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The Effects of Training Multiple Mands Within Functional Communication Training on The Resurgence Of Problem Behaviors

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THE EFFECTS OF TRAINING MULTIPLE MANDS WITHIN FUNCTIONAL COMMUNICATION TRAINING ON THE RESURGNECE OF PROBLEM BEHAVIORS

by

Emily Jane Ness

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ABSTRACT

THE EFFECTS OF TRAINING MULTIPLE MANDS WITHIN FUNCTIONAL COMMUNICATION TRAINING ON THE RESURGNECE OF PROBLEM BEHAVIORS

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Resurgence is the reoccurrence of a previously reinforced behavior when, under similar circumstances, a more recently reinforced behavior is placed on extinction (Epstein, 1985). The resurgence of problem behavior within the context of functional communication training (FCT) may occur when reinforcement is inadvertently thinned or placed on extinction due to low implementation integrity throughout the course of the intervention (Lieving et al., 2004). Techniques evaluated to mitigate resurgence of problem behavior have included long-term exposure to extinction (Wacker et al., 2011), signaled schedule thinning (Fuhrman, Fisher, and Greer, 2016), and a combination of both techniques (Wacker et al., 2013). These studies, however, have demonstrated varied results. Training multiple mand modalities may be a way to program for generalization, by increasing a child's response repertoire. The purpose of the current study is to evaluate the effects of training multiple mands on the resurgence of problem behavior after implementing FCT in a school setting and the social validity of conducting the assessments and interventions in this context as reported by school staff. Three students ages 15, 7, and 5 years, developmental disabilities and exhibiting communication deficits and problem behaviors were trained on an initial mand to gain access to a reinforcer. After resurgence was demonstrated following extinction of the initial mand, participants

were taught two additional, functionally identical, mand modalities. A reversal design was used to evaluate differences in the resurgence of problem behavior when a participant's preferred mand is placed on extinction but the additional two are available. A reduction in the resurgence of problem behaviors was observed for two of three participants following $mand_2$ and $mand_3$ training. In addition, an increase in rates of non-preferred mands was observed for two of three participants during extinction phases. It was concluded that, within classroom settings, training multiple mand modalities serving the same function is likely to reduce the resurgence of students' problem behaviors to a greater degree than teaching one mand within FCT. Implications, future directions, and limitations are discussed.

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DEDICATION

This project truly belongs to family and friends who have supported and inspired me through this process. Most notably, this project is dedicated to my mom and step-dad, Cheri and Mike Quist, who have continuously demonstrated their unconditional love and support in both tangible and intangible ways. The countless miles traveled, thoughts, prayers, and gifts have always been felt and appreciated.

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Finally, this project and my degree are dedicated to my dad, Dr. Bradley Ness. You may not be here in person, but your words of advice and encouragement will always be with me. I have felt your presence in everything I do and you will continue to inspire me the rest of my life.

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LIST OF ABBREVIATIONS

ASD	Autism Spectrum Disorder
BFA	Brief Functional Analysis
DRA	Differential Reinforcement of Alternative Behavior
DRO	Differential Reinforcement of Other Behavior
FBA	Functional Behavior Assessment
FCT	Functional Communication Training
FIE	Fingers in Ear
ID	Intellectual Disability
IV	Inappropriate Vocalizations
OOS	Out of Seat
PIR	Partial Interval Recording
S^D	Discriminative Stimulus

CHAPTER I - INTRODUCTION

Children with developmental disabilities such as Autism Spectrum Disorders (ASD) and Intellectual Disability (ID) typically exhibit persistent deficits in communication and display disruptive behaviors that may restrict multiple aspects of their lives including education, family, and community. This presents a need for teachers and schools to implement instructional techniques to address communication and behavioral impairments in these settings (Hart & Banda, 2010). Manifestations of these deficits include a lack of conversation skills, failure to initiate and understand verbal and non-verbal expression, and an inability to adjust behaviors to various settings (American Psychiatric Association, 2013). Additionally, up to 94% of children with ASD demonstrate some form of challenging behavior (Jang, Dixon, Tarbox, & Granpeesheh, 2011).

These problem behaviors may be conceptualized as a form of communication (Carr & Durand, 1985; Durand & Merges, 2001). In typical language development, children learn to control the delivery of reinforcers through the pairing of verbal behavior and parent or caregiver response (Cooper, Heron, & Heward, 2007). Students with developmental delays often fail to develop adaptive and functional ways to communicate wants and needs. It has been estimated that approximately 25% of children with ASD do not develop functional speech (Volkmar, Lord, Bailey, Schultz, & Klin, 2004). Consequently, these children may learn to communicate their desires when challenging behaviors (e.g., tantrums, throwing objects, aggression, self-injurious behavior) are reinforced through the delivery of rewarding consequences by teachers and other caregivers contingent on those behaviors (Carr & Durand, 1985). For example, a

student's throwing of objects may be maintained by a history of reinforcement through teacher attention, or a student may engage in tantrums as a way of escaping aversive task demands.

Functional Communication Training (FCT)

Functional Communication Training (FCT) is a type of differential reinforcement of alternative behavior (DRA) procedure used to teach individuals communication techniques while reducing problem behaviors related to existing communication deficits (Carr & Durand, 1985). The intervention involves replacing a child's challenging behaviors with more appropriate communicative responses serving the same function. Thus, the logic underlying FCT purports that if a student can gain access to a desired consequence more effectively by using an appropriate response, the undesirable response will fade (Durand & Merges, 2001).

When FCT is used, a functional assessment that includes a functional analysis (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994; Northup et al., 1991) is first conducted to identify variables (e.g., attention, escape from aversive demands, access to tangibles) that may be maintaining problem behaviors. Next, an appropriate communicative response is taught to the student. These responses, or mands (i.e., verbal responses followed by specific reinforcement, or more simply, requests for preferred items; Cooper et al., 2007) can be emitted via vocalizations (e.g., Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998), manual signs (e.g., Fisher et al., 1993), picture exchanges (e.g., Ganz, Parker, & Benson, 2009), card touches (e.g., Wacker et al., 2013), and/or augmentative communication devices (e.g., Wacker et al., 1990). Selection of the replacement communication response should include four considerations: (a) the child's

capability of completing the response based on motor and verbal abilities, (b) the ease of teaching the response, (c) the ability of individuals in the student's environment to understand and acknowledge the response, and (d) how efficiently and effectively the response serves its function in generalized environments (Mancil & Boman, 2010). When the learner produces this mand, he or she is presented with the corresponding functional reinforcer; concurrently, the target problem behavior(s) is placed on extinction (Falcomata & Wacker, 2013).

FCT has been effective in decreasing a variety of problem behaviors, including but not limited to, screaming, spitting, hair-pulling, head-banging, self-biting, stereotypy, aggression toward peers, and removal of clothing. Additionally, the intervention has been successful with a variety of populations including toddlers, school-age children, adolescents, adults and children with autism, traumatic brain injury, developmental delays, expressive language delays, and intellectual disability (Carr & Durand, 1985; Dunlap, Ester, Langhans, & Fox, 2006; Durand & Carr, 1991; Wacker, 1990). FCT has demonstrated superior effectiveness compared to other behavioral interventions (e.g., time out) in terms of reduction in frequency of problem behaviors (Durand & Carr, 1992).

FCT has also been employed in a variety of settings. Clinical applications of FCT have been effective (Fisher et al., 1993; Hagopian et al., 1998; Hanley, Piazza, Fisher, Contrucci, & Maglieri, 1997; Wacker et al., 1990). Fewer studies have applied FCT in more natural environments such as schools (Casey & Merical, 2006; Durand & Carr, 1987; Durand & Carr, 1991), community settings (Durand, 1999) and home settings

(Dunlap et al., 2006). Out of eight studies identified by Mancil (2006) that conducted FCT with children with ASD, seven of those studies were conducted in a school setting.

Carr and Durand (1985) conducted the first evaluation of what is currently known as FCT. That is, the experimenters first assessed the functional relationship between participants' problem behaviors and environmental consequences by comparing rates of problem behaviors during difficult and easy tasks to assess the effects of task difficulty and comparing rates during high (100% of intervals) and low (33% of intervals) levels of attention to assess the effects of adult attention on problem behaviors. Subsequently, researchers implemented a differential reinforcement procedure based on results of the functional assessment. For two out of four participants, the highest frequency of disruptive behaviors occurred during difficult task demands (suggesting an escape function for problem behavior), for the third participant, highest levels of disruptive behavior occurred during low levels of teacher attention. The authors suggested that this pattern of responding indicated an attention function as low levels of attention mimicked the effect of intermittent reinforcement and served as a discriminative stimulus for problem behavior. The fourth participant engaged in the highest levels of problem behaviors during conditions featuring difficult task demands and low levels of adult attention (suggesting that this participant's problem behaviors were controlled by more than one set of variables). Carr and Durand then trained participants, in a discrete trial format, to emit vocalizations corresponding with the determined function of their problem behaviors (e.g., "I don't understand" elicited assistance from a teacher; "Am I doing good work?" elicited verbal praise and physical approval from the teacher).

