condition, she returned to 0 levels of completion for the behavior plan. During the second intervention

phase, Catherine completed 97% (range = 89 - 100%) of correct treatment fidelity. During baseline, Maddie did not take any bites that were more than 15 seconds from the previous bite (independent bite) and averaged 4.98 seconds per bite (range = 3.67 - 6.67). During the first intervention phase she engaged in 61% independent bites (range = 42 - 85%) with 15 seconds or more between bites and averaged 17.18 seconds per bite (range = 15.52 - 18.46). During second baseline, her percentage of independent bites returned to zero levels, and she averaged 5.69 seconds per bite (range = 4.82 - 6.77). With the reintroduction of the behavior intervention plan, Maddie engaged in 41% of independent bites (range = 18 - 66%) and averaged 16.36 seconds per bite (range = 15.46 - 17.31).

Lucas and Catie

During baseline Catie correctly implemented 12.8% (range = 7 - 22%) of behavior support plan steps. During the first intervention phase, she correctly completed 87.4% (range = 80 - 91%) of steps. During second baseline, Catie completed 12% (range = 7 - 22%) of behavior support plan steps. Upon reintroduction of the intervention Catie completed 89% (range = 89 - 97%) of steps correctly. During baseline, Lucas engaged in challenging behavior for a mean of 72% of intervals (range = 50 - 93%) and completed an average of 34.2% of task analysis steps (range = 18 - 50%). During the first intervention phase, Lucas engaged in an average of 20.5% of 10-second partial intervals of challenging behavior (range = 4.5 - 33%) and completed an average of 96.2% of task analysis steps (range = 86 - 100%). During second baseline, Lucas engaged in 35% of intervals of challenging behavior (range = 15 - 40%) and completed an average of 52% of task analysis steps (range = 16 - 72%). During the second intervention phase, Lucas

engaged in 23% of intervals of challenging behavior (range = 15 - 40%) and completed an average of 100% of task analysis steps.

Henry and Daniel

During baseline, Daniel implemented 11% of intervention steps. After training and with coaching, Daniel's implementation increased to an average of 88.2% (range = 84 - 93%). During the second baseline condition, Daniel implemented 11% of steps correctly in each session. During the second intervention phase, Daniel implemented 90% (range = 85 - 94%). Henry engaged in an average of 71% of intervals with challenging behavior during baseline (range = 53 - 87%) and the toothbrush was never placed in his mouth. Henry engaged in no functional communication responses. When the intervention plan was implemented, Henry engaged in challenging behavior in 24% of intervals (range = 13 - 40%), brushed his teeth for an average of 38.2 s (range = 34 - 42), and engaged in an average of 2.8 functional communication responses (range = 2 - 3). During second baseline, Henry's challenging behavior averaged 84.6% of intervals (range = 70 - 93%) and tooth brushing took place for 0 s and engaged in no functional communication responses. During the second intervention phase, his challenging behavior averaged 35.6% of intervals (range = 17 - 46%) and allowed his teeth to be brushed for an average of 38 s (range = 35 - 42) and engaged in 1.8 functional communication responses (range = 1 - 4).

Visual Analysis

The figures below depict the data on child challenging behavior and appropriate or replacement behavior by dyad.

Joe and Gina

Child challenging behavior. Figure 2 displays both Joe's challenging behavior (percentage of 10-s partial intervals) and frequency of FCRs (mands for help, more food, and attention). During baseline, Joe exhibited somewhat variable rates of challenging behavior ($M = 92.2\%$; range = 20 – 50%). During intervention, Joe's challenging behavior showed a decreasing trend with two overlapping data points ($M = 17.5\%$; range = 10 - 26%). When the intervention was removed, Joe's challenging behavior returned to baseline levels ($M = 25.4\%$; range = 20 – 33%) with increased stability, a change in trend, and two overlapping data points with the previous intervention condition. The intervention was reintroduced, and Joe's challenging behavior showed an immediate decrease in level with no overlapping data points ($M = 8.8$; range = 0 – 14%). There was one demonstration of the basic effect from second baseline to intervention; however, no functional relation was detected. Tau-U analysis was conducted for this data and there was a strong relation for challenging behavior, FCR, and treatment fidelity.

Child appropriate behavior. Joe's appropriate replacement behavior was the use of FCRs to address the function of attention, manding for more food items, and a mand for assistance with eating. During baseline, Joe did to engage in any FCRs. During intervention, there was an immediate (within two data points) change in level and trend. Joe engaged in highly variable instances of FCR ($M = 5.2$; range = 1 - 10). During second baseline, Joe did not engage in any FCRs. Once the intervention was reintroduced, Joe engaged in slightly less variable responding with one outlying data point that corresponded with a novel stimulus of the lazy Susan on the table ($M = 7.4$; range = 5 - 15). There was a functional relation observed for FCRs.

Figure 2

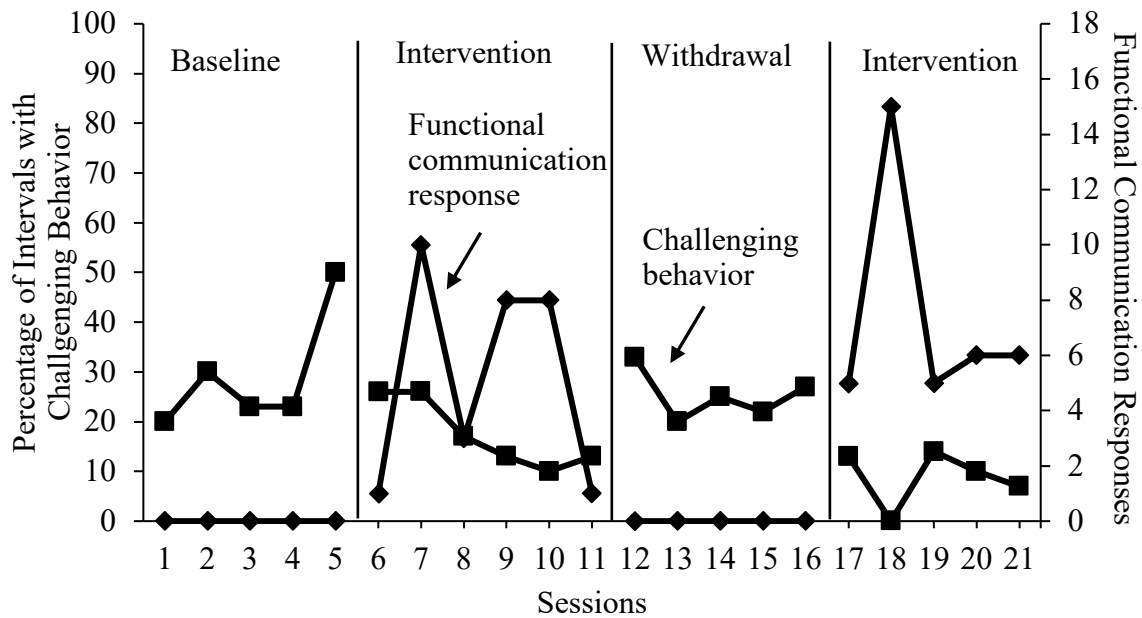


Figure 2. This graph depicts the percentage of intervals with challenging behavior and frequency of FCRs for Joe.

Tau-U. As a result of visual analysis showing three basic demonstrations of the effect, Tau-U was calculated for challenging behavior and FCRs. Tau-U for challenging behavior was 0.77, 0.97, and 1 for each phase change demonstrating two strong and one medium to strong effect. Tau-U for FCRs was 1, .97, and 1, indicating a strong relation.

Maddie and Catherine

Child challenging behavior. Figure 3 depicts Maddie’s challenging behavior (seconds per bite) and appropriate behavior (percentage of bites with ≥ 15 s interresponse time completed independently). Maddie’s challenging behavior was eating very rapidly ($M = 4.98$ seconds per bite; range = 3.67 - 6.67). During baseline, her rate of eating remained stable over five data points with a slight increasing trend. Once the intervention

was implemented, there was an immediate increase in seconds per bite ($M = 17.18$; range = 15.52 - 18.46) with a change in level. When intervention was withdrawn, seconds per bite ($M = 5.69$; range = 4.82 - 6.77) returned to baseline levels immediately with a change in level and no overlapping data points and a slight decreasing trend. When the behavior intervention was reimplemented, there was an increase in seconds per bite with a slight decreasing trend and increased stability ($M = 16.36$; range = 15.46 - 17.31).

Child appropriate behavior. Maddie's appropriate behavior was correct responding to the stimulus of the MotivAider independently or having 15 s or more inter-response time. During baseline, Maddie took 0 bites independently. Once the behavior intervention was implemented, Maddie's independent bites immediately increased in level and trend ($M = 61\%$; range = 42 - 85%). The data were variable with an increasing trend. Once the behavior intervention plan was withdrawn, her correct responding immediately returned to 0% and remained stable at zero. With the reimplementation of the intervention, Maddie's appropriate behavior immediately increased but remained variable with a decreasing trend ($M = 41\%$; range = 18 - 66%).

Tau-U. Visual analysis resulted in three basic demonstrations of the effect for challenging behavior and appropriate behavior. Tau-U was calculated for both variables and for each basic effect. Tau-U results were 1 for each comparison of independent correct responding, indicating a strong relation for these variables. For challenging behavior, the first comparison resulted in a 0.8 which is medium to high and the other two comparisons resulted in 1 for a strong relation.

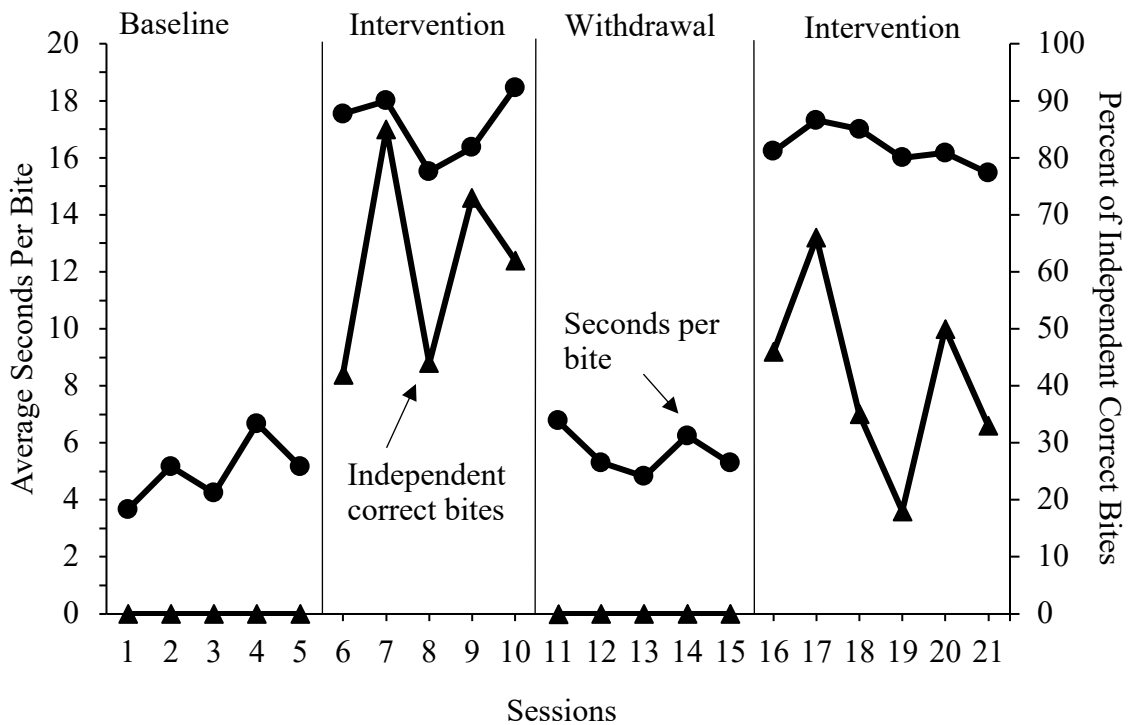


Figure 3. This graph depicts the number of seconds per bite of food and percentage of independent bites taken by Maddie.