Participants' disruptive behaviors decreased from baseline levels and were observed at lower levels from conditions in which non-function-based verbalizations were trained.

More recent studies have expanded Carr and Durand's (1985) examination of FCT. Subsequent FCT research has used functional analysis procedures as outlined by Iwata et al. (1982/1994) to determine functional relationships between problem behaviors and environmental consequences (Durand & Carr, 1991; Wacker et al., 1990). Results are then used to inform intervention procedures. For example, Durand and Carr (1991) taught two participants to request assistance with difficult tasks after determining that challenging behavior occurred as a function of escape while teaching a third participant to request social attention after experimentally determining an attention function of his challenging behavior. Prior to FCT, the students made no assistance-seeking or attention-getting requests without teacher prompts. Following FCT, the three students exhibited unprompted requests at mean rates of 5.8%, 6.4%, and 9.1% of observed intervals during three 20-minute observations. Additionally, the requests generalized across teachers and classrooms and results were maintained at 2-and 3-year follow-up probes. Challenging behaviors were also reduced in all three participants following FCT. Tim's mean rates of problem behaviors declined from 9.5% in baseline to 0.3% following treatment, increased slightly to 2.5% in a Year 2 follow-up, and decreased again to 0% in Year 3. "Hal's" mean rates of problem behaviors decreased from 22.9% in baseline to 4.8% after intervention. Following booster sessions in a Year 2 follow-up, problem behaviors maintained at 6.8% and 5.5% in Year 3. Ben's mean rates of challenging decreased from 22.7% in baseline to 4.3% after intervention and maintained around 3% at 1-year and 2-year follow-up. Researchers further observed that challenging behavior and appropriate

requests were inversely related; as participants' unprompted requests increased, their challenging behaviors decreased.

Researchers have also demonstrated the superiority of FCT over alternative interventions such as time out procedures, contingent restraint, and overcorrection (Durand & Merges, 2001) in terms of generalization to settings outside the training environment (Durand and Carr, 1992) and client preference (Hanley et al., 1997). Durand and Carr demonstrated greater maintenance of treatment effects across novel teachers with FCT compared to a time out procedure. Furthermore, Hanley et al. (1997) demonstrated similar reductions in problem behaviors between FCT and non-contingent reinforcement (NCR), but participants indicated a preference for FCT over NCR during a concurrent-chains experiment.

The basic techniques for establishing mands include prompting, fading, and differential reinforcement (Cooper et al., 2007).Typically, prompt fading procedures have been used to initially teach mands. A procedure commonly used in the literature is prompting with progressive time delay (e.g., Hagopian et al., 1998; Volkert, Lerman, Call, & Trosclair-Lasserre, 2009). During this procedure, participants are presented with low-preference demands. An instructor delivers verbal or physical prompts to the student after a length of time typically determined by baseline rates of problem behaviors. Gradually, prompts are faded by systematically increasing the length of time between the beginning of the trial and delivery of the prompt. For example, to teach participants ages 2 to 16 with intellectual disability and severe behavior disorder, whose disruptive behaviors were maintained by escape, Hagopian et al. verbally prompted participants, (e.g., "If you want to take a break, say 'break please.) These prompts were faded until the

participant independently engaged in the target response during at least 80% of trials for two successive 10-trial sessions. Similarly, Volkert et al. taught participants ages 5, 8, and 9 who were diagnosed with autism or a developmental disability vocal mands, card pulls, and signs by delivering the designated prompt and subsequently increasing the delay by 10 seconds each time an 80% reduction in problem behavior (relative to the mean rate in baseline) was observed for two consecutive training sessions.

Errorless backward chaining is another procedure that has been used to teach mands (Fisher et al., 1993; Hagopian et al., 1998). Fisher et al. displayed the reinforcer at the beginning of each trial, then sitting behind the participant, used the minimal amount of hand over hand guidance for the participant to produce the full response and blocked movements inconsistent with the appropriate response. Hagopian et al. taught participants to sign and exchange picture cards by first breaking the designated mand into three distinct steps. For example, picture exchanges were separated into Step A (move hand toward the picture), Step B (pick up the picture), and Step C (give the picture to the therapist). In the initial 10-trial session, the instructor used the minimal amount of hand over hand guidance to allow the participant to complete the full sequence. Next, minimal hand-over-hand guidance was used to prompt the participant to complete steps A and B. The instructor waited 5 seconds for the participant to complete the sequence with Step C before providing hand-over-hand guidance for non-completion. Criterion for advancing to subsequent phases was the client completing the targeted steps independently during at least 80% of trials for one session.

Resurgence

Another area of the FCT literature includes the evaluation of extinction-induced resurgence. The term resurgence has held various definitions, including simply, the recurrence of a behavior after a period of nonoccurrence (Cleland, Guerin, Foster, & Temple, 2001). However, Epstein (1985) offered a more useful definition of "extinction-induced resurgence:" the reoccurrence of a previously reinforced behavior when, under similar circumstances, a more recently reinforced behavior is placed on extinction. This definition proved to be the most accurate and widely cited definition (e.g., Mazur, 2013; Pierce & Cheney, 2013; Wilson & Hayes, 1996). Resurgence has been demonstrated in laboratory investigations with animals (Epstein,1983; Epstein & Skinner, 1980; Sanchez-Carrasco & Nieto, 2005; Winterbauer & Bouton, 2010), in highly controlled clinical settings with human participants (Lieving, Hagopian, Long, & O'Connor, 2004; Reed & Clark, 2011), and with human participants in natural settings (Volkert et al., 2009; Wacker et al., 2013).

The phenomenon of resurgence requires the evaluation of three phases. First, an original response (Response A) is learned through a reinforcement contingency. Second, the original response is placed on extinction while a second, alternative response (Response B) is learned through positive or negative reinforcement. Extinction of Response A and training of Response B can occur one of three ways (a) simultaneously, (b) by extinguishing Response A before reinforcing Response B, or (c) by using differential reinforcement of other behavior (DRO). Finally, resurgence is demonstrated if, when both behaviors are placed on extinction, Response A occurs at levels higher than observed in the previous phase (Wacker et al., 2013).

Resurgence has been challenged by explanations of a range of behavioral phenomena including spontaneous recovery, extinction-induced response variability, and Matching Law (Cleland et al., 2001). Yet, studies have controlled for alternative explanations for resurgence and provided evidence supporting Epstein's (1985) definition, which suggest that resurgence is a distinct behavioral phenomenon (e.g., Winterbauer & Bouton, 2010). Measures of resurgence may include the number of sessions with a response, the frequency of responses across resurgence conditions, or rates within individual sessions (Lattal & Pipkin, 2009).

The first systematic demonstration of resurgence was conducted by Epstein (1983) using key pecking by pigeons. First, subjects were reinforced following a left or right key peck. Reinforcement was then withheld for at least 30 minutes until no key peck occurred for 10 minutes. Following extinction of initial key pecks, an alternative response, incompatible with pecking (e.g., head turn, wing raise), was reinforced 20 times. After 20 training trials, all reinforcement was withheld. When all responses were placed on extinction, subjects resumed pecking on the key correlated with the history of reinforcement. This investigation was unique to prior studies of resurgence in that it addressed previous empirical limitations and challenges to resurgence as a distinct behavioral phenomenon. This study (a) included the presence of a second key during training of the initial behavior to distinguish resurgence of key pecking from other extinction effects and (b) extinguished key pecking before training the alternative response, minimizing the possibility that pecking recurred simply because it failed to extinguish due to the presence of the alternative response.

More recent studies have demonstrated resurgence of trained pecking patterns in pigeons (Cancado & Lattal, 2011). Additionally, Winterbauer and Bouton (2010) examined resurgence in lever pressing with rats by demonstrating that the specific behaviors that reoccur are dependent on prior training, or prior exposure to reinforcement following that particular response, refuting extinction-induced response variability as an explanation of resurgence. Furthermore, resurgence occurred regardless of changes in reinforcement schedules. Further research suggests, however, that resurgence may be influenced by schedules of reinforcement and that resurgence may be more likely and/or occur more quickly when the original behavior was reinforced on a denser schedule (Doughty, da Silva, & Lattal, 2007; Lieving & Lattal, 2003).

Similar patterns have been observed in clinical settings with human participants. Resurgence effects have been demonstrated with undergraduate college students through a matching-to-sample training procedure (Doughty, Cash, Finch, Holloway, & Wallington, 2010; Doughty, Kastner, & Bismark, 2011) and through equivalence relations tasks (Wilson & Hayes, 1996). Additionally, resurgence has been demonstrated with children with developmental disabilities. For example, Reed and Clark (2011) evaluated play behaviors of 24 children ages 7 to 15 with ASD and found that play sequences on which participants were initially trained reoccurred following the cessation of reinforcement for a second play sequence. Additional findings of this study purport that the length of time the second behavior is trained, or reinforced, played less of a role in determining the level of resurgence than the schedule of conditioning. Specifically, the group trained on Response 2 on a VR-4 schedule for 30 minutes displayed stronger resurgence of Response 1 than a group trained on the same schedule for 60 minutes and a

group trained on a VR-2 schedule for 30 minutes. This study suggests that greater levels of reinforcement provided for the alternative response may lead to lower levels of resurgence of the original response.

Studies with human participants have indicated that resurgence effects extend to college students and children with disabilities in contrived settings, but few of these studies have extensive social validity within an applied context. A portion of the resurgence literature with humans has branched to evaluations of mand modalities and problem behaviors in the context of FCT. The first study to extend contrived procedures to clinically relevant problem behaviors and their treatment was conducted by Volkert et al. (2009). The authors examined resurgence of disruptive, aggressive, and self-injurious behaviors in five children diagnosed with autism or a developmental disability in the context of an FCT intervention. A functional analysis revealed that problem behaviors were maintained by escape from demands for three participants, maintained by attention for one participant, and tangible items for the fifth participant. Alternative communicative responses were chosen for each participant based on the child's ability and teacher preference and included card pulls, a break sign, or vocal responses. These mands were taught using a physical prompt with progressive time delay or, for the vocal response, a vocal model prompt with progressive time delay.

First, a test for resurgence was conducted by evaluating levels of problem behaviors after FCT training followed by an extinction phase in which communicative responses were no longer followed by reinforcement. The participants met the criteria for resurgence when their target problem behaviors yielded higher levels in the extinction condition than in the FCT condition. For three participants, an additional "intermittent

reinforcement" condition was implemented during which the delivery schedule was increased by a factor of 12, replicating Lieving and Lattal (2003). Thus, in this condition, FCT responses were reinforced on an FR-12 schedule to test resurgence effects when alternative responses were exposed to a thin schedule of reinforcement rather than extinction. Target problem behaviors occurred more frequently in the extinction condition than in the FCT condition for 2 of 3 participants. Resurgence was also observed in the intermittent schedule condition, indicating that problem behaviors in applied contexts can resurge when treatment schedules are not only halted completely, but thinned as well.

As an extension of Volkert et al.'s (2009) findings, Berg et al. (2015) conducted a study demonstrating resurgence of mands and further demonstrating a relationship between established mands and previously established problem behavior with the same functional properties. All experiments were conducted in a clinical setting. Prior to evaluation, a paired choice preference assessment was conducted as well as a mand modality assessment to identify two mand modalities the participant displayed with similar proficiency. Investigators used three-step prompting to teach participants three mand topographies (i.e., card touches, vocal words, manual signs, or miscroswitch presses) resulting in the same reinforcer. The participant's proficiency was evaluated based on the level of prompting required before he or she emitted the target mand. The two topographies associated with the most independent mands exhibited across 10-trials blocks were selected as the mand modalities for that participant.

During the first experiment, one female and two male participants ages 50, 34, and 69 years old with intellectual disabilities were taught two mands (i.e., card touch,

microswitch activation, or manual sign). An ABCB design was used to evaluate the resurgence of a previously trained but less frequently exhibited mand when a more "preferred" mand was placed on extinction. According to authors, the demonstration of resurgence for all three participants suggested that the recurrence of the least preferred mand was distinct from other forms of extinction.

Experiment 2 extended experiment 1 by evaluating the occurrence of appropriate communication responses when a third set of responses (i.e., problem behaviors) were also placed on extinction. Two participants, Kimi, a 7-year-old girl and Cyrus, a 3-year-old boy, diagnosed with developmental disabilities and both exhibiting aggressive and destructive behaviors were taught two mands (i.e., vocal mands and card touches for Kimi and manual signs and card touches for Cyrus) resulting in functional consequences identified through experimental functional analyses. The same ABCB design was used to evaluate resurgence of mands and problem behaviors. Along with the demonstration of the resurgence of the least exhibited mand, similar to the previous experiment, the authors also found that rates of problem behaviors were diminished upon FCT implementation and participants continued to exhibit low levels of problem behaviors when one mand was placed on extinction.

The authors indicate that this study translates results from basic research studies to clinically relevant concerns, targeting the relationship between functional communication and challenging behaviors. Several limitations of this study invite further evaluations to more rigorously examine the training of multiple mand topographies on the resurgence of problem behavior, including a comparison of baseline levels of problem behaviors and a replication of the effects of FCT.

Although Volkert et al. (2009) indicated that resurgence can occur in the context of an FCT intervention, and results of Berg et al. (2015) provide preliminary evidence that behavioral concerns may be addressed by training multiple mand modalities, few studies have investigated techniques that may mitigate the behavioral effects of thinned reinforcement schedules and extinction, with problem behaviors as the primary targeted variable. This may be especially important in applied settings when thinned schedules and extinction is brought on by low treatment integrity of change agents or other environmental factors frequently encountered in natural settings. Wacker et al. (2011) examined whether long-term FCT, and thus, long-term exposure to extinction of problem behaviors, would weaken levels of resurgence in participants ages 3 to 6 who were diagnosed with a developmental disability. Functional analyses conducted by the parents indicated escape as the primary maintaining variable. FCT comprised of a two-step chain in which compliance with a parent-delivered request produced a word card attached to a microswitch and touching the card or switch produced a 1-2 minute break. Multiple extinction conditions were repeated 2 to 4 times throughout the course of the intervention at intervals (2-16 months) varying by each participant. Researchers found that, overall, destructive behavior occurred at higher levels during extinction conditions than FCT conditions, exemplifying resurgence. Furthermore, quantitative analyses indicated that extended FCT aligned with a decrease in resurgence of destructive behavior across successive extinction sessions.

In addition, Fuhrman, Fisher, and Greer (2016) demonstrated that the resurgence of destructive behavior was mitigated by the combination of schedule thinning and signaled schedule changes during extinction procedures. This study added the component

of training a discriminative stimulus (i.e., colored index cards) to signal the availability and unavailability of reinforcement in the context of FCT. Schedules of reinforcement were also altered quasi-randomly. Following exposure to these treatment components, levels of problem behaviors remained low during full extinction procedures.

Opposing results were obtained by Wacker et al. (2013) in an extension of Volkert et al. (2009) and Wacker et al. (2011), examining resurgence (a) in the presence and absence of discriminative stimuli used in training and (b) after repeated exposures to extinction of disruptive behaviors. A functional analysis conducted by the parents indicated escape from demands as the maintaining variable for all participants. This was followed by a mand analysis to determine the extent to which the trained mand served the same function as the target problem behavior, which was placed on extinction during the analysis. All participants displayed undifferentiated levels of resurgence in the switch (SD) and no-switch (no SD) conditions and, counter to Wacker et al.'s (2011) results, continued to display similar levels of resurgence after repeated exposures to extinction.

The principle of resurgence can be particularly troublesome in the context of teacher-driven interventions in applied settings. Specifically, treatments that require the delivery of reinforcement, such as FCT, rely on teacher or caregiver compliance with the intervention procedures. Instances of inadequate compliance with these procedures have been observed during treatment implementation in school settings. For example, Wickstrom, Jones, LaFleur, and Witt (1998) observed mean rates of treatment integrity at 4% among teachers who were trained to implement evidence-based behavioral interventions such as token economies and response cost procedures. Poor treatment integrity among change agents has been linked to lower levels of intervention

effectiveness and increases in student problem behavior, especially when behavioral interventions are employed in natural settings by individuals with little to no training in behavior analysis (Fryling, Wallace, & Yassine, 2012; Pipkin, Vollmer, & Sloman, 2010). Within DRA interventions specifically, when teachers delay, alter, or fail to provide appropriate reinforcement dictated by the treatment protocol, this poor integrity may evoke the recurrence of old patterns of problem behaviors or other response class hierarchies and lead to the loss of treatment gains (Lieving et al., 2004). A student's problem behaviors may recur if he or she no longer receives reinforcement for communicative responses. Therefore, systematically placing learned FCT responses on extinction imitates circumstances of teachers' failure to implement FCT procedures with integrity.

Previous studies have demonstrated resurgence with children in applied contexts (Volkert et al., 2009) and examined ways to decrease these reoccurrences of problem behavior (Berg et al., 2015; Sweeney & Shahan, 2013; Wacker et al., 2013) with varying results. Based on these inconclusive findings in the literature regarding prolonged exposure to treatment and extinction of problem behaviors on resurgence and the otherwise lack of research investigating techniques to address resurgence, there is a need to examine ways to mitigate the reoccurrence of problem behaviors when reinforcement schedules are thinned or ceased. Thus, the purpose of the current study is to evaluate a technique to mitigate resurgence effects in the context of FCT.