Lucas and Catie

Child challenging behavior. Figure 4 depicts Lucas' challenging behavior (10 s partial intervals) and frequency of FCRs (break and help mands). Lucas' challenging behavior was high and variable during baseline ($M = 72\%$; range = 50 - 93%). Once the intervention was implemented, there was an immediate decrease in level and a decreasing trend during the intervention phase ($M = 20.5\%$; range = 4.5 - 33%). When the intervention was withdrawn there was a change in trend and level with one data point overlapping between intervention and second baseline ($M = 35\%$; range = 15 - 40%). Once the intervention was implemented again, Lucas' challenging behavior showed a

change in level with one overlapping data point between intervention and second baseline ($M = 23\%$; range = 15 - 40%).

Child Appropriate Behavior. Lucas' appropriate replacement behavior was the use of FCRs to mand for assistance with cleaning tasks. He was limited to three requests per cleaning session. During baseline, he used no FCRs. Upon implementation of the intervention, he used three FCRs for each session (maximum of three allowed). Once the intervention was withdrawn, he used zero FCRs. Upon the reintroduction of the intervention, Lucas used all three of his mands for help during each session.

Task analysis completion. Figure 5 depicts the percentage of task analysis steps completed. Lucas engaged in correct responding that was variable during baseline with a slight increasing trend ($M = 34.2\%$; 18 - 50%). During intervention, Lucas engaged in higher percentage of room cleaning tasks (putting away laundry, sweeping the floor, making his bed) with an immediate increase in level and change in trend. His task analysis levels also increased in stability during intervention ($M = 96.2\%$; range = 86 - 100%). When the intervention was withdrawn, task analysis percentage decreased immediately with a decreasing trend, increased variability, and no overlapping data points ($M = 52.2\%$; range = 16 - 72%). When the intervention plan was reimplemented, Lucas' task analysis completion increased and became more stable with an immediate change in level and trend to 100% completion across all five data points.

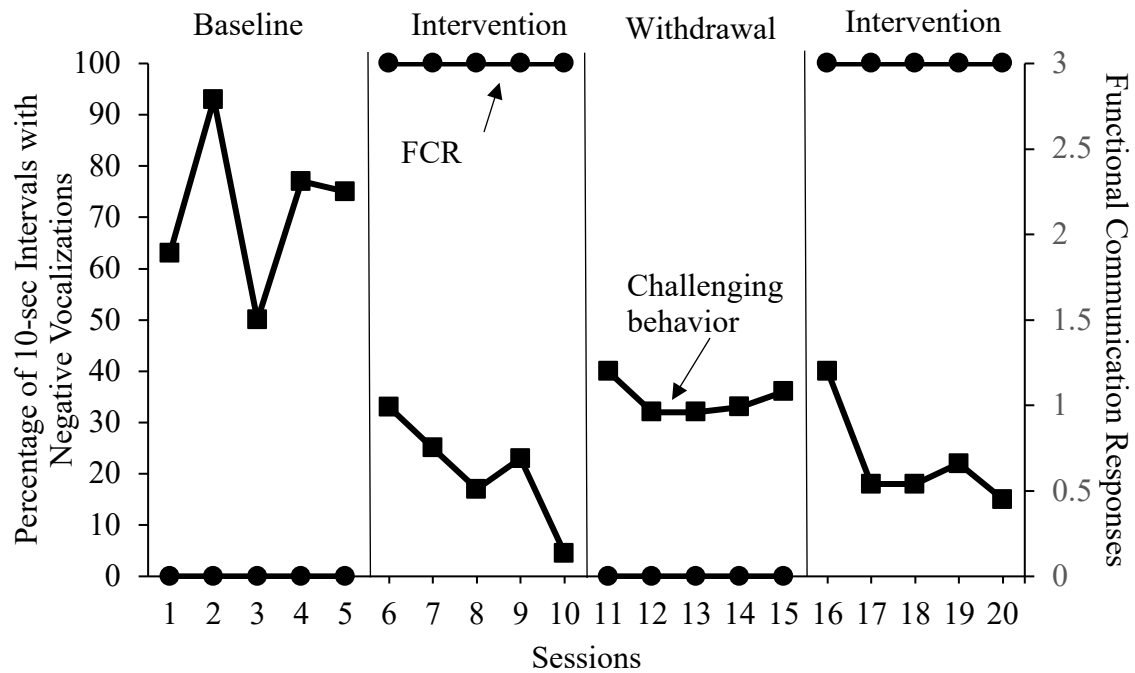


Figure 4. This graph depicts the percentage of intervals with challenging behavior and frequency of FCRs for Lucas.

Tau-U. As a result of visual analysis showing three basic demonstrations of the effect, Tau-U was calculated for challenging behavior, FCRs, and task analysis completion. Tau-U for challenging behavior was 1, 1, and 0.68 for each phase change demonstrating two strong and one medium to strong effect. Tau-U for FCRs was 1 across all phases. Tau-U for task analysis percentage was 0.67, 1, and 1 supporting two strong effects and one medium to strong effect.

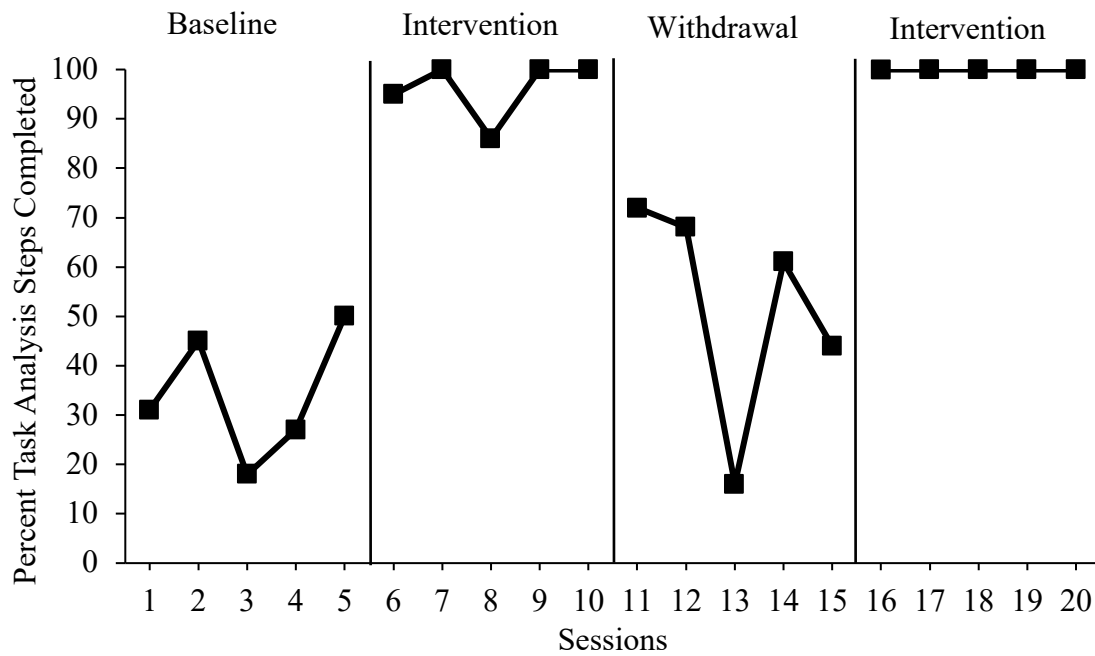


Figure 5. This graph represents the percent of task analysis steps completed independently by Lucas.

Henry and Daniel

Child challenging behavior. Figure 6 depicts Henry’s challenging behavior (10 s partial intervals) and frequency of FCRs (mand for breaks). Henry’s challenging behavior was variable and increasing in baseline ($M = 71\%$; range = 53 - 87%). During intervention, Henry’s challenging behavior decreased with an immediate change in level and trend with zero overlap. Henry’s challenging behavior in the first intervention phase showed a decreasing trend and less variability than baseline ($M = 24.2\%$; range = 13 - 40%). When the intervention was removed, Henry’s challenging behavior immediately increased with zero overlap and a change in trend and level ($M = 84.6\%$; 70 - 90%). With the reintroduction of the intervention, Henry’s challenging behavior decreased in level

with no overlapping data points and similar levels to the previous intervention phase ($M = 35.6\%$; range = 17 - 46%).

Child appropriate behavior. Henry’s appropriate replacement behavior was the use of FCRs for a break for the task of tooth brushing. During baseline, Henry engaged in no FCRs. During the first intervention phase, Henry engaged in increased FCRs ($M = 2.8$; range = 2 - 3). When the intervention was withdrawn, Henry returned to baseline levels of FCRs. With the reintroduction of the intervention, Henry engaged in more variable rates of FCRs ($M = 1.8$; range = 1 - 4).

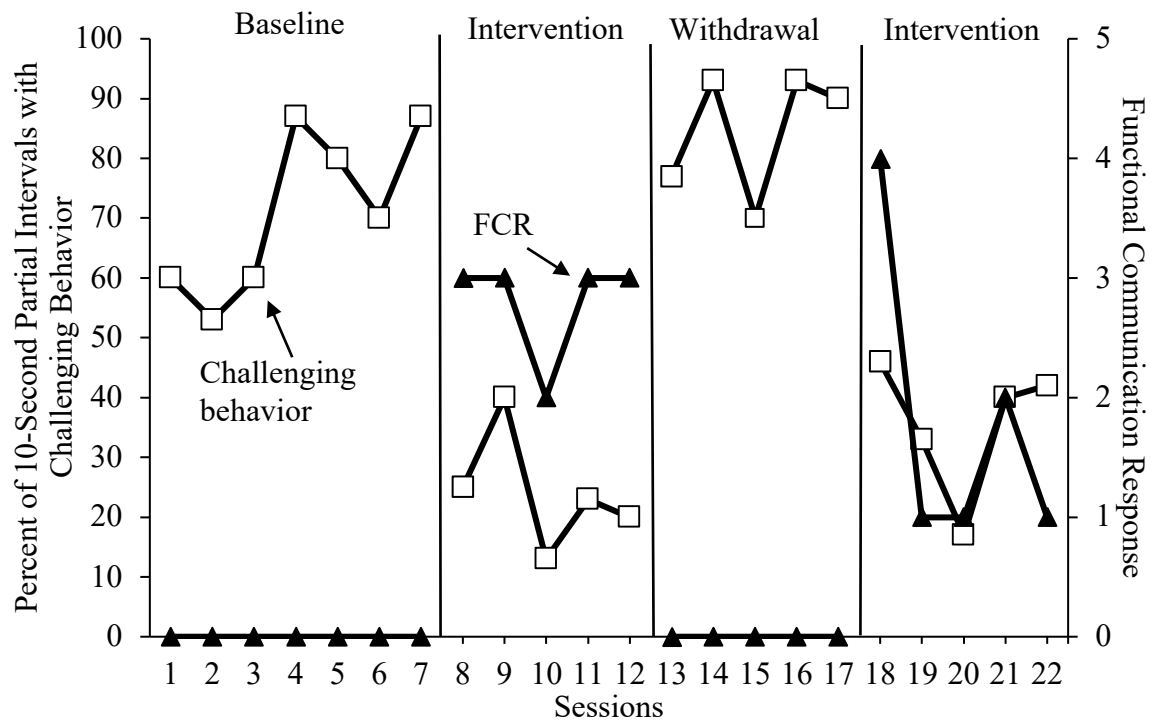


Figure 6. This graph represents percentage of intervals of challenging behavior and frequency of FCRs for Henry.

Time with toothbrush in mouth. Figure 7 depicts the number of seconds Henry allowed the toothbrush in his mouth (total duration). During baseline, Henry allowed the toothbrush to be in his mouth for 0 seconds. During intervention, the number of seconds

the toothbrush remained in Henry’s mouth increased immediately and remained stable with no overlap ($M = 38.2$; range = 34 - 42). During second baseline, Henry allowed the toothbrush to enter his mouth for 0 seconds. During the second intervention phase, Henry increased total time the toothbrush remained in his mouth immediately with a change in level and trend ($M = 38$; range = 35 - 42).