One strategy to address resurgence may emerge from the generalization literature. Generalization is the occurrence of relevant behavior under non-training conditions (i.e., across subjects, settings, people, behaviors, and/or time) without scheduling the same

events in those conditions as had been scheduled in the training conditions (Stokes & Baer, 1977). Stokes and Osnes (1989) categorized the generalization programming techniques identified by Stokes and Baer into three general principles that includes specific tactics: (a) Exploitation of current functional contingencies, which includes contacting natural contingencies, recruiting natural consequences, modifying maladaptive consequences, and reinforcement of occurrences of generalization (b) training diversely, which includes the use of sufficient stimulus exemplars, the use of sufficient response exemplars, making antecedents less discriminable, and making consequences less discriminable and (c) incorporating functional mediators, which includes incorporating common salient physical stimuli, common salient social stimuli, incorporation of salient self-mediated physical stimuli, and salient self-mediated verbal stimuli.

Falcomata and Wacker (2013) reviewed the literature regarding generalization of FCT and identified several techniques that have not been evaluated to program for generalization, one of which is training sufficient response exemplars. In the context of FCT, this involves teaching multiple mand topographies. Research has indicated that students' preferences for different mands may emerge (Harding et al., 2009; Richman, Wacker, & Winborn, 2001; Winborn, Wacker, Richman, Asmus, & Geier, 2002). For example, there is evidence that response effort of particular mands may influence the effectiveness of FCT in terms of levels of disruptive behaviors and communication (Richman et al.; Winborn et al.) and, over time, a preference for vocal mands over picture cards, signing, and augmented devices has been observed (Harding et al.). Therefore, providing students with a greater communicative and behavioral repertoire could allow greater generalization of FCT across people and settings and provide students with more

ways to solicit reinforcement, thereby increasing their likelihood of engaging in appropriate responses when change agents slow the delivery of or fail to deliver programmed reinforcement. Individuals may engage in a variety of mand topographies rather than challenging behavior when lapses in treatment integrity occur (Falcomata & Wacker).

Purpose

Resurgence of problem behaviors has been documented in applied settings in the context of FCT interventions. The phenomenon may present itself when students are exposed to extinction of communication responses or thinned schedules of reinforcement due to low integrity by interventionists. Two studies have addressed resurgence by implementing repeated exposures to extinction with differing results (Wacker et al., 2011; Wacker et al., 2013). Training multiple response exemplars within FCT interventions, particularly in applied settings such as schools, has limited presence in the literature, but this technique may address the problem of resurgence. Teaching students multiple mands may allow them to access a larger behavioral repertoire when faced with low treatment integrity or novel people and settings, thereby increasing the likelihood they will engage in these appropriate responses rather than revert to previously reinforced problem behaviors. Therefore, the purpose of the current study is to evaluate the effects of training multiple mand topographies in the context of an FCT intervention on the resurgence of problem behaviors in a school setting.

Research Questions

1. Is FCT effective in reducing problem behaviors in a school setting?

2. Is resurgence of problem behaviors demonstrated after implementing FCT in a school setting?

3. Is there a difference in the patterns of resurgence of problem behaviors under extinction procedures after participants are taught two additional mands serving the same function as the initial mand?

4. Is FCT an acceptable intervention to target disruptive behaviors in students with developmental disabilities, as reported by teachers?

5. Is a Brief Functional Analysis acceptable as an assessment procedure in developing an FCT intervention, as reported by teachers?

CHAPTER II – METHODS

Participants

Participants included three students and their teachers: two of the teacher/student dyads were recruited from a public K-12 school district and one teacher/student dyad was recruited from an alternative school for students with disabilities. Both schools were located in a rural southeastern state. All participants met the following criteria: (a) the student was referred by his or her teacher or other school personnel for problem behavior in the classroom or other school settings, (b) the student demonstrated a deficit in communication supported by his or her IEP, previous assessments, and/or other educational records (e.g., students with a special education classification of Autism Spectrum Disorder, Developmental Delay with noted significant delays in language, Specific Learning Disability in the area of language, or Intellectual Disability with data to demonstrate delays in language) and (c) results from a functional assessment, which included a brief functional analysis, indicated that the student's target problem behavior is socially mediated.

Jason/Teacher 1

Jason was a 15-year-old African American male who received special education services under the classification of Autism. He attended a self-contained classroom in a public high school. His classroom typically included eight students and two staff members (i.e., primary teacher and teacher's aide). Jason was reported by school staff to be frequently non-compliant and had a history of minor aggression toward school staff (i.e., pushing) and elopement from the classroom. Jason's verbal repertoire was very limited and primarily included gestures (e.g., pointing, waving) and occasional vocal

approximations. He received speech therapy services at school but had no prior history of functional communication training or other behavior therapy services. Prior to the start of data collection, Jason assented to participate in the study.

Jason's teacher had 22 years of teaching experience in special education: 5 years teaching deaf and hard of hearing students, 15 years teaching students with mild to moderate disabilities and 2 years teaching students with severe to profound disabilities. She had previous experience implementing general classroom behavior management strategies but no prior experience implementing functional communication training.

Robby/Teacher 2

Robby was a 5-year-old Hispanic male who received special education services under the classification of Developmental Delay, exhibiting delays in the areas of communication and cognitive ability. He attended a general education kindergarten classroom at a public elementary school and his classroom included 22 students, three of whom (including Robby) received special education services under the classification of developmental delay. In addition, the classroom included two staff members (i.e., a primary teacher and teacher's aide). School staff reported that Robby engaged in frequent disruptive behaviors that included screaming, out of seat behavior, throwing objects, and non-compliance. Robby had a limited vocal repertoire that included echoic responses and 1-2 word statements. Spanish was the primary language spoken in Robby's home but he also spoke and understood English as reported by teachers. He received ELL services at school and had no prior history of functional communication training.

Robby's teacher had 17 years of teaching experience with elementary-aged students. She had worked primarily with the general education population but had

experience teaching special education students with autism and mild to moderate cognitive delays in inclusion settings. She had previous experience implementing class-wide behavior management programs (e.g., group contingencies, token economies, levels systems) but had no previous experience implementing FCT or other individualized behavior interventions.

Nick/Teacher 3

Nick was a 7-year-old Caucasian male who attended an alternative school for students with disabilities. He was previously diagnosed with autism and received special education services under the same classification. His classroom consisted of six students, a primary teacher, and a teacher's aide. Students' levels of functioning ranged between moderate and severe delays and exhibited problem behaviors that ranged from mild to severe in terms of frequency and magnitude (e.g., banging on objects that occurred once per week, to severe self-injury that occurred several times per day). Nick's teachers reported that he engaged in frequent tantrums that involved crying, screaming, and throwing objects. His verbal repertoire included echoic vocalizations and 1-2 word statements. Prior to the study, Nick did not have exposure to functional communication training.

Nick's teacher had less than 1 year of teaching experience and had recently received a bachelor's degree in psychology. He had previous experience implementing behavioral interventions with children with autism and developmental disabilities.

Settings and Materials

All experimental procedures (i.e., assessment and intervention sessions) were conducted in the educational setting in which the target problem behavior occurred most frequently as indicated by referring personnel. Materials included data collection sheets, observation track recordings, communication materials relevant to the student's target communication response(s), typical academic materials, and preferred tangible items.

Dependent Measures

Two dependent variables were monitored in the current study: target problem behavior and target communication responses (i.e., trained mands). Each participant's problem behavior was determined through consultation with school staff (i.e., teacher interview and teacher completion of the FAIR-T II) and the screening observation. Jason's target problem behavior, as determined through teacher consultation, was placing his fingers in his ear (FIE), defined as covering the openings of one or both ears with his fingers or placing his finger in one or both of his ears. Robby's target problem behavior was out of seat (OOS) behavior, defined as his body being removed from his assigned chair or area for 3 seconds or more. Nick's target problem behavior was inappropriate vocalizations (IV), defined as audible vocalizations that were not relevant to the task demand and included crying and screaming.

The topography of target mands were unique to each participant based on the function of their behavior as well as their verbal and motor skills and the teacher's preference. This takes into consideration Mancil and Boman's (2010) guidelines for selection of replacement communication responses and replicates Volkert et al.'s (2009) procedures for determining the FCT response for each participant. If the participant

demonstrated the ability to vocalize at least one-word utterances, he was taught vocal mands. If the participant did not demonstrate vocal abilities, he was taught to manually sign as the alternative response. Further, if the participant was not able to manually sign or if the teacher preferred another technique, he or she was taught to touch a picture card as the alternative response. Vocal manding was the first choice for two reasons: (a) this method has a high degree of generalizability across people and settings; other teachers and caregivers do not have to learn the meaning of vocalizations like they may have to learn new signs and (b) children have demonstrated a preference for verbal mands over other mand topographies (Harding et al., 2009). All participants demonstrated vocal abilities; therefore, each participant's initial mand was a vocal communication response. The additional two mands taught to each participant were raising their hand and touching a picture card that corresponded to the function of their target behavior. (See table 1).

Consent

Teacher and parental consent were obtained prior to the student's participation in the study. Assent was also obtained by students capable of assenting to participate. Prior to the start of the study, permission to conduct the study was received from The University of Southern Mississippi Institutional Review Board.