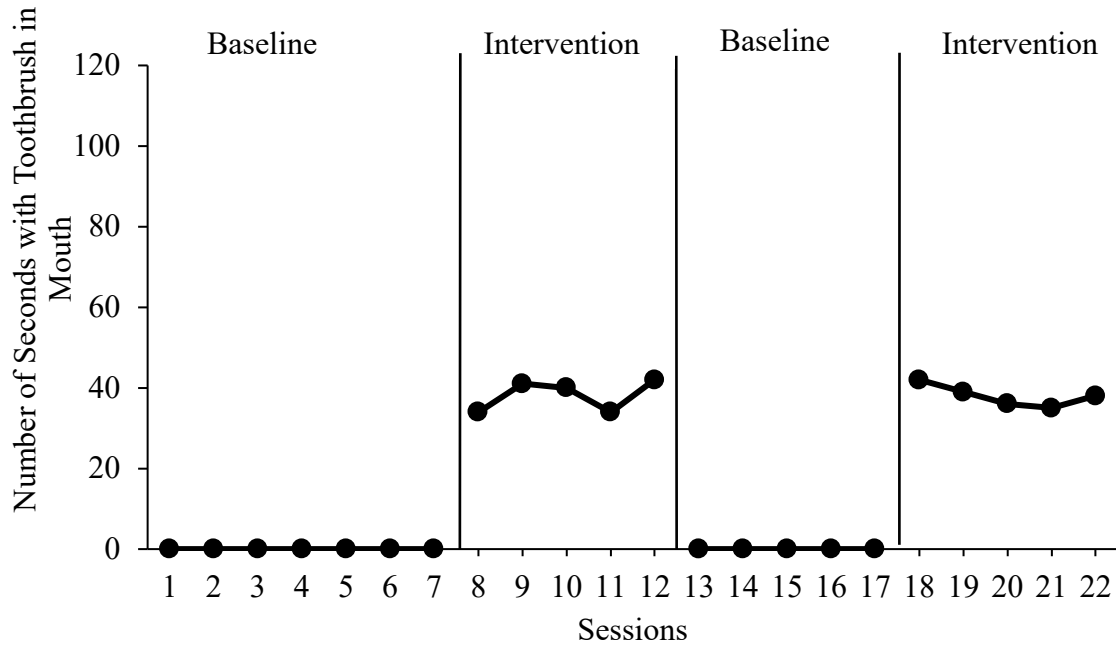


Figure 7. This graph represents the seconds that Henry kept the tooth brush in his mouth.

Tau-U. There were three demonstrations of the basic effect for challenging behavior, FCRs, and time with toothbrush in mouth. Tau-U analysis was completed on each dependent variable and each comparison equaled 1 for each dependent variable. Table 3 depicts the results for each participant including visual analysis demonstrations of the effect, the strength of each functional relation comparison, and mean, range, and Tau-U. Table 3 displays the summary of results by participants.

Table 3

Summary of Results by Participant

Participant (behavior)	<i>M</i>	Range	Tau-U	Strength of functional relation	Demonstrations of the effect (visual analysis)
Joe					
(Inappropriate mealtime behavior)					
Baseline 1	29.0%	20 - 50%			
Intervention 1	18.0%	10 - 26%	0.77	Medium - Strong	
Baseline 2	25.4%	20 - 33%	0.97	Strong	
Intervention 2	8.8%	0 - 14%	1	Strong	3
(FCRs)					
Baseline 1	0				
Intervention 1	5.2	1 - 10	1	Strong	
Baseline 2	0		0.97	Strong	
Intervention 2	7.4	5 - 15	1	Strong	3
Maddie					
(Seconds per bite – rapid eating)					
Baseline 1	4.98	3.67 - 6.67			
Intervention 1	17.18	15.52 - 18.46	0.8	Medium - Strong	
Baseline 2	5.69	4.82 - 6.77	1	Strong	
Intervention 2	16.36	15.46 - 17.31	1	Strong	3
(Percent independent bites IRT \geq 15 s)					
Baseline 1	0				
Intervention 1	61%		1	Strong	
Baseline 2	0		1	Strong	
Intervention 2	41%		1	Strong	
Table 3 (Continued)					3

Table 3 (Continued)

Participant (behavior)	<i>M</i>	Range	Tau-U	Strength of functional relation	Demonstrations of the effect (visual analysis)
Lucas					
(Negative verbalizations)					
Baseline 1	72%	50 - 93%			
Intervention 1	20.5%	4.5 - 33%	1	Strong	
Baseline 2	35%	15 - 40%	1	Strong	
Intervention 2	23%	15 - 40%	0.68	Medium - Strong	3
(FCRs)					
Baseline 1	0				
Intervention 1	3		1	Strong	
Baseline 2	0		1	Strong	
Intervention 2	3		1	Strong	3
(Task analysis completion)					
Baseline 1	34.2%	18 - 50%			
Intervention 1	96.2%	86 - 100%	0.67	Medium - Strong	
Baseline 2	52%	16 - 72%	1	Strong	
Intervention 2	100%		1	Strong	3
Henry					
(Physical refusal)					
Baseline 1	71%	53 - 87%			
Intervention 1	24%	13 - 40%	1	Strong	
Baseline 2	84.6%	70 - 93%	1	Strong	
Intervention 2	35.6%	17 - 46%	1	Strong	
(FCRs)					
Baseline 1	0				
Intervention 1	2.8	2 - 3	1	Strong	
Baseline 2	0		1	Strong	
Intervention 2	1.8	1 - 4	1	Strong	3

Table 3 (Continued)

Participant (behavior)	<i>M</i>	Range	Tau-U	Strength of functional relation	Demonstrations of the effect (visual analysis)
Time with toothbrush in mouth (seconds)					
Baseline 1	0				
Intervention 1	38.2	34 - 42	1	Strong	
Baseline 2	0		1	Strong	
Intervention 2	38	35 - 42	1	Strong	

3

Non-experimental Results

TARF-R scores. For each dyad, TARF-R assessments were conducted pre- and post- intervention. Scores of treatment acceptability remained the same (Gina and Lucas), increased slightly (Catherine), and decreased slightly (Daniel) between pre- and post-intervention. Effectiveness scores decreased (Gina, Catie, and Daniel) slightly or remained the same (Catherine). Disadvantages ratings decreased (Gina and Catherine), increased slightly (Catie), and remained the same (Daniel). Contextual fit ratings increased (Gina, Catherine, and Daniel) or remained the same (Catie). Table 4 depicts the results of TARF-R for each participant.

Table 4

Modified Treatment Acceptability Rating Form - Revised

Item Category	Administration	Gina	Catherine	Catie	Daniel
Acceptability	Pre	5.00	4.66	5.00	5.00
	Post	5.00	5.00	5.00	4.50
Effectiveness	Pre	4.67	4.66	5.00	5.00
	Post	4.30	4.66	4.50	4.20
Disadvantages	Pre	2.33	2.33	1.00	1.67
	Post	2.00	1.33	1.33	1.67
Contextual fit	Pre	4.50	3.75	4.33	4.50
	Post	4.75	4.50	4.33	5.00

Summary of Results

Research question one. *Does behavioral parent training (BPT) delivered via synchronous telehealth (i.e., videoconferencing) result in high parent treatment fidelity of a function-based intervention with their child during naturally occurring routines?*

All parents showed high treatment fidelity ($\geq 80\%$) for all data points during intervention and low treatment fidelity ($\leq 25\%$) for all data points during baseline and withdrawal. Each parent showed immediate changes in level of implementation with Lucas showing a change in trend. Taken as a whole, the results of the first A-B comparisons of the reversal designs show that BPT conducted via telehealth showed a basic effect of parent implementation of BSP strategies.

Research question two. *Is there a functional relation between increased parent implementation of a function-based intervention and a decrease in rate of target challenging behavior displayed by a child with IDD during naturally occurring routines?*

To test this research question, data were collected on percent of 10-second intervals with

challenging behavior during sessions (Joe, Lucas, and Henry). For Maddie, seconds per bite was calculated and correct responses (i.e. bites with 15 s between them that were completed independently). For Lucas and Henry, immediate decreases in challenging behavior with changes in level and trend and no overlap were obtained. An immediate increase in the seconds per bite occurred for Maddie, with a change in level and zero overlap. There were also corresponding changes when the intervention was withdrawn for Maddie and Henry. An immediate change in level and trend with one data point overlapping was obtained for Lucas. Corresponding changes were observed when the intervention was reintroduced for Maddie, Lucas, and Henry with Maddie and Henry showing immediate changes in level and trend. Lucas also saw a change in level and trend with one overlapping point.

Research question three. *Is there a functional relation between increased parent implementation of a function-based intervention and an increase in the rate of adaptive/replacement behavior displayed by a child with IDD during naturally occurring routines?*

For 3 of the 4 dyads, basic effects were detected for the appropriate replacement behavior (FCR and appropriate bites). For Maddie correct responses (i.e. bites with 15 seconds between them that were completed independently showed a strong functional relation with parent-implemented behavior intervention. For 3 of the 4 participants, a strong functional relation was present for the function-based intervention and a decrease in challenging behavior and an increase in appropriate behavior (FCRs and independent correct bites). Three basic demonstrations of the effect were found for Maddie, Lucas, and Henry for the intervention. Three basic demonstrations were also present for

secondary dependent variables for Lucas and Henry (room cleaning tasks and toothbrush in mouth).

The author's anticipated results were a strong and immediate (within three data points) functional relation between the use of BPT and decreased challenging behavior, which was confirmed by the performance of Maddie, Lucas, and Henry. Joe's results were a slight change in level and trend.

Research question four. *Do parents find the procedures of the function-based intervention delivered via synchronous telehealth (i.e., videoconferencing) beneficial and acceptable to the target child with IDD and their family?*

Based on the modified TARF-R scores pre- and post-intervention, all parents found the intervention acceptable, minimally disruptive, easy to understand, supportive of their child's participation in routines, and felt supported in their use of the intervention.

CHAPTER IV

DISCUSSION

This study evaluated the effect of BST and coaching on parent implementation of function-based behavior intervention plans when delivered via telehealth. A secondary goal was to evaluate the effects of parent-implemented behavior intervention plans on the challenging behavior of older children and adolescents with IDD. Additionally, the author aimed to assess the acceptability of the interventions both before and after parents implemented them. In this chapter, the findings of the study are discussed, and limitations and future directions for research are presented.

In the first phase of this study, parents were interviewed using the FAI and rating scales (Matson & Vollmer, 1995; O'Neil et al., 1997) to determine the potential operant consequences of their child's target challenging behavior and to identify adaptive behavior to teach as a replacement behavior. Parents completed the routine of concern with the interventionist observing to establish baseline levels of challenging and functional behavior. Following BPT consisting of didactic teaching, demonstration, role play, and feedback, parents demonstrated their knowledge and competence in independently implementing their child's behavior intervention plan. Telehealth equipment facilitated the delivery of BPT and data collection on parent's use of individualized behavior intervention plans, child challenging behavior, and child appropriate behavior. Baseline was then repeated and the intervention was reimplemented to establish the presence of a functional relation between the parent intervention implementation and child challenging behavior and appropriate replacement behavior.

The findings of this study extend the current telehealth intervention literature in several meaningful ways. First, this study contributes to an expansive and growing body of research supporting the use of telecommunication technology to provide medical care, supervision of educational, mental health, and medical practitioners, and direct intervention by behavior intervention professionals. Using consumer ready videoconferencing equipment, the interventionist was able to conduct interviews with parents, train parents, coach parents via bug-in-ear, and observe the routines of concern with parents. Each parent reached performance criterion in implementation of their child's BSP quickly ($M = 59$ min, range = 49 min - 68 min). Parent implementation of the function-based plans developed via videoconference resulted in decreased child challenging behavior and improvements in adaptive behavior for functional communication responses, completion of task analysis steps for room cleaning, adequately spacing their bites of food during mealtime, and tolerating tooth brushing.

One limitation of the current research is the absence of parent knowledge of behavioral principles assessment both pre- and post-training and coaching. Parents may have only learned strategies for the specific routine of concern and not the behavioral principles that underlie the intervention. This may play a role in maintenance of the intervention when the researcher is no longer coaching the parent. The author also did not collect data on the type and frequency of prompting needed by parents during coaching. For example, some parents might have required more error correction while others may have required more prompts to begin responding. The coaching portion of the intervention was not systematically faded or withdrawn. Data collection only occurred for one parent. Data on parent treatment fidelity and not independent correct use of strategies

were collected, thus the author cannot assess the effect of the training and coaching model on parent knowledge and independent skill performance. Future research should assess parent knowledge and the effect of withdrawing or systematically fading bug-in-ear coaching and interventionist presence by having the parents record sessions without the interventionist to assess independent performance.

Parents rated each intervention as having good contextual fit ($M = 4.46$; range = 3.75 - 5), to be acceptable ($M = 4.9$; range = 4.5 - 5), and effective ($M = 4.62$; range = 4.2 - 5) where high numbers correspond with high satisfaction. Parents reported that the intervention plans had few disadvantages ($M = 1.71$; range = 1 - 2.33) where a score of 1 meant little to no disadvantages. Parents also all reported that they felt “very supported” during the implementation of the intervention ($M = 5$) and said that the procedures were easy to understand ($M = 5$). Daniel, Catherine, and Catie noted that even though telehealth required some troubleshooting of camera placement, they felt that the telehealth delivery method was more convenient as it lessened their stress around cleaning their home prior to sessions and allowed for more flexible scheduling. Gina noted that the family could not have received effective behavioral support without the use of telehealth based on their distance from a city with behavior analysts. Past research showed that satisfaction with current services and technological skill level were significant factors in parents’ willingness to enroll in telehealth behavior supports (Salomone & Giuseppe, 2017). Future research should ask specific questions about telehealth as a delivery method of intervention potentially using qualitative methodologies to obtain a broader picture of parents’ experiences, concerns, and preferences in using telehealth.

Third, unique to this study, adolescents and older children were selected for participation to address the gap in the literature on parent-implemented behavior interventions via telehealth for this age range (Gerow et al., 2018). The specific challenges presented by this population include the extended learning history and the potential worsening of challenging behavior in adolescence (Rattaz et al., 2018). While there are varying prevalence estimates and data on chronicity of challenging behavior across the lifespan for individuals with IDD, factors such as increased size, hormonal changes, and prolonged learning history could influence the impact of the challenging behavior in adolescents in particular. Adolescence includes physical growth spurts, hormonal changes, a desire for increased independence and autonomy, and more complicated social situations (APA, 2002), all of which may be associated with challenging behavior. Adolescents may be operating under unique motivating operations not present at other developmental stages. Motivating operations are internal states that change both the reinforcing value of stimuli and temporarily change the rate of behavior (Cooper, Heron, & Heward, 2007). Motivating operations include abolishing operations (AO), which result in decreased reinforcing value and decreased rate of behavior, and establishing operations (EO), which result in increased reinforcing value of certain stimuli and increased rate of behavior. For example, if an adolescent is tired (i.e. in a state of relative deprivation of sleep) and has successfully engaged in challenging behavior to escape tasks in the past, they are temporarily more likely to engage in challenging behavior to escape from tasks they find aversive at a higher frequency, intensity, or duration because the value of escape or avoidance is increased when in a state of relative sleep deprivation (EO; Adams, Matson, & Jang, 2014). In this example, a student may

ask for a break with a scream instead of their typical voice volume or engage in higher rates of self-injury and aggression than on other days. The lack of sleep serves as a motivating operation, specifically an EO for all behaviors that are maintained by escape.

Each of the parents included in this study noted that the problem behaviors targeted in this study and others the participants exhibited were long-standing including some from early childhood, and had not been adequately addressed by behavior consultants, educational professionals, or ABA therapy. These types of problem behaviors require ongoing consultation, data collection, and the expertise of specialists that are not readily available. Each family had concerns in addition to the target routines and reported that they had requested assistance with their child's challenging behavior from many sources including local, school, and medical professionals and were displeased with the quality of ABA therapy and discontinued services. At this time, there is not sufficient evidence to support the use of FCT with adolescents and school-aged children with parents serving as interventionists (Gerow et al., 2018). Moving toward FCT with parents as interventionists as an evidence based practice could lead to increased use among available practitioners. Incorporating the use of telehealth delivery mechanism could increase the accessibility for families living in rural or underserved areas and increase practitioners' ability to complete follow up and maintenance checks on intervention effectiveness.

Prior research suggested that parents would have high levels of treatment fidelity after behavior skills training and with coaching via telehealth (Machalicek et al., 2016; Neely, Rispoli, Gerow, Hong, & Hagan-Burke, 2017). The behavior intervention plans created for each dyad were relatively simple interventions with few steps and clear

procedures and included the use of well-known evidence based practices for ASD and IDD. Parents reported that they were novel and that they had not previously learned the use of task analyses, token economies, FCT, or consequence-based interventions. These would be very typical intervention components designed by a Board Certified Behavior Analyst. With fewer than 2 hours of training, each parent was able to implement the intervention with high fidelity. Some adaptations made to BPT delivered via telehealth included the use of only auditory-only cues to interrupt incorrect behavior and using the screen share feature to display the didactic teaching materials (PowerPoint) during which the parents cannot see the interventionist.

Three dyads did not complete the study. Two dyads were disqualified from participating due to improvements in the child's targeted routine (toothbrushing) potentially related to the parent's increased attention to the routine and increased predictability of the routine for the child. One dyad did not complete the study due to the mother's work and school schedule and end of school year obligations for the participant child and his sibling. None of these reasons for attrition are directly related to the use of telehealth. For the dyad with time constraints, face to face support would not have addressed their specific needs. Future research should investigate facilitators and barriers to behavior consultation and research conducted via telehealth including potential privacy concerns, parents with sensory impairments (auditory and visual) or mobility impairments. It would also not be conducive for work with children with specific mobility impairments that require complex communication systems.

Other considerations include the participant's, siblings', and other family members' involvement in the creation of the behavior intervention plan. Self-

determination theory was not included in the planning or framing of the interventions (Schalock, Verdugo, Gomez, & Reinders, 2016; Taylor, Cobigo, Ouellette-Kuntz, 2019). Future research should incorporate adolescents' preferences and priorities into the planning of the BSP and choice of routine of concern. Adolescents also have a right to effective treatment, which may be in conflict with their preferences. These ethical difficulties can be viewed as an opportunity to work collaboratively with participants to achieve ecologically and socially valid interventions.

Considerations for family interaction are especially important when interventions are delivered in the context of family homes and family routines. For routines during which other family members were present (Joe and Gina and Maddie and Catherine), the other family members were not included in the intervention. They were provided information about the purpose of the study by the parent, but they were not required to behave in a particular way. This is an uncontrolled part of these observed routines as the interventionist felt it was an ecological validity concern to require meals to be held with just two members of the family when they are usually whole family events. For Lucas and Henry, the presence of other family members during the routine was controlled as much as possible. Both families included young children, and they would occasionally enter the room where the intervention was taking place (bathroom and bedroom). These variables were not controlled for but increase the likelihood of generalization because it is common during the typical routines of the household for siblings to be in the same room for at least part of these types of routines. Future research should address family member involvement if appropriate for the routine. This could include training siblings as communication partners and assessing social validity for siblings and other family

members as part of research. Sibling involvement may be a vehicle to address generalization across communication partners. Spector and Charlop taught three siblings to use Natural Language Paradigm to expand a child with ASD's utterances (2018). While the routines are different (play versus mealtime), there may be sufficient opportunities to interact and expand utterances. A review of the literature on interventions involving siblings found that interventions have generally focused on social and play skills (Shriver & Plavnick, 2015). The authors found that siblings had served as successful interventionists and models for skill building studies. There was no research specific to challenging behavior and the authors expressed in the use of such interventions with children with lower IQ, challenging behavior, and autism symptomology severity. The authors also report that individual factors for the sibling such as closeness of relationship, age, and gender should be taken into consideration prior to implementing such an intervention. Siblings can also participate in didactic portion of behavior skills training. There are ethical concerns with involving siblings in research on challenging behavior. Some of the problem behavior was directed at the parent such as verbal aggression from Lucas, which may have caused distress to the younger sibling. Some baseline procedures required the parent to withdraw attention from the participant or give the participant more attention. The effect of these changes on siblings and other family members is unknown and was not addressed in this study.

Furthermore, the parent-implemented interventions were effective for 3 of the 4 children. Increases in challenging behavior were also present when the intervention was withdrawn, and a corresponding decrease was observed when the intervention was implemented for the second time. These a priori predictions were confirmed by the

increase in appropriate behavior and decrease in challenging behavior for Maddie, Lucas, and Henry. For each dyad, there are some considerations for variables that potentially influenced the effectiveness for the intervention plan. For Joe in particular, several variables may have contributed to the intervention being slightly less effective in comparison to other dyads. First, FCRs did not correspond with changes in challenging behavior during the first intervention phase. This could be due to issues with motivation such as the relative availability of Gina's attention or Joe's need for more food items which fluctuated based on how much food he had on his plate at the beginning of the meal. An additional issue with the functions of the FCRs is the use of the "help" mand. The interventionist hypothesized that he may have wanted assistance with eating, but he never manded for help independently. This could be because eating with his hands had a lower response effort than pressing a button and waiting for mom to help with the use of the fork. Joe may benefit from the addition of a token economy or another positive consequence-based intervention to ensure that eating with his hands remains at a low rate by making the use of his fork, while effortful, match the reinforcement available.

One limitation of this research is the lack of homogeneity in developmental level and communication skills because of the inclusion of an 8-year-old participant (Henry). Henry was the only participant with no systematic means of functional communication (vocal-verbal, sign, or AAC). Future research should include more rigorous inclusion criteria due to the uniqueness of adolescence.

The one outlier data point for FCRs for Joe corresponded with the use of many novel foods and a Lazy Susan device on the table. Gina had made Joe pasta (at his request), while the rest of the family had a Greek meal in which many novel foods were

presented. Joe manded using the iPad and then pointing to items on the Lazy Susan and did not touch the items. This is an excellent example of MO manipulation, while inadvertent was helpful for the parents to have experienced for future language goals and development. Introducing novel foods to Joe could increase his manding through environmental arrangement (in sight but out of reach), which is a very common antecedent manipulation and relatively easy for parents to implement (Wong et al., 2015).

Past research that has included FA methods for older individuals using telehealth have included the use of safety equipment to address ethical concerns about harm to self or others during assessment. Functional analysis (FA) methodology can be disruptive to family activities such as dinner routines. The use of highly structured FA methodology may have resulted in more effective behavior intervention plans. At this time, the use of FAs in telehealth with parents as interventionists is very limited for older populations (Machalicek et al., 2009; Machalicek et al., 2016). Future research should assess the acceptability and feasibility of the use of trial-based or latency functional analysis via telehealth.

At the beginning of this study, Maddie was on one medication to decrease her appetite. During the course of the study, her weight moved into the healthy weight category and the specific appetite suppressant medication was decreased and then discontinued. Maddie also increased signs of satiation during intervention phases. During baseline, she never indicated satiation through saying she had enough food or was done eating. During intervention, she indicated satiation for 3 out of 5 meals during the first intervention phase and 3 out of 6 for the second intervention phase. Catherine reported that Maddie had never indicated satiation prior to beginning intervention and that Maddie

often perseverated on obtaining food and engaged in challenging behavior when told that she could not have third portions of meals.

For Lucas' specific topographies of challenging behavior, a tiered intensity data collection method or the use of decibels as a metric for yelling may give an additional dimension to the data analysis. During baseline, Lucas would often scream and threaten but after intervention most of his challenging behavior was grumbling and making sarcastic comments. While these behaviors are not socially acceptable, they are more age-appropriate than screaming and threatening and may be within social norms. Without the inclusion of typically developing age normed data on this routine it is difficult to assess the appropriate level of less severe challenging behavior such as grumbling or talking under his breath.

When designing the intervention plan for Henry, Daniel suggested a few modifications and Kelley chose the reinforcers for the token economy. Daniel suggested that we not respond to the less disruptive behavior of head turning away from the toothbrush with prompting Henry to ask for a break because he believed that the routine would stretch out unnecessarily long and increase the likelihood that Henry would engage in more severe topographies of challenging behavior. Because of this modification, challenging behavior occurred during intervention. The current behavior intervention plan did not systematically plan for demand fading, but the interventionist discussed this at length with Henry's parents who reported that they felt confident that they could start gradually increasing the duration of Henry's tolerance for toothbrushing. The terminal goal was about 30 seconds per token and to brush each quadrant of his mouth during the session for a total of the dentist-recommended 2 minutes of tooth brushing. During the

study, the interventionist did not specify or take data on where Daniel was brushing so it is very possible that the brushing was not evenly distributed to address all teeth, gums, and tongue.