Data Collection

Rates of problem behavior were recorded using partial interval recording (PIR) procedures. That is, observers recorded the behavior if it occurred at any time during a 10-second interval. Observations were 20 minutes in duration and completed in each participant's classroom. Data were collected by trained undergraduate and graduate students during class activities. To minimize the likelihood of reactivity, observers sat in

an unobtrusive area of the room to collect data. Operational definitions of problem behaviors and communication responses were provided to each observer before observation sessions to promote reliable data collection.

Design and Data Analysis

A Brief Functional Analysis (BFA) was conducted in each participant's target setting to systematically evaluate the function of their problem behavior. The functional analyses included a brief multi-element experimental design. Each condition was 10 minutes in duration and conducted in one day; and at least a 5-minute break was included between sessions conducted on the same day. Furthermore, a contingency reversal phase was conducted to verify the results of the BFA.

A two-phase withdrawal design was used to first demonstrate resurgence in problem behavior and then evaluate the effects of FCT on subsequent opportunities for resurgence of problem behavior. The first phase consisted of an A/B/C sequence with a baseline, FCT_1, and a resurgence phase. Following a stable trend or trend in the opposite direction of desired treatment effects in baseline, the FCT_1 condition was initiated during which the initial vocal mand was trained. Following stability of low levels of problem behaviors, the communication response and problem behavior were placed on extinction in the resurgence phase. The purpose of Phase 1 (resurgence phase) was to 1) demonstrate the occurrence of resurgence or previously reinforced problem behavior and 2) to provide a comparison of resurgence effects to those observed after training multiple mands. Resurgence was demonstrated if problem behaviors increased to levels greater than those observed in the previous intervention condition.

In phase 2, a DCDC sequence, alternating between FCT_2 and extinction phases, was used to evaluate the effects of multiple mands on the resurgence of problem behavior. Prior to data collection in phase 2, participants were taught two additional mands using the same training procedures that were used to teach the initial mand.

During the FCT_2 conditions, all three mands (i.e., vocal, hand raises, and picture cards) were available and the participant received access to reinforcement contingent on accurate, independent responding. During the extinction condition, the participant's preferred mand was placed on extinction. A participant's preferred mand was determined based on response rates in the first FCT_2 condition; that is, the mand topography exhibited at the highest rates during the first FCT_2 condition was considered preferred. The design included the introduction and withdrawal of the independent variable, thus, allowing for replication and verification of intervention effects (Kratochwill et al., 2010).

Visual analysis of level, trend (slope of the data), variability (fluctuation of data), degree of overlap (proportion of data from one phase that overlaps with data from a previous phase), immediacy of effect (change in level between the last three data points in one phase and the first three data points in the following phase), and similarity of data patterns under identical conditions, were used in each condition to examine these effects (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005). Lesser degrees of overlap, greater immediacy of effect, and greater similarity of data in replicated conditions supports a stronger conclusion of a causal relationship between the independent and dependent variables. Simple phase change designs provided experimental control by allowing for a comparison of the intervention to baseline conditions, verification of effects with the withdrawal of the intervention, and replication of effects during a second intervention

condition. An effect was demonstrated if manipulation of the independent variable coincided with predicted change in the pattern of the dependent variable. Sound conclusions could be made about the intervention when at least three demonstrations of an effect were made at different times throughout all phases (Kratochwill et al., 2010).

Visual analysis was supplemented with the effect sizes calculation Tau-U to quantify the magnitude of intervention effects for the FCT intervention and for the single-multiple mand comparison. Specifically, levels of problem behavior were evaluated between baseline and FCT_1 to determine the effect of FCT as an intervention to reduce problem behaviors. Additionally, levels of problem behavior were evaluated between FCT_1 and extinction conditions following $mand_2$ and $mand_3$ training to determine the effect of training multiple mands on problem behaviors. Tau-U is a nonparametric effect size. It is based on two established statistics, Mann-Whitney U test of nonoverlap between groups and Kendall Rank Correlation, a trend interpretation; thus, Tau-U is sensitive to overlap and the between and within-phase trend in the data (Parker, Vannest, Davis, & Sauber, 2011).

Assessment Procedures

To assess the topography of participants' target problem behaviors and potential variables that evoke and maintain problem behaviors, a teacher interview, direct classroom observations, and experimental functional analyses were conducted for each participant.

Functional Assessment Informant Record for Teachers II (FAIR-T II)

The FAIR-T II (Miller, Dufrene, Olmi, Tingstrom, & Filce, 2015; see Appendix A) is a semi-structured teacher interview used to gather information about problem

behavior and to develop hypotheses regarding the function of problem behavior. It uses a rating-scale format to gather information about the child's behavior.

The FAIR-T II includes three sections. Section 1 allows teachers to identify the target student's problem behaviors, rank them in order of severity, and specify the topography of these behaviors (i.e., time and setting of occurrence, manageability, disruptiveness, frequency, and duration). In Section 2, teachers identify environmental antecedents that may be maintaining the behavior. Finally, in Section 3, teachers report consequences that typically follow the student's problem behaviors.

Following a referral from a teacher or administrator, the FAIR-T II was completed by each participant's teacher. The information obtained in the FAIR-T II was used to gather information about the participant's problem behavior and hypothesize a function of the identified problem behavior. A follow-up meeting was scheduled with the teacher following completion of the FAIR-T II to review the information and develop operational definitions of the participant's problem behaviors and replacement response.

Screening Observation

To verify the frequency of problem behaviors, a 20-minute screening observation was conducted following the teacher interview. Problem behaviors identified by the teacher on the FAIR-T II were recorded during screening observations. These observations took place at the time and location the teacher identified as most problematic. The student had to exhibit problem behavior in at least 20% of intervals to be included in this study. Teachers were told to conduct class in their typical manner and no other alterations to the classroom were made during screening observations.

Brief Functional Analysis (BFA)

A classroom-based BFA was conducted to determine the function of each participant's problem behavior and to confirm results from the FAIR-T II. The conditions tested in the BFA were determined based on teacher reports on the FAIR-T II and results of the screening observation; when these results did not support the inclusion of a condition, those conditions were excluded from the analysis. This replicated procedures used in school-based FA's reviewed in Mueller, Nkosi, and Hine (2011). During all conditions, except the control condition, the participant engaged in the same academic task. The lead investigator conducted functional analysis conditions. A trained independent observer recorded instances of target behavior and monitored procedural integrity.

Tangible condition. Each participant's preferred tangible item was determined based on teacher report and, prior to the start of each tangible session, a brief preference assessment was conducted to identify the participant's highest preferred item that day. Participants were presented with an array of teacher-indicated preferred items and instructed to choose one. Following a choice, participants received 30 seconds access to the item. The item was then removed from the array and remaining items were presented in the same manner. Trials continued until the participant chose each item or did not respond within 30 seconds (DeLeon et. al., 2001). During the tangible condition, the experimenter restricted the participant's access to the preferred item identified in the brief preference assessment and, contingent on problem behavior, allowed the participant to engage with the item for 30 seconds.

Attention condition. Prior to the start of session, the experimenter was positioned next to the participant and delivered attention for 2 minutes. The experimenter then told the participant that it was time to begin the academic activity and withdrew all social attention. During the condition, the experimenter engaged in a work activity, visible to the participant. Contingent on the target problem behavior, the experimenter provided attention in the form of brief, typical reprimands or redirections. All other problem behaviors were ignored.

Escape condition. During the escape condition, the experimenter instructed the student to engage in an academic task. Contingent on an occurrence of the target behavior, the experimenter withdrew the task and turned away from the participant for 30 seconds. At the end of 30-second interval, the experimenter re-issued the task demand and instructed the participant to return to work. All other problem behaviors were ignored. A three-prompt hierarchy was employed to ensure that the participant did not escape task demands for any other problem behavior besides the target behavior. If the participant engaged in non-compliance for the task demand, the therapist initiated the following hierarchy: (1) a verbal command, (2) a verbal command and gestural prompt, and (3) a verbal command and hand-over-hand compliance.

Control condition. The control condition establishes an abolishing operation for all functions of problem behavior by providing access to all potential maintaining variables. This condition was conducted in an area of the classroom away from other students and task demands. The participant had free access to preferred tangible items and a non-academic task. Additionally, the experimenter delivered neutral attention every 30 s (e.g., “You’re writing your name”). All problem behaviors were ignored.

Contingency reversal phase. A contingency reversal sequence was conducted to confirm the results of the BFA. The contingency reversal involved a brief BAB design with one datum point per condition and included the functional analysis condition with the highest occurrence of problem behavior and at least a 20% difference from the next highest condition. The B phase consisted of a reversal of the contingency; that is, a differential reinforcement of other behavior (DRO) procedure in which reinforcement was delivered every 30 seconds contingent on the absence of target problem behavior. Phase A replicated previous BFA procedures.