A limitation of research on behavior plan development is that there were no systematic decision rules governing how much a behavior plan was modified based on parent input. The interventionist accepted small changes from parent feedback, but there were no formal decision rules in place for this process. The interventionist used clinical judgement to ensure that the behavior plan still addressed the function of the challenging behavior hypothesized based on the results of the QABF and FAI (Matson, & Vollmer, 1995; O'Neil et al., 1997). Creating decision rules will increase the replicability and reproducibility of BPT for future research and practice. Future research should be transparent about these processes and strive to systematize the decisions.

Generalization and maintenance were not assessed during this study. The results did not address cleaning a different room of the house or eating a meal at a restaurant or in a school cafeteria, or brushing teeth in the bathroom at grandma's house. Future studies should address generalization and plan for generalization by programming common stimuli and planning for generalized and then naturally occurring reinforcement. Maddie also occasionally yelled curse words, which was not included as a target of this study but would impact generalization into community settings for mealtime. During Joe and Maddie's dinner routines, data were collected on a limited and pre-determined amount of time, which does not generalize well to eating out. During meals out with family, Joe and Maddie would be required to wait to order food, then wait until the food was ready, and then wait for everyone else to finish.

The use of telehealth was most critical for Joe and Gina who lived 68 miles from the interventionist. The distance would have been prohibitive for the number of sessions required to complete the intervention. Telehealth was also critical for all dyads because there were other children and family members who might have found the presence of an additional person in the home disruptive. This was especially true for Joe and Gina and Maddie and Catherine for the dinner routine.

The level of challenging behavior deemed safe to intervene on via telehealth was mild to moderate (not causing immediate harm to self or others or property). For higher level challenging behavior, FAs and more intensive functional assessments are indicated, which can be difficult or hazardous for families to attempt in their homes. For other routines of concern, face to face observations and assessments may be warranted or specific training in crisis management should challenging behavior escalate beyond what is safe for the individual and the family. Past research on more severe topographies of challenging behavior has mostly included children under the age of 5 (Lindgren et al., 2016). Very few intervention articles for challenging behavior intervention via telehealth include older adolescents (Ferguson, Craig, & Dounavi, 2019). Research that includes adolescents who engage in more severe topographies of challenging behavior (cause harm to self or others) involve reliance on protective equipment and/or targeting precursor behaviors as part of a confirmed response class with the more serious challenging behavior (Machalicek et al., 2009; Machalicek et al., 2016). Future research should address the barriers to accessing complete and accurate behavior assessment via telehealth and potential procedural modifications for use with older participants who engage in topographies of behavior that cause harm to self and others.

Limitations

This research was conducted in the Pacific Northwest, which has a majority white population, and 3 of the 4 participants were white children being raised by white parents and one child was a black child being raised by a white parent. The inclusion of participants from one cultural group limits the generalizability of the findings. Families of the non-white/non-dominant cultural group may have different opinions on the acceptability of the use of telehealth, the intervention procedures, and behavioral expectations for children with disabilities during family routines (Huer, Parette, & Saenz, 2001; Kulkami & Parmer, 2017). This study included only 4 participants with varying levels of functional communication skills and at varying ages, so the generalizability is limited. In an effort to increase generalizability, the author included information about the participants that may enable future researchers and practitioners to match skill levels to their future research and work with clients. There was some diversity of economic status, educational level, employment type, and population density of where families lived. Family composition was also variable with a single parent raising two children, a divorced parent raising three children, and two parents raising two children. Socioeconomic status and employment level varied as well. A limitation of the current research is that only one parent was trained in the intervention. The burden of behavior plan implementation may create stress in the co-parenting relationship. None of the current research on behavioral parent training (BPT) includes both parents due to single case methodology considerations.

Future research on family routines should include assessments of overall routine quality or family quality of life both pre- and post-intervention. These types of assessment would be a strong supplement to the TARF-R social validity measure.

Conclusion

In summary, this study evaluated the effects of telehealth coaching on parent-implemented behavior intervention treatment fidelity, and the impact of parent implementation on child challenging behavior and appropriate replacement behavior for older children and adolescents using an A-B-A-B design. Visual analysis and Tau-U were used to evaluate the results of the interventions and a functional relation was established for 3 of the 4 participants. This study addresses the research gap of involving older children and adolescents addressing challenging behavior via telehealth.

APPENDIX A: EXPERIMENTAL PROCEDURES

Stages of Research Procedures

Phase	Measures/Materials	Procedures	Research Question/s Addressed
Screening	Screening questionnaire /ABC Data (as needed)/Observation (as needed)/Smart device, laptop, or desktop	<ul style="list-style-type: none"> • Brief screener administered • ABC data collected by parents (as needed) • Direct observation by interventionist (as needed) 	N/A
Technology demonstration/trouble shooting	Smart device, laptop, or desktop/VSee software/Bluetooth headset	<ul style="list-style-type: none"> • Conduct brief conversation with VSee • Parent uses Bluetooth headset • Position device to view entire room/area used during intervention 	N/A
I	Functional Assessment Interview (FAI) /Questions About Behavioral Function (QABF)/interventionist procedural fidelity checklist for FAI and QABF/Smart device, laptop, or desktop/VSee software/Bluetooth headset	<ul style="list-style-type: none"> • Administer FAI • Administer QABF 	N/A
II	Challenging behavior data collection sheet/Smart device, laptop, or desktop/VSee software/Bluetooth headset	<ul style="list-style-type: none"> • Provide prompts to parents to conduct the routine of concern • Baseline challenging behavior data collected 	N/A

III	PowerPoint/BIP procedures/TARF-R pre-test/materials for BIP/treatment fidelity checklist for interventionist/Smart device, laptop, or desktop/VSee software/Bluetooth headset	<ul style="list-style-type: none"> • Didactic training • Conduct BPT • Administer TARF-R 	N/A
IV	BIP materials/challenging behavior data collection sheet/parent treatment fidelity checklist/interventionist procedural fidelity checklist/Smart device, laptop, or desktop/VSee software/Bluetooth headset	<ul style="list-style-type: none"> • Bug-in-ear coach parents in BIP procedures • Challenging behavior data collected during intervention 	3
V	Smart device, laptop, or desktop/VSee software/Bluetooth headset/challenging behavior data collection sheet	<ul style="list-style-type: none"> • Baseline challenging behavior data collected 	N/A
VI	BIP materials/challenging behavior data collection sheet/parent treatment fidelity checklist/interventionist procedural fidelity checklist/Smart device, laptop, or desktop/VSee software/Bluetooth headset	<ul style="list-style-type: none"> • Bug-in-ear coach parents in BIP procedures • Challenging behavior data collected during intervention 	1, 2
VII	TARF-R post-test/Smart device, laptop, or desktop/VSee software/Bluetooth headset	<ul style="list-style-type: none"> • Administer TARF-R 	4

APPENDIX B: SCREENING AND BEHAVIOR ASSESSMENT
SCREENING CHECKLIST

(a) Do you have access to the internet and either a personal desktop/laptop/smart device with video capabilities?

Y N

(b) Is your child between 7 and 18 years old?

Y N

(c) Does your child have a medical or educational diagnosis of autism/ASD, intellectual disability, or other genetic disability?

Y N

(d) Does your child engage in challenging behavior on a daily basis that interferes with the quality of one or more routines?

Y N

(e) Are you willing to participate in training that involves videotaping your interactions with your child in your home and participation in regular online coaching?

Y N

(f) Is this behavior dangerous to themselves, others, and important property?

Y N

If the parent answers “yes” to each question and “no” to the last question, then they will move into the assessment portion of the research. If they answer “no” to any question except for the last question, then they will be disqualified from participation and referred to the College of Education HEDCO Autism Clinic for appropriate referrals to community resources

If they answer “yes” to the last question, they will be asked follow up questions:

(a) How often does the challenging behavior occur?

(b) Describe the behavior to me

(c) Are there times when you can be sure the challenging behavior will occur?

(d) Are there times when you can be sure the challenging behavior will not occur?

(e) Are there any “warning” behaviors that may happen before the severe challenging behavior?

Form 1. Screening Checklist

Demographics Form

Last Name:

First Name:

Middle Name/Initial:

Date of Birth:

Gender:

Race:

American Indian/Alaskan Native

Asian American

Black or African American

Native Hawaiian or Other Pacific Islander

White

Hispanic or Latino

Primary Disability

ASD. ID. Deaf-Blindness. HI. OHI. PI. LD. SLI.

TBI. VI Other: _____

Medical or school diagnosis?

Grade:(Please Select) 1st 2nd 3rd 4th 5th

6th 7th 8th 9th 10th 11th 12th

PARENT/GUARDIAN INFORMATION

Parent/Guardian Name

Parent/Guardian Address

Parent/Guardian Phone #

Income level

Do you have not enough, just enough, or a little extra, tons of extra

Do you have money to buy nice things: Never, rarely, sometimes, often, always

How many in household?

Relation to child?

APPENDIX C

PROCEDURAL FIDELITY CHECKLISTS

FAI and QABF

Task	Description	Yes/No
Social opening	The interventionist greets the parent using their name and makes small talk for 1-2 minutes (i.e., asks about family events, asks how the parent is doing, etc.).	Yes No
Introduce the FAI or FAI Adolescent	The interventionist describes the purpose of the interview and orients the parent to the type of questions that will be asked. The interventionist explains that they may need to be taking some notes and looking down at certain points as the parent talks. Before covering routines in depth, the interventionist asks the parent about his or her main concerns (i.e., asking about what parts of the day are most challenging, what's going well, what's not going well, etc.).	Yes No
Ask about topography of challenging behavior	As challenging behavior is described by the parent, the interventionist asks questions related to the topography of the behavior, such as, "Can you tell me more about what biting looks like for Johnny?", or "Thinking about the last 10 times you got Johnny dressed, how many times did the biting occur?"	Yes No
Ask follow-up questions	If the parent does not provide an answer to the structured question, or does not provide information directly related to the content of the question, the interventionist asks a follow-up question for more information.	Yes No
Ask if scope of concerns have been addressed	The interventionist asks the parent if all of their concerns regarding family routines were addressed.	Yes No
Identify routines of interest	Before concluding the interview, the interventionist asks the parents which routine they would most like to receive help with.	Yes No
Cover all topics	The interventionist covers all topics included in the FAI	Yes No
Closing conversation	The interventionist schedules (or confirms) the next session. The interventionist explains what will happen in the next session. The interventionist summarizes the content covered in the interview. The interventionist thanks the parent for his or her time and says goodbye.	Yes No

FAI Procedural Fidelity Checklist
Responsive Interaction Fidelity Checklist

Task	Description	Rating 0=rarely 1=sometimes/partially 2=usually
Use conversational style	<p>The interventionist avoids reading directly from the scripted questions without prefacing them first. The interventionist adapts the scripted questions based on information he or she has learned from the parent. Where appropriate, the interventionist responds to parent answers before asking another questions.</p> <p>Example: For the question “Could you describe what wake up time is like?”, the interventionist says, “Now I’m going to ask about your wake-up routines with Johnny. Can you tell me a little bit what his daily schedule looks like?”</p>	
Move the interview along appropriately	<p>When pressed for time or changing topics, the interventionist moves the interview forward in a way that is friendly, positive and appropriate.</p>	
Refer to child and others in the household by name	<p>The interventionist refers to members of the household by name who have been mentioned in the interview, such as the name of the child, parent, sibling, dog, etc.</p> <p>Example: “Can you tell me more about what the interactions between Johnny and Lillian look like?”</p>	

<p>Take notes only when necessary</p>	<p>The interventionist takes notes to the extent that they will be helpful to conduct the interview. The interventionist refrains from taking excessive notes during the interview. Example: The parent mentions that Johnny “went ballistic” when his sister took away his toy in the course of telling another unrelated story. The interventionist jots this statement down as a reminder to circle back to it once the parent has finished telling the story.</p>	
<p>Use behavioral language appropriate based on parent experience</p>	<p>The interventionist uses behavioral terms appropriate based on the background and experience of the parent. Example: For a parent with little knowledge of behavioral terminology, the interventionist says “All of this great information will help us figure out how to decrease Johnny’s hand-biting!” instead of “All this great information will help us figure out how to best intervene on Johnny’s challenging behavior!”</p>	
<p>Ask open-ended questions where appropriate</p>	<p>The interventionist asks broad, open-ended questions before asking more specific questions. Example: For the feeding/meal routine, the interventionist says, “Can you tell me what meal time looks like for Johnny?” before asking “Where does Johnny usually eat?”</p>	
<p>Ask for clarification as needed</p>	<p>If the parent makes an ambiguous statement, or does not provide adequate information to answer the question, the interventionist for more information. Example: In response to “How much can Johnny do on his own?” the parent says, “He can do some things but mostly I just take charge.” The interventionist then asks for clarification by saying, “Okay, can you tell me more about the things that Johnny CAN do?”</p>	

Use parents' words	<p>The interventionist consistently uses the parent's own language to refer to home routines and/or child behavior.</p> <p>Example: The parent refers to her child's behavior as "having a meltdown". From then on, the interventionist also refers to that same behavior as "having a meltdown".</p>	
Expand and elaborate parents' statement to incorporate new information	<p>The interventionist responds by reflecting back information that the parent has provided to solidify understanding, and then prompts the parent to say more.</p> <p>Example: The parent says, "These days we can't get Johnny to sit down for dinner for 5 seconds." The interventionist says, "It sounds like dinner time has been difficult for Johnny lately. Can you tell me more about what dinner time looks like?"</p>	
Describe positive behavior frequently and authentically	<p>The interventionist places emphasis on positive statements made by the parent and summarizes what the parent has said.</p> <p>Example: The parent says, "Johnny has come really far with getting dressed. He will now help me by putting on his shirt all by himself!" The interventionist responds, "Wow! It sounds like Johnny is doing really well to help get himself ready in the morning. That must make the morning routine easier on you all!"</p>	
Listen and respond	<p>The interventionist engages in active listening by nodding, smiling (when appropriate), looking at the webcam (not the screen), and making remarks that indicate understanding (e.g., "mhm", "okay", "I see"). The interventionist responds with on-topic remarks or exclamations before asking a new question or changing the topic.</p>	
Use positive body language	<p>The interventionist sits up straight and leans toward the computer. The interventionist maintains a warm facial expression throughout the interview.</p>	

Ensure that background of interventionist's screen is neat, and minimal distractions occur	The background of the interventionist's screen is tidy and uncluttered. The interventionist is in a private and secure location with no distractions or interruptions occurring during the interview.	Yes No
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Treatment Fidelity Checklist FAI

Procedural Fidelity Checklist - Parent Training Part I

<u>STEPS</u>	Score 0 1
<p><u>Materials for Interventionist to provide:</u></p> <ul style="list-style-type: none"> • Any materials required for the plan (sent via email or post or gathered from the home) • PowerPoint presentation for didactic teaching portion 	
<p><u>Social greeting and introduce topic</u></p> <p><i>“Hello, _____. Thank you for meeting with me today. Today we’re going to go through the plan for _____ in detail. The idea is that we do more thorough practice together so it’s easier to during (targeted routine).”</i></p>	
<p><u>Introduce the training:</u></p> <p><i>“For the 1st part of the training, we will talk about why we are using this intervention.”</i></p> <p><i>“For the 2nd part of the training, we will actually practice delivering the intervention together.”</i></p>	
<p><u>Initial Training Part I agenda items:</u></p> <p>1. Administrative tasks—</p>	

<ul style="list-style-type: none"> • Discuss confidentiality <ul style="list-style-type: none"> ○ <i>“One thing the University likes us to review with you is that we will keep all information gathered during the study confidential, or private. We won’t even use your real name or <u>[child/adolescent name]</u>_____’s outside of our conversations. We check in with our supervisors about how things are going but we will not use either of your names in that context either, just Parent1 or Participant1, for example. It’s very important to us that you feel comfortable participating and that you know we work very hard to keep your information private and protected. Do you have any questions about confidentiality or privacy?”</i> 	
<ul style="list-style-type: none"> • Mandatory reporting <ul style="list-style-type: none"> ○ <i>“As I think we are both aware, I am a mandatory reporter, which means...”</i> 	
<ul style="list-style-type: none"> • Preferred time and method of contact (<i>for contacting them throughout the study</i>) <ul style="list-style-type: none"> ○ <u>[Get both email and phone number if possible]</u> <ul style="list-style-type: none"> <input type="checkbox"/> Email: <input type="checkbox"/> Phone: ○ <u>[Rank order preferred method of contact]:</u> <ul style="list-style-type: none"> <input type="checkbox"/> Email: (1 2 3) <input type="checkbox"/> Phone call: (1 2 3) <input type="checkbox"/> Text message: (1 2 3) 	
<p>2. Deliver PowerPoint training— <i>“First, we’ll start with why we use FCT to treat challenging behavior...”</i></p>	

<p>3. Describe behavioral theory— <i>“When we design a behavior plan, we base our decisions on what we call “behavioral theory”, which basically means that we focus on changing the environment, not the child/adolescent, so that the child/adolescent is rewarded for engaging in appropriate behavior and not rewarded for problem behavior. Also, it means we focus on...”</i></p> <ul style="list-style-type: none"> • Gradual change over time. Thinking about the big picture • Nail down one small setting, achieve success, then start generalizing to other settings <p>○ [Draw picture of data path going up and down]</p> <p>○ Point out one of the data points that dips following a high point, and say something like, <i>“Imagine what you might think this day; they did worse than yesterday, so it’s important that we zoom out and see the big picture that they really is improving overall; slowly but surely.”</i></p>	
<p>4. Describe characteristics of successful interventions— <i>“Researchers have been studying this stuff for decades and we now have <u>a lot of research</u> to suggest that if our interventions have three requirements, it’s extremely likely that we will make huge improvements in child behavior: the interventions must be (1) <u>function-based</u>, (2) <u>contextually fit</u>, and (3) implemented with <u>high fidelity</u>”</i></p> <ul style="list-style-type: none"> • <i>“<u>Function-based</u> means...”</i> • <i>“<u>Contextually fit</u> means...”</i> • <i>“<u>Fidelity</u> is how accurate we are when we deliver the intervention...”</i> 	

Procedural Fidelity Checklist - Initial Training Part 2

	Score 0 1
<p>1. Instructions</p> <ul style="list-style-type: none"> • Explain the “I do” “We do” “You do” style of the training – <i>“We will use a strategy called behavior skills training to teach you how to implement _____’s behavior intervention plan. First I will model how to implement the behavior plan and you kick back and watch. One thing you might do is imagine yourself implementing the plan as I am doing it, because you will have a chance, after I model it, to practice implementing it and I will be right there to give you feedback the whole time to help make sure you get it right. Then, after that,</i> 	

<ul style="list-style-type: none"> • Explain what performance feedback will look like – <i>“After I model the plan for you and you have a chance to practice, I will give you feedback in two ways. First, I will give you thumbs up, or nod my head, or say something to indicate that you are doing things correctly. I will also tell you which specific steps you did well implementing so you know exactly. If you do something that is not part of the plan or something that is technically not correct in the plan, I will stop you by saying something like _____, so we don’t accidentally practice any bad habits.”</i> 	
<ul style="list-style-type: none"> • Explain how long the training will take – <i>“The training today will not be time-restrained; we will practice until you feel comfortable implementing the plan with 100% accuracy.”</i> 	
<p>2. Go over Competing Behavior Pathway – <i>“This is what we call a behavior pathway, and we use it sort of like a map to see what parts of the environment might be triggering _____’s challenging behavior, how things in the environment are responding to the behavior, and it allows to think about how we replace the challenging behavior with more appropriate replacement behavior.”</i></p> <ul style="list-style-type: none"> • <i>“Also, we use this to build our interventions; we try to design strategies that are based on information from each of the three boxes...what triggers can we neutralize or remove, what behaviors do we need to teach, how do we best respond to the student when they are responding appropriately to make it MORE likely to occur in the future, and how do we respond to challenging behavior, like _____, so it is LESS likely to occur in the future.”</i> • <i>If we incorporate all of these ideas into our intervention, and implement it accurately, we know the likelihood of the plan working is very, very high.</i> 	
<p><u>BEGIN BEHAVIORAL SKILLS TRAINING</u> <u>(instructions, modeling, rehearsal, praise, and corrective feedback)</u></p>	
<p>3. Modeling (I do) ...(interventionist <i>thinking out loud</i>)</p> <ul style="list-style-type: none"> • The interventionist will model implementation of the entire BSP with the parent in a mock arrangement where the parent pretends to be the child/adolescent, and the interventionist pretends to be the child/adolescent. This is performed 1-2 times. • Check with parent whether they are ready to practice or whether they want to see it again. 	

<u>Administer Intervention acceptability form</u>	
<p>4. Rehearsal (We do) with performance feedback</p> <ul style="list-style-type: none"> • The parent will practice implementing the intervention with the interventionist in a mock arrangement where the parent acts as themselves and the interventionist pretends to be the target child in the target setting, while also providing prompts during the guided practice. • Guidance will be implemented in three distinct levels: (1) Highly-guided practice with feedback; (2) Moderately-guided practice with feedback; and (3) Minimally-guided practice with feedback (near independent). <ul style="list-style-type: none"> ○ Highly-guided – Prompt every step ○ Moderately-guided – Prompt about half steps ○ Minimally-guided practice – Prompt only if they need it; repeat until don't need prompts 	
<p>5. You do (with feedback)</p> <ul style="list-style-type: none"> • Following successful practice at the minimally-guided practice (with feedback) level of support, the consultee will have the opportunity to practice FCT independently, with feedback only occurring at the end of the practice trial. The consultee will continue trials until implemented with 100% fidelity. <i>“I won't say anything DURING and then tell you what percentage you followed ...”</i> 	
<p>6. Record total number of minutes included in the training</p>	

**Procedural Fidelity Checklist – Intervention Sessions
Dyad 1: Joe and Gina**

Parent Coaching Fidelity Checklist

Participant Code _____

D.C. _____

Parent coaching/direct feedback		
0 = never 1 = rarely 2 = less than half the time 3 = the majority of the time 4 = always		
1.	Interventionist ensures parent has all supplies for routine and is clear on procedure (as needed)	0 1 2 3 4
2.	Interventionist uses 0-second time delay prompting if parent makes errors <ul style="list-style-type: none"> • Interventionist gives a brief verbal reminder • As needed, interventionist gives a more elaborate reminder (e.g., “Go head and tell him you’re going to talk to his brother.”) 	0 1 2 3 4 NA
3.	Interventionist uses error correction procedure <ul style="list-style-type: none"> • Interventionist interrupts the parent (e.g., “Don’t respond to that since he’s not using the iPad.”) • As needed interventionist asks parent to complete correct action (e.g., “Ok, now you can respond.”) • Interventionist praises correct response and asks parent to continue 	0 1 2 3 4 NA
4.	Interventionist prompts parent to use descriptive praise if not completed after 3 seconds	0 1 2 3 4
5.	Interventionist praises parent for correct responses throughout coaching session	0 1 2 3 4
TF Score = Points /total points		_____ %

Dyad 2: Maddie and Catherine
Parent Coaching Procedural Fidelity Checklist

Participant Code _____

D.C _____

Parent coaching/ direct feedback	
0 = never 1 = rarely 2 = less than half the time 3 = the majority of the time 4 = always	
Interventionist ensures parent has all supplies for routine and is clear on procedure (as needed)	0 1 2 3 4
Interventionist uses 0-second time delay prompting if parent makes errors <ul style="list-style-type: none"> • Interventionist gives a brief verbal reminder • As needed, interventionist gives a more elaborate reminder (e.g., “Be sure to block her hand if she tries to move before the timer.”) 	0 1 2 3 4 N/A
Interventionist uses error correction procedure <ul style="list-style-type: none"> • Interventionist interrupts the parent (e.g., “Remember to set the timer before you give her the bowl.”) • As needed interventionist asks parent to complete correct action (e.g., “Go ahead get the bowl back and set the timer.”) • Interventionist praises correct response and asks parent to continue 	0 1 2 3 4 N/A
If needed, interventionist prompts parent to remain close to child during mealtime.	0 1 2 3 4 N/A
Interventionist prompts parent to use descriptive praise if not completed after 3 seconds	0 1 2 3 4 N/A
Interventionist praises parent for correct responses throughout coaching session	0 1 2 3 4
TF Score = Points /total points	_____ %