Intervention Procedures

The evaluation of the intervention occurred across two phases: 1) Demonstration of resurgence of the problem behavior and 2) the evaluation of training multiple mands on the resurgence of problem behavior.

Mand Training

The primary researcher conduced mand training sessions, which were completed during 5-minute sessions using a progressive prompt delay procedure. A physical prompt with progressive time delay procedure was used to teach physical mands such as card touches or signing while a verbal prompt with progressive time delay procedure was used to teach vocal mands. During training sessions, the experimenter issued a physical prompt (e.g., hand over hand guidance) or vocal prompt (e.g., "say 'break'") after 10 seconds, initially. The delay was increased by 10 seconds each time an 80% reduction in problem behavior occurred relative to the mean rate of the last three baseline sessions. These training procedures replicate those used in Volkert et al. (2009). Training continued until the participant independently engaged in communication responses

during at least 80% of trials across two successive 5-minute sessions. Intertrial latency included the delay plus the 30 seconds of reinforcement delivery, falling between 30-50 seconds.

Phase 1(Resurgence Phase)

Phase 1 refers to the first three conditions during which the phenomenon of resurgence was tested. To demonstrate resurgence, a decrease in the target problem behavior must be first observed during the intervention (i.e., FCT), followed by a recurrence of the target behavior to levels greater than those observed during the FCT condition.

Baseline (A). During the baseline phase, frequency of target problem behavior and frequency of independent target mands were recorded during 20-minute direct observations in the participant's target setting. Target problem behaviors and mands were recorded during natural conditions; no changes were made to the student's environment and the teachers were instructed to interact with the participant in their typical manner.

FCT_1 condition (B). Teachers were trained by the primary investigator to deliver the corresponding reinforcer, identified during the BFA, when the student independently engaged in the target mand. Teachers were trained on the operational definitions of their student's problem behaviors and the student's independent mand. Teacher training also included an overview of intervention procedures, modeling of the procedures, role-play by the teacher, and corrective feedback.

Following teacher training, researchers conducted 20-minute direct observations in the target setting during which frequency of target behaviors and independent mands were recorded. Teacher treatment integrity was also monitored. Criteria for moving to the

resurgence condition was an 80% reduction in problem behaviors relative to the mean rate of the last three baseline sessions for at least three consecutive sessions (Volkert et al., 2009).

Resurgence condition (C). During the resurgence condition, all intervention procedures were withdrawn. Specifically, teachers were instructed to ignore instances of problem behavior and all independent mands and conduct class in their typical manner. Direct observations were conducted in the same manner as previous conditions. Resurgence was defined as the occurrence of problem behavior at a rate exceeding levels observed during the FCT condition in at least one session (Volkert et al., 2009).

Phase 2 (Intervention Phase)

During Phase 2, four conditions were implemented to demonstrate and verify the effects of training multiple mands on the resurgence of problem behaviors.

FCT_2 condition (D). During this condition, two additional mands were taught to the participants. Participants were taught these mands in the same format as the first mand. During these training sessions, the first mand was also reviewed; that is, trials using the vocalization mand were interspersed throughout the training session. Training of additional mands involved the same procedures and criteria used during training of the initial mand. Procedures continued until the participant independently engaged in communication responses during at least 80% of opportunities across two successive 5-minute sessions. Following mand training, direct observations in the student's target setting were conducted during which the frequency of communication and problem behaviors were recorded. Prior to beginning the *FCT_2* replication condition, researchers conducted one mand training session to ensure acquisition maintenance.

Extinction condition (C). During those conditions, participants' preferred mand and target problem behavior were placed on extinction. Teachers were instructed to ignore all instances of disruptive behaviors. They were also instructed to ignore instances of their student's preferred communicative response but to continue responding to instances of the additional two mands by delivering the corresponding reinforcement.

Social Validity

Assessment Rating Profile-Revised (ARP-R)

A modified version of the Assessment Rating Profile-Revised (ARP-R; Eckert, Hintze, & Shapiro 1999; see Appendix B) was used to determine teachers' acceptability of the assessment procedures used during the FBA. Modifications included (a) the word "school psychologist" was replaced with "teacher" and (b) the tense of the document was changed from present to past tense. The ARP-R included a 6-point Likert scale measuring 12 items, with higher ratings indicating greater agreement (1 = strongly disagree to 6 = strongly agree). The ARP-R has been found to have high internal consistency (Crohnbach's coefficient alpha of .99) and test-retest reliability. Additionally, factor analysis has verified that the scale is a one-factor instrument for measuring teachers' acceptability (Eckert et al.).

Behavior Intervention Rating Scale (BIRS)

The Behavior Intervention Rating Scale (BIRS; Elliott & Treuting, 1991; see Appendix C) was used to assess teachers' perceptions of acceptability, effectiveness, and time of effectiveness of the intervention procedures. A 6-point Likert scale (1 = strongly disagree to 6 = strongly agree) is used to measure the 24 items on the BIRS. Scores range from 24 to 144 with higher scores representing greater acceptability. The BIRS has been

found to have sufficient psychometric properties. A factor analysis revealed a three-factor structure consisting of acceptability, effectiveness, and time to effectiveness, with the acceptability factor accounting for 63% of the variance. Additionally, these factors yield strong internal consistency indicated by alpha coefficients ranging from .87 to .97. (Finn & Sladeczek, 2001). The BIRS was administered to teachers following the training of multiple mands to assess acceptability of this intervention.

Interobserver Agreement (IOA)

Secondary observers were trained to reliably collect data on the occurrences and non-occurrences of problem behavior and mands to a 90% accuracy criterion with the primary observer before being included as a trained data collector for the study. IOA was calculated during both the assessment and intervention conditions. Observers were re-trained if IOA ever fell below 85%. During the course of the study, reliability never fell below 85%. Percent agreement was calculated by dividing the number of agreements between observers by the total number of agreements plus disagreements, and multiplying by 100. Agreements included intervals in which the primary and secondary observers both recorded an occurrence or non-occurrence of behavior. Disagreements included intervals in which observers recorded a mismatch between the occurrence and non-occurrence of behavior.

IOA was calculated for 41.67% of all observations across participants, behaviors, and phases. Average IOA across all observations was 99.07% (range = 88.75 – 100%). IOA was collected for 40.91%, 47.46%, and 37.68% of observations for Jason, Robby, and Nick, respectively. Furthermore, IOA was collected during at least 20% of sessions per phase for Jason (*m* = 36.85%, range = 28.6 – 60%), Robby (*m* = 51.17%, range = 25 –

100%), and Nick (*m* = 46.72%, range = 23.1 – 100%) Across all conditions, average IOA for Jason was 99.50% (range = 95 – 100%), average IOA for Robby was 98.59% (range = 93.33 – 100%), and Nick's average IOA was 98.57% (range = 88.75 – 100%).

Kappa was also calculated to assess reliability between observers. Kappa controls for chance agreement by calculating the number of agreements of occurrences and non-occurrences of behaviors and the disagreements of occurrences and non-occurrences between the two observers. Kappa values range from 0.0, indicating poor (i.e., less than chance) agreement, to 1.0, indicating perfect interobserver agreement. Values from 0.01 – 0.20 indicate slight agreement, 0.21-0.40 indicates fair agreement, moderate agreement ranges from 0.41 – 0.60, substantial agreement falls between 0.61 – 0.80, and values of 0.81 – 0.99 indicate almost perfect agreement (Viera & Garrett, 2005).

For all participants, Kappa values indicated very good agreement across all behaviors measured and across target problem behaviors. For Jason, Kappa was found to be 0.97 (95% CI = 0.96 – 0.98) for all behaviors and the target problem behavior. For Robby, Kappa was found to be 0.93 (95% CI = 0.92 – 0.95) across all behaviors and the target problem behavior. For Nick, Kappa was also found to be 0.93 (95% CI = 0.91 – 0.94) across all behaviors and 0.91 (95% CI = 0.88 – 0.93) across the target problem behavior.

Procedural Integrity

Procedural integrity was calculated for 100% of functional analysis conditions for each participant. Using a checklist, data collectors recorded the percentage of steps accurately completed during the functional analysis, including correct responses to

participant behaviors. Procedural integrity was 100% across participants for all conditions.

Treatment Integrity

Treatment integrity was monitored and recorded during 100% of treatment observations. A checklist was used to record the percentage of steps accurately implemented by teachers. If treatment integrity fell below 90% for any session, the primary researcher re-trained the teacher on the procedures via performance feedback.

Teachers yielded overall average treatment integrity of 96.73%. Jason's teacher, Robby's teacher, and Nick's teacher yielded average integrities of 97.5%, 92.65%, and 100%, respectively. During extinction conditions, Jason's teacher was, on average, 95.24% accurate in implementing procedures and yielded 100% accurate implementation during FCT conditions. Robby's teacher yielded, on average, 100% integrity during extinction conditions and 91.67% integrity during FCT conditions. Nick's teacher demonstrated 100% treatment integrity during both extinction and FCT conditions.