Dyad 3: Lucas and Catie
Parent Coaching Procedural Fidelity Checklist

Participant Code _____

D.C _____

Parent coaching/ direct feedback	
0 = never 1 = rarely 2 = less than half the time 3 = the majority of the time 4 = always	
Interventionist ensures parent has all supplies for routine and is clear on procedure (as needed)	0 1 2 3 4
Interventionist uses 0-second time delay prompting if parent makes errors <ul style="list-style-type: none"> • Interventionist gives a brief verbal reminder • As needed, interventionist gives a more elaborate reminder (e.g., “Say, I hear you but we’re going to talk about that later”) 	0 1 2 3 4 NA
Interventionist uses error correction procedure <ul style="list-style-type: none"> • Interventionist interrupts the parent (e.g., “Remember that we don’t want to help him unless he asks”) • As needed interventionist asks parent to complete correct action (e.g., “Go ahead and put that back.”) • Interventionist praises correct response and asks parent to continue 	0 1 2 3 4 NA
Interventionist prompts parent to use descriptive praise if not completed after 3 seconds	0 1 2 3 4
Interventionist praises parent for correct responses throughout coaching session	0 1 2 3 4
TF Score = Points /total points	_____ %

Dyad 4: Daniel and Henry
Parent Coaching Procedural Fidelity Checklist

Participant Code _____

D.C _____

Parent coaching/ direct feedback	
0 = never 1 = rarely 2 = less than half the time 3 = the majority of the time 4 = always	
Interventionist ensures parent has all supplies for routine and is clear on procedure (as needed)	0 1 2 3 4
Interventionist uses 0-second time delay prompting if parent makes errors <ul style="list-style-type: none"> • Interventionist gives a brief verbal reminder • As needed, interventionist gives a more elaborate reminder (e.g., “Be sure to have him touch the break card before letting him have a break.”) 	0 1 2 3 4 NA
Interventionist uses error correction procedure <ul style="list-style-type: none"> • Interventionist interrupts the parent (e.g., “Don’t give him a token because he didn’t get to five seconds of brushing.”) • As needed interventionist asks parent to complete correct action (e.g., “Go ahead and take that token back.”) • Interventionist praises correct response and asks parent to continue 	0 1 2 3 4 NA
Interventionist prompts parent to use provide token if not completed after 3 seconds	0 1 2 3 4
Interventionist praises parent for correct responses throughout coaching session	0 1 2 3 4
TF Score = Points /total points	_____ %

APPENDIX D

CHALLENGING BEHAVIOR AND FCT DATA

Date: _____ Participant# _____ Condition: _____ Session # _____ DC _____ Interventionist: _____	Date: _____ Participant# _____ Condition: _____ Session # _____ DC _____ Interventionist: _____
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	0-1 min	1-2 min	2-3 min	3-4 min	4-5 min	0-1 min	1-2 min	2-3 min	3-4 min	4-5 min
1 s	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -
11 s	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -
21 s	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -
31 s	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -

41 s	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -
51 s	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -	CB Integrity :+ -

FCT Pretraining

Date	Participant#	Condition	Session #	Data Collector
Trial #	Targets	Independent response	Physical prompt	Integrity
1		+ E NR	+ E NR	+ -
2		+ E NR	+ E NR	+ -
3		+ E NR	+ E NR	+ -
4		+ E NR	+ E NR	+ -
5		+ E NR	+ E NR	+ -
6		+ E NR	+ E NR	+ -
7		+ E NR	+ E NR	+ -
8		+ E NR	+ E NR	+ -
9		+ E NR	+ E NR	+ -
10		+ E NR	+ E NR	+ -

Date	Participant#	Condition	Session #	Data Collector
Trial #	Targets	Independent response	Physical prompt	Integrity
1		+ E NR	+ E NR	+ -
2		+ E NR	+ E NR	+ -
3		+ E NR	+ E NR	+ -
4		+ E NR	+ E NR	+ -
5		+ E NR	+ E NR	+ -
6		+ E NR	+ E NR	+ -
7		+ E NR	+ E NR	+ -
8		+ E NR	+ E NR	+ -
9		+ E NR	+ E NR	+ -
10		+ E NR	+ E NR	+ -

+ = correct; E = error; NR = no response

APPENDIX E

BEHAVIOR SUPPORT PLANS

Behavior Support Plan Joe and Gina (Dyad 1)

Step in the BSP	No	some	most	Yes
BEFORE he sits down for dinner				
Step 1: Collect the following: (1) BSP Checklist (this form!), (2) iPad with guided access on and GoTalk open				
Step 2: Talk to J before prayers				
Step 3: Conduct mini-lesson on using the iPad Example: "J, if you want to talk to me, you can press this button." Press the button and then say "What do you want to say, J?" "J, if you need help to eat your dinner or need more food or drink, you can press this button." Press the button and say, "I'll help you!"				
Step 4: Model – Lead – Test asking for attention and help <ul style="list-style-type: none"> Model examples of asking for attention and help Lead "If you want help, what should you do?" "If you want to tell me something, what should you do?" – Prompt him to press the buttons Test "Show me how you tell me you need help." "Show me how you tell me something." 				
Step 5: Remind him of the rules and model the first two for him. <ul style="list-style-type: none"> "At the table we keep our hands to ourselves." "We sit with our legs under the table." "We eat with our fork." 				
DURING dinner				
Step 6: Turn your body away from J and toward his brother. Say "I'm going to talk to C right now."				
Step 7: If...J asks for attention or help appropriately				
(1) Attention: Turn your body toward him and say, "I hear you! What do you want to say?"				
(2) Help: Tell him, "I'll help you with that" and either help by placing your hand over his and assist him with that bite or correct whatever he's asking for help with				
Step 8: If... J yells, touches your arm or any object/food on the table				
(1) Stay faced away from him for three seconds				na
(2) Turn and ask him if he needs help or wants to say something				
(3) Help him to press a button on the iPad and respond to his request				na
AFTER he finishes eating				
Step 9: Tell him you like eating dinner with him				
Step 10: Say "Thank you for telling me what you need, using your fork, sitting nicely, and keeping your hands to yourself."				

Behavior Support Plan for Maddie and Catherine (Dyad 2)

Step in BSP	No	some	most	Yes
BEFORE Mealtime				
Step 1: Collect the following: (1) Mealtime Checklist (this form!), (2) Rewards for M (cut up sour patch or other small items), (3) the MotivAider				
Step 2: Check to make sure MotivAider batteries are working and it is set to the right time				
Step 3: Talk to M right <i>before</i> mealtime				
Step 4: Remind M about what she needs to do and show her the MotivAider Example: "M, we're going to eat breakfast/lunch/dinner. Remember that if you wait for the buzzer before you take a bite, you can have sour patch."				
AT VERY BEGINNING of Mealtime				
Step 5: Test M about how she earns rewards Example: "How do we get sour patch?" "We wait to take a bite. Great!"				
DURING Mealtime				
Step 6: If...M engages in waiting to take a bite,				
(1) Use specific praise "I like how you're waiting to eat"				
(2) After each bowl, provide a small piece of the reward				
Step 7: If... M says "no" or has other problem behavior				
(1) Ignore her verbalizations				na
...if she gets up from the table (2) Ask her to return to the table				na
...if she eats before the buzzer (3) block her by holding her hand/the spoon and (4) Remind her what she earns if she waits				na

Behavior Support Plan for Lucas and Catie (Dyad 3)

Step in the BSP	No	some	most	Yes
BEFORE he cleans his room				
Step 1: Collect the following: (1) BSP Checklist (this form!), (2) List of chores with pictures and steps				
Step 2: Talk to L after he takes his medication.				
Step 3: Conduct mini-lesson on expectations for cleaning his room Example: "L, today we're going to make you bed, pick up trash, put laundry away, and sweep the floor. Remember, you can ask me for three breaks from cleaning and help three times."				
Step 4: Remind L of what he can earn for cleaning his room. <i>"If you clean your room, you can choose between using your phone or playing your games."</i>				
Step 5: Model – Lead – Test <u>asking for a break or help</u> <ul style="list-style-type: none"> Model examples of asking for a break and help Lead <i>"If you want a break, what should you say?" "If you want help, what should you say?"</i> Test <i>"Show me asking for a break and help."</i> 				
DURING room cleaning				
If L is cleaning, every time he completes a step of a task, provide specific praise Ex: "Thanks for getting the broom." "I appreciate you taking the sheets off the bed."				
Step 6: If...L asks for a break or for help appropriately				
(1) Break: Tell him, "That's great, I'm setting a timer," set 1 minute timer, put a check in a box under breaks, and step out of the room				
(2) Help: Tell him, "I'll help you with this one" and put a check in a box under Help and help with that step				
Step 7: If... L yells or refuses to work or talks about off topic subjects				
If he has breaks or help left... (1) Ask if he wants a break or help				na
If no breaks or help left.... (2) point at the picture or the next step of cleaning				
(3) Remind L of how he can earn his phone/games				na
AFTER he finishes cleaning				
Step 8: Give him games or phone				
Step 9: Say "Thank you for cleaning your room today."				
Step 10: Leave room				

1 minute breaks

--	--	--

Help

--	--	--

Making the Bed

1. Take pillows off bed.
2. Put pillows on chair
3. Remove comforter
4. Shake comforter out
5. Put sheet back on bed
6. Put comforter on (even with bottom of bed)
7. Smooth comforter
8. Put pillows back on
9. Add pillow spray (optional)

Trash and food

1.Pick up all cups and plates

2.Bring all cups and plates

downstairs

3.Pick up all wrappers and food

4.Bring all wrappers and food

to the trash can

5.Throw all wrappers and food in

trash can

Sweeping

1.Get broom and dustpan

2.Sweep under bed

3.Sweep in front of TV

4.Sweep near closet

5.Sweep all trash into hallway

6.Sweep into dustpan

Laundry

1.Pick up all dirty clothing

2.Put dirty clothing in laundry

basket

3.Pick up clean clothing

4.Put clean clothing in drawers

5.Shut drawers

Extras (once a week)

Wipe down top of dresser and

windowsills

Organize games



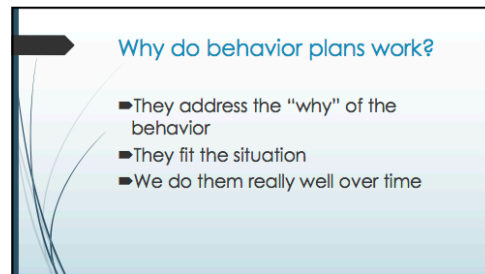
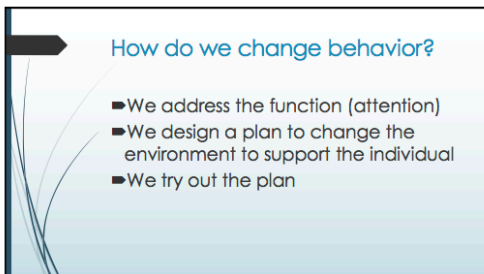
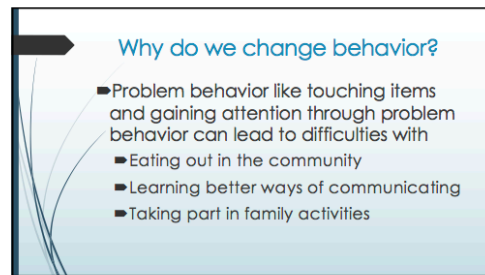
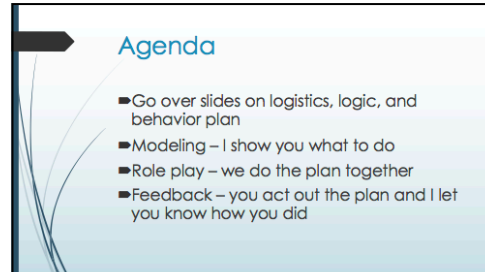
Behavior Support Plan Henry and Daniel (Dyad 4)

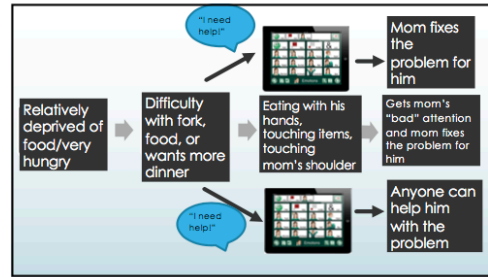
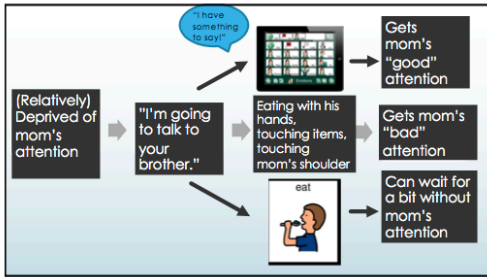
Step in the BSP	No	some	most	Yes
BEFORE you tell him to brush his teeth				
Step 1: Collect the following: (1) BSP Checklist (this form!), (2) token board and tokens, (3) break card, (4) new toothbrush, (5) rewards (vacuum/water beads)				
Step 2: Show H the tokens and break card				
Step 3: Conduct mini-lesson on the tokens and break card Example: "H, if you want to take a break, touch the card." "H, if you brush your teeth, we can play with the vacuum/water beads/water."				
Step 4: Tell him to go to the bathroom to brush his teeth				
Step 5: If he does not go to the bathroom, provide a light touch to guide him. If that does not work, provide more physical guidance.				
DURING toothbrushing				
Step 6: Let him choose between new toothbrushes				
Step 7: Place the toothbrush in his mouth or have him place it in his mouth				
Step 8: As soon as the toothbrush goes in his mouth, tell him great job and add a token				
Step 9: Brush his teeth for him and count down from 5 and then add the next token (repeat until all five tokens are earned)				
Step 10: After all tokens are earned, leave the bathroom and use the vacuum				
Step 11: If...H touches the break card				
(1) Remove the toothbrush from his mouth and say "we're taking a break" and give him a 30 second break				
(2) Show him the tokens and remind him that he's earning tokens for the vacuum/water beads/water play.				
Step 12: If... H flops, pushes your arm, or moves away from the sink				
1. Hold the break card in front of him				na
2. Touch his arm lightly to help him touch the card				
3. If he does not touch the card, use more physical guidance until he does				na
4. Go back to Step 10 and repeat				
Step 13: Repeat from Step 8 until it has been 5 minutes				
AFTER toothbrushing				
Step 14: If he completed the full two minutes of tooth brushing, he can continue with bedtime routine				
Step 15: If he did not complete the two minutes, brush his teeth in bed for the remaining amount of time.				

APPENDIX F

PARENT TRAINING PRESENTATIONS

Didactic Teaching PowerPoint for Joe and Gina (Dyad 1)





Your goals

- What would you like for dinner to look like?
- What are your goals for J?

The Plan – Part 1

- First, teach J how to use the iPad
- Set up a snack situation
- Teach the mini-lesson
- Do not give him a fork so he has to ask for help and give him a small amount so he has to ask for help
- Say, "I'm going to talk to Christine" and talk on the phone so he has to get your attention

The Plan – Part 2

- Set up for dinner
- Teach the mini-lesson again
- After prayers, turn to talk to C
 - If he uses the iPad, respond immediately
 - If he has inappropriate behavior, wait three seconds and point to the iPad or ask him if he needs help/wants to say anything

The Plan - Part 3

- After 5 minutes of turning and talking to C, return to normal dinner routine
- If he uses the iPad, respond immediately
- If he has inappropriate behavior, wait three seconds and then prompt him to use the iPad

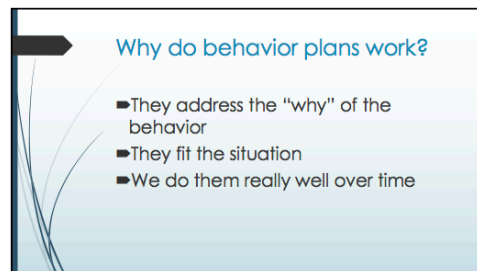
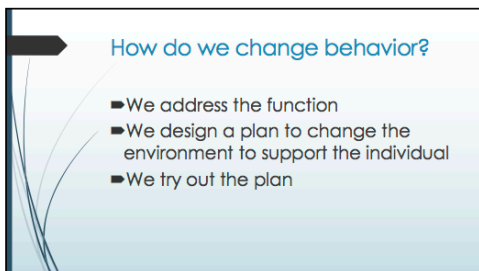
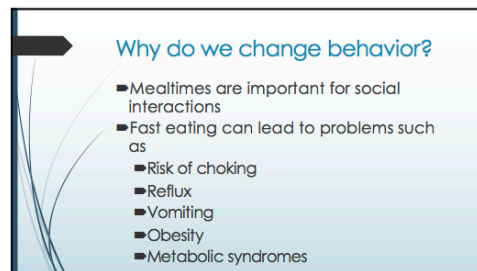
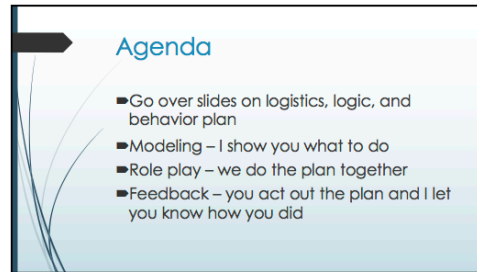
Role play

- I do
- We do
- You do

Congrats! Great work!

- Any questions, concerns, or thoughts?

Didactic Teaching PowerPoint for Maddie and Catherine (Dyad 2)



Your goals

- What would you like for dinner to look like?
- What are your goals for M?

The Plan – Part 1

- First, teach M how to use the device with her favorite foods
- After dinner every night
- Provide her favorite food after the buzzer goes off
- Then set her favorite food out and she gets to pick one each time the buzzer goes off

The Plan – Part 2

- Set the timer to wait 10 seconds between bites
- Cut up sour patch into 2-3 pieces
- Tell her that if she waits for bites, she can have a sour patch
- After two bites of waiting, give her a piece of sour patch

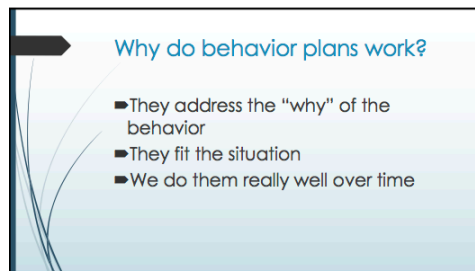
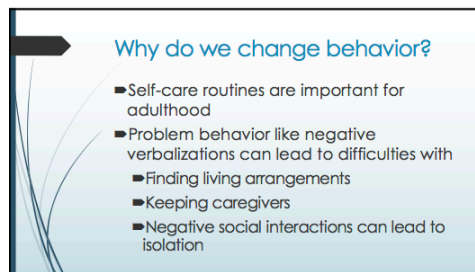
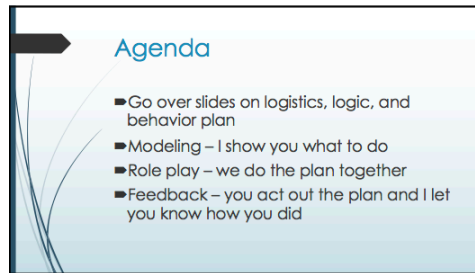
The Plan - Part 3

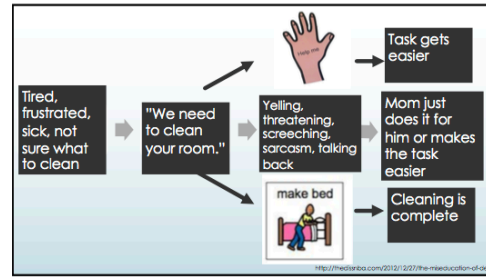
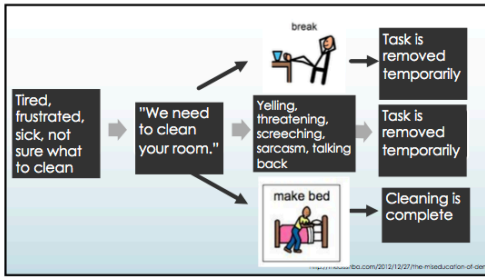
- We will add a blocking component as needed if she won't wait for the timer

Role play

- I do
- We do
- You do

Didactic Teaching PowerPoint Lucas and Catie (Dyad 3)





Your goals

- What would you like for room cleaning to look like?
- What are your goals for L?

The Plan – Part 1

- First, teach L how to do each part of the room cleaning using the task analysis and pictures
- He or you will check off each part of the task as he goes
- Make sure he doesn't have any questions about any part of the routine

The Plan – Part 2

- Explain how the routine will go
- He will use the task analysis and check off each item as he goes
- Teach him how to ask for breaks and help
 - He can ask for 3 one-minute breaks and you will set a timer and leave the room
 - He can ask for help three times and you will help him with that task

The Plan - Part 3

- Implement each part of the routine each day during the school week and at least once on the weekend (preferably twice a weekend) at the same time if possible

Cell Phone Plan

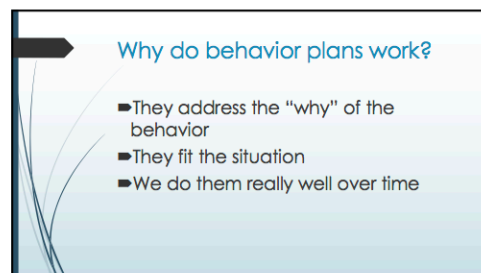
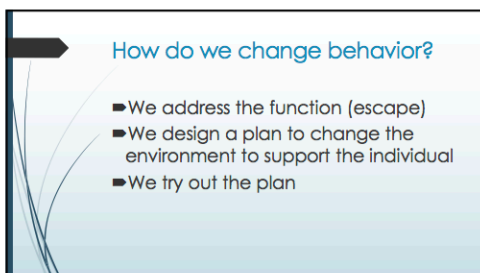
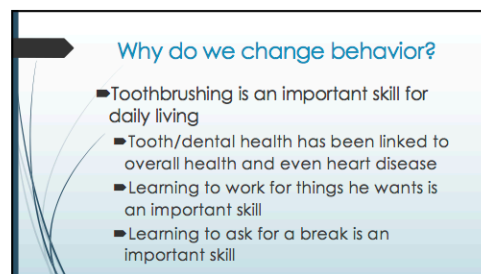
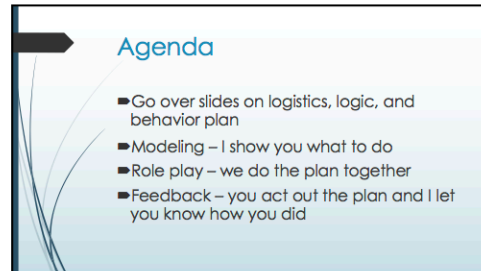
- ▶ New plan for earning cell phone back
- ▶ Yelling adds days to losing phone
- ▶ If he cleans his room, will that help him earn his phone back?
- ▶ Let's be clear about the expectations

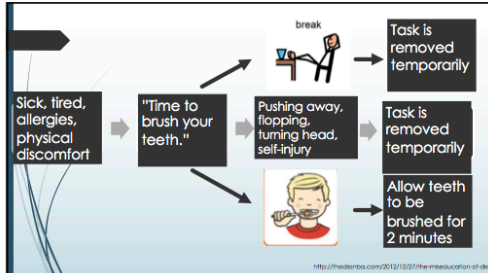
Role play

- ▶ I do
- ▶ We do
- ▶ You do

Congrats! Great work!

- ▶ Any questions, concerns, or thoughts?





Your goals

- What would you like for teeth brushing to look like?
- What are your goals for H?

The Plan – Part 1

- First, teach H how to use tokens and break card
- Hearing aids
- Tokens (vacuum, water beads, and water play)

The Plan – Part 2

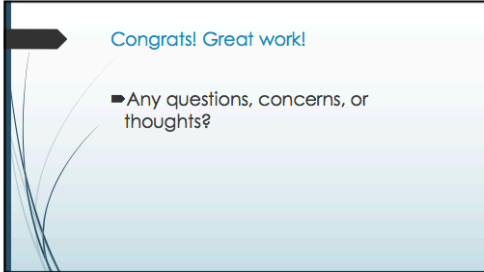
- Tell him "We're going to brush our teeth for vacuuming. If you want a break, touch the card."
- Bring him to the bathroom
- Give him a new toothbrush
 - If he puts it in his mouth, put a token on the shelf
 - If he allows you to put the toothbrush in his mouth, count down from 5 and give him a token
- After he earns five tokens take him to play with the vacuum

The Plan - Part 3

- If he has problem behavior, have him touch the break card.

Role play

- I do
- We do
- You do



No discomfort
at all

Neutral

Very much

13. How well will carrying out the behavior intervention procedures (FCT+ EXT)
fit into your existing routine?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Not at all Well		Neutral		Very well

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