IOA for treatment integrity was also collected for 50.47% of all sessions across each participant. For Jason, treatment integrity IOA was collected for 42.5% of sessions and average IOA across all sessions was 100%. Integrity IOA for Robby was collected for 55.88% of sessions and average IOA was 100%. For Nick, integrity IOA was collected for 54.55% of sessions and average IOA was also 100% across all conditions.

CHAPTER III - RESULTS

The percentage of intervals with problem behavior are presented graphically in Figures 2, 3, and 4 for Jason, Robby, and Nick, respectively. Results are described in terms of data level, trend, variability, immediacy and magnitude of effects across conditions, the degree of overlap between conditions, and consistency of effects across participants. The functional assessment identified maintaining variables for each participant's target problem behavior. These identified functions informed intervention in terms of the item or activity each participant was taught to request. In the initial FCT condition (FCT_1), each participant demonstrated acquisition of the trained mand and a significant reduction in problem behaviors. Each participant also demonstrated a resurgence of problem behaviors in the resurgence condition when trained mands no longer received previously reinforcing consequences and extinction procedures were no longer implemented in response to problem behaviors. Following training of two additional, topographically-varied but functionally-identical mands, resurgence of problem behaviors was no longer observed for Robby and Nick when their preferred mand was placed on extinction. Jason demonstrated variable rates of problem behaviors across all conditions following $mand_2$ and $mand_3$ training, indicating limitations in the effectiveness of the intervention for this participant. Overall, the acquisition of three mands was more effective at maintaining reductions in problem behaviors and reducing resurgence of problem behaviors compared to the acquisition of one mand for the same consequence.

Table 1

Functional Assessment Outcome Data for Jason, Robby, and Nick

Participant	Identified Function	Mand$_1$ Topography	Mand$_2$ Topography	Mand$_3$ Topography	Reinforcement
Jason	Escape	Vocalization "Break"	Raising hand	Card touch	Break from academic tasks
Robby	Tangible	Vocalization "Computer please"	Raising hand	Card exchange	Access to computer
Nick	Tangible	Vocalization "Gumby"	Raising hand	Card exchange	Access to Gumby toy

Functional Behavior Assessment

Results of the assessment include data from a teacher interview, direct classroom observations, and an experimental functional analysis. These procedures were conducted prior to the intervention to ensure that function-based treatment components were developed. Results of the BFA's for all participants are displayed in Figure 1.

Jason

Teacher ratings. On the FAIR-T II rating scale, Jason's teacher indicated that placing his fingers in his ears (FIE) was the highest priority problem behaviors that he exhibited. FIE reportedly occurred 10-12 times per day and had been occurring for approximately 2 months prior to the interview. When FIE occurred, it typically lasted for 6-10 minutes. Jason's teacher also reported that FIE occurred in all academic settings, particularly during difficult tasks and when new subject material was presented. Additionally, Jason's teacher reported that he occasionally receives access to an activity after the behavior has occurred and that task demands and social interactions with adults and peers are typically terminated, delayed, or avoided following engagement in FIE.

Jason's teacher suggested that FIE was maintained by an escape function as indicated by an average rating of 1.0 on questions assessing negative reinforcement.

Direct observation. During the screening observation, Jason exhibited the target problem behavior during 69.2% of intervals. FIE was primarily followed by escape from task demands (97.6%) and occasionally by teacher attention (20.5%).

BFA. Attention, escape, and control conditions were conducted by the primary researcher in a multielement format. Jason exhibited the highest rates of target problem behavior in the escape condition and results were verified during the contingency reversal sequence. Results of the functional analysis suggested that FIE is maintained by escape from task demands.

Robby

Teacher ratings. On the FAIR-T II, Robby's teacher indicated that out of seat (OOS) behavior was the highest priority problem behavior exhibited in the classroom. OOS reportedly occurred up to nine times per day and had been occurring for the entire school year. She also indicated that Robby was typically out of seat for 5 minutes at a time, making this behavior highly unmanageable given staff responsibilities to the rest of the class. Additionally, Robby's teacher reported that OOS behavior occurred in the context of all types of task demands and he often received access to preferred activities (e.g., computer) and positive and negative attention from adults immediately following this behavior. Robby's teacher most strongly suggested that OOS behavior was maintained by a tangible function as indicated by an average rating of 2.75 on questions assessing positive tangible reinforcement. Regarding preferred tangible items, Robby's teacher indicated that he enjoyed playing games on the computer, blocks, and puppets.

Direct observation. During the screening observation, Robby engaged in OOS behavior during 92.5% of intervals. Escape from task demands occurred 100% of the time following this behavior while access to tangible items occurred 32% of the time and Robby received teacher attention 45% of the time following OOS. During times in which Robby was engaged with a tangible item, he was most frequently engaged with the computer.

BFA. Escape, tangible, and control conditions were conducted in a multielement format. Results of the functional analysis suggest that access to preferred tangible items may maintain Robby's OOS behavior. The contingency reversal sequence verified these results. Data are displayed in Figure 1.

Nick

Teacher ratings. On the FAIR-T II, Nick's teacher indicated that tantrums were his most severe and highest priority problem behavior. Through teacher consultation, it was determined that Nick most frequently engaged in crying and yelling during these tantrums; therefore, Nick's target problem behavior was more discretely defined as inappropriate vocalizations (IV). Nick's teacher reported that IV's occur over 13 times per day and had been occurring for approximately 4 months. When IV occurred, it typically lasted up to 5 minutes. Nick's teacher also indicated that problem behaviors occurred in the context of all task demands and throughout all periods of the day. Nick most often received teacher and peer attention and access to preferred tangible items following instances of IV. Nick's teacher suggested that his problem behaviors were maintained by an attention function as indicated by average ratings of 0.80 on questions

assessing positive social reinforcement. Regarding tangible items, Nick's teacher indicated that he enjoyed playing with a rubber snake, a Gumby toy, and toy dinosaurs.

Direct observation. During the screening observation, Nick engaged in IV during 25.8% of intervals. Nick most often received teacher attention (35.5% of the time) following instances of IV. He also received access to tangible items (e.g., food, rubber snake) 22.6% of the time following IV.

BFA. Attention, tangible, escape, and control conditions were conducted with Nick. Low rates of the target problem behavior were observed during the first series. Researchers then conducted an extended tangible session to further test hypotheses about the function of Nick's problem behavior as reported by his teacher. Rates of IV were elevated during this extended tangible condition. Elevated rates of IV were also observed during the first contingency reversal condition. Rates of IV in the following tangible condition were similar to the previous extended tangible session. And the final contingency reversal session yielded low rates of IV. Thus, results of the functional analysis suggest that Nick's problem behaviors may be maintained by access to preferred tangible items.

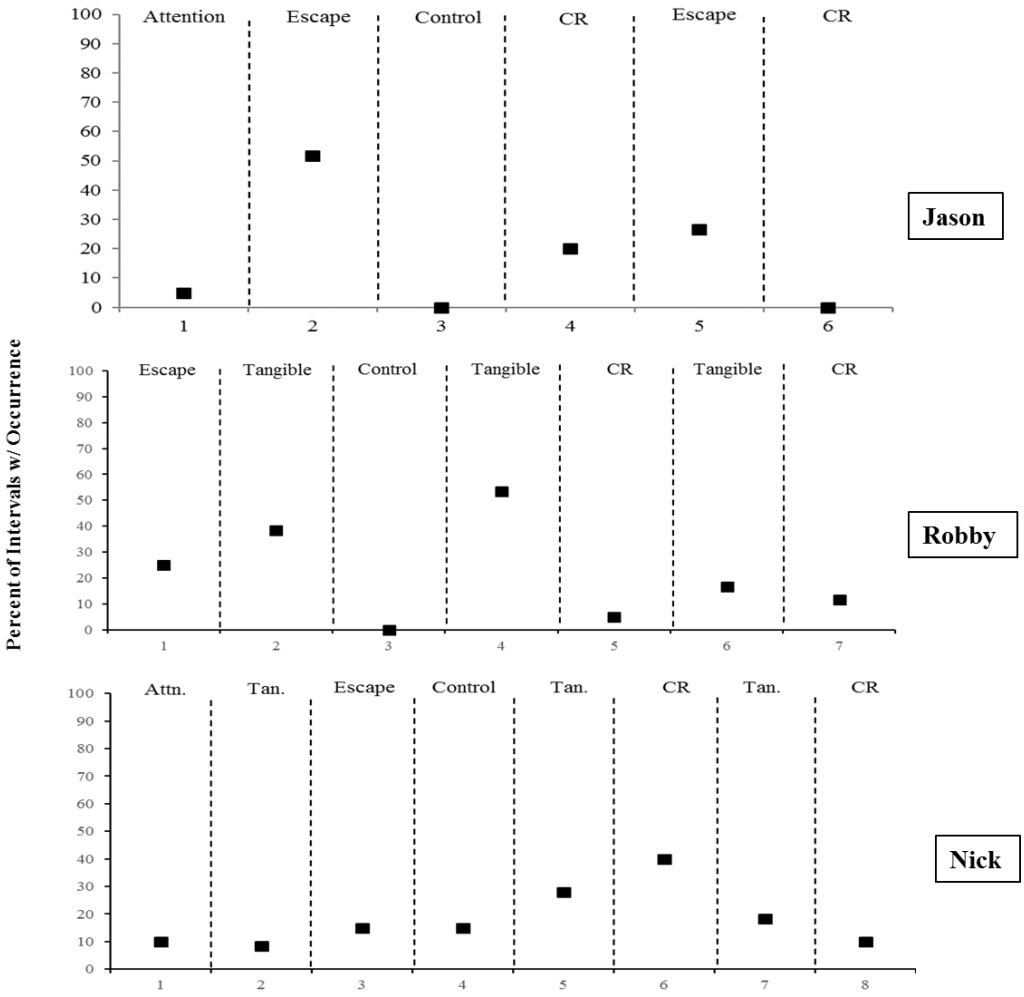

Figure 1. BFA results for all participants.

Percent of target problem behavior observed during BFA conditions for Jason, Robby, and Nick.

Visual Analysis

Jason

In the first phase of the intervention, an ABC design was employed to examine the effects of FCT on problem behavior and the subsequent effects (i.e., resurgence) of placing the previously reinforced communication responses on extinction. During baseline, Jason demonstrated highly variable rates of problem behavior (*m* = 61.17%,

range = 34 – 95.83%) and no appropriate mands were observed. Jason demonstrated acquisition of $mand_1$ (i.e., vocal requests for "break") after 14 training sessions.

Following training, a large and immediate decrease in problem behaviors was observed upon the implementation of FCT_1 (*m* = 8.33%, range = 2.5 – 27.5%) while instances of $mand_1$ remained low throughout this condition (*m* = 0.5%, range = 0 – 1.67%).

Jason then demonstrated an immediate resurgence in problem behaviors when appropriate mands were no longer reinforced evidenced by an increase in problem behaviors to levels slightly lower, but overlapping, with baseline rates (*m* = 34.88%, range = 18.33 – 59.17%). Additionally, low levels of $mand_1$ were observed during the resurgence phase (*m* = 1.30%, range = 0 – 4.17%).

During Phase 2 of the intervention, Jason was taught two additional mands and a DCDC sequence was used to evaluate the effects of training three mands on the resurgence of problem behaviors. Jason demonstrated acquisition of $mand_2$ after 10 training sessions and acquisition of $mand_3$ after seven training sessions. He did not exhibit $mand_1$ across any of the subsequent conditions.

Low rates of problem behaviors were observed during the first FCT_2 condition (*m* = 5.00, range = 0 – 10.83%) and $mand_2$ (*m* = 1.33%, range = 0.83 – 2.5%) and $mand_3$ (*m* = 2.50%, range = 0.83 – 5%) were observed at low but stable rates.

Upon implementation of the first extinction conditon, during which $mand_3$ was placed on extinction, Jason exhibited variable rates of problem behavior that increased gradually from FCT_2 rates then decreased again gradually across the condition (*m* = 12.55%, range = 0 – 48%). $mand_2$ (*m* = 0.58%, range = 0 – 2.5%) and $mand_3$ (*m* =

0.75%, range = 0 - 2.5%) were observed at low but stable rates during the extinction condition.

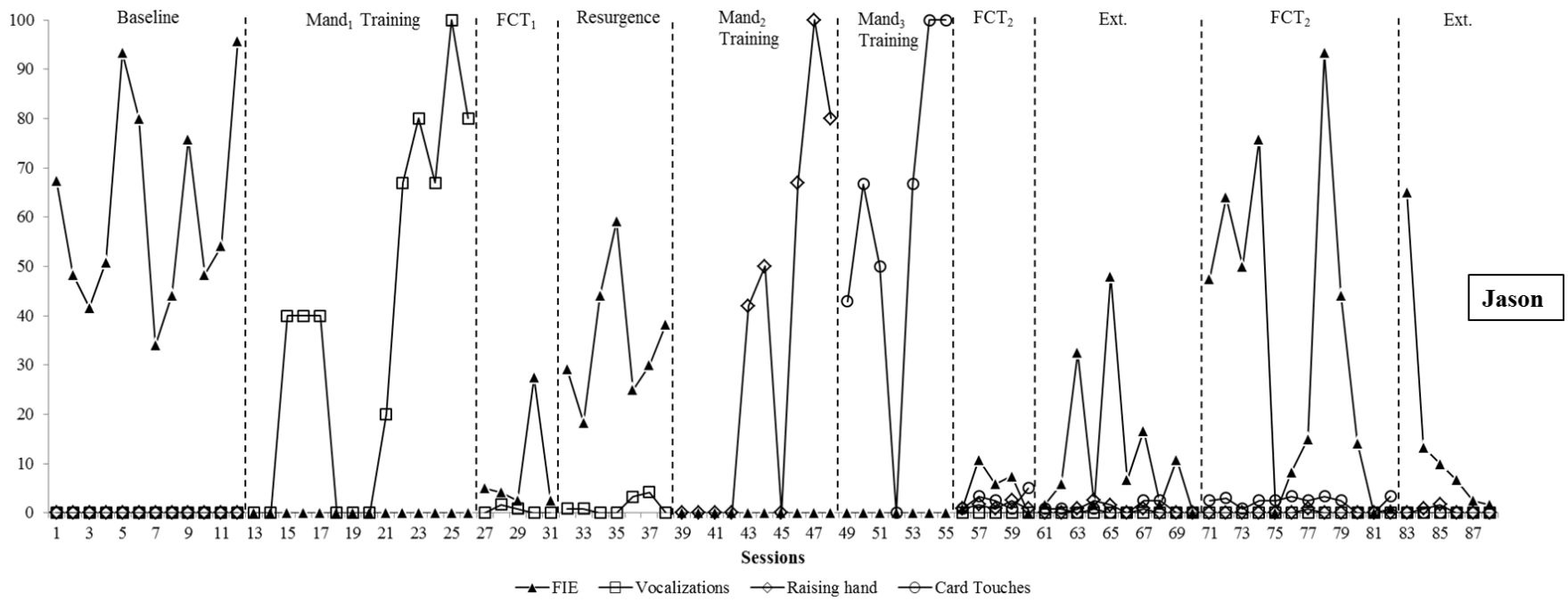

Figure 2. Jason's treatment evaluation data

Percent of problem behavior (Fingers In Ear; FIE) and communication responses across training conditions and treatment evaluation phases.

During the FCT_2 replication condition, Jason exhibited an immediate increase in problem behavior followed by high variability across the condition (m = 33.25%; range = 0 – 93.33%). Jason exhibited one instance of mand2 across this condition but exhibited higher rates of mand3 (m = 2.19%; range = 0 – 3.33%).

Jason exhibited an immediate increase in the rate of problem behaviors upon implementation of the second extinction condition, followed by a gradual decrease in problem behaviors across the condition (*m* = 16.53%, range = 1.67 – 65%). Low rates of $mand_2$ were observed (*m* = 0.42%, range = 0 – 1.67%) and Jason exhibited 0 instances of $mand_3$ during this phase.

Table 2

Mean Percentages of Problem Behavior and Mands for Jason

Condition	**Problem Behavior (FIE)**	**$Mand_1$ (Vocal)**	**$Mand_2$ (Hand raise)**	**$Mand_3$ (Card Touch)**
Baseline	61.17%	0%	0%	0%
FCT_1	8.33%	0.5%	0%	0%
Resurgence	34.88%	1.30%	0%	0%
FCT_2	25.77%	0%	0.44%	2.28%

Robby

In Phase 1 of the intervention, an ABC design was also employed for Robby to examine the effects of FCT on problem behavior and the effects of training two additional mands on the resurgence of problem behaviors. During baseline, Robby demonstrated an increasing rate of problem behaviors (*m* = 51.50%, range = 32.5 –

67.5%). He demonstrated acquisition of $mand_1$ (i.e., vocal request for "toys, please") relatively quickly after three training sessions.

Robby then exhibited an immediate and significant increase in problem behaviors when mand1 was placed on extinction, indicating the occurrence of resurgence (*m* = 74.33%, range = 55.83 – 92.5%). The level of problem behavior met and exceeded rates observed in baseline.

During Phase 2 of the intervention, Robby was taught two additional mands and a DCDC sequence was conducted to evaluate the effects of increasing his mand repertoire on the resurgence of problem behaviors. Robby demonstrated acquisition of $mand_2$ (i.e., raising his hand) after six training sessions and he reached mastery criterion for $mand_3$ (i.e., card touch) after eight training sessions. Low rates of problem behaviors were observed during both $mand_2$ training (*m* = 7.22%, range = 0 – 20%) and $mand_3$ training (*m* = 3.96%, range = 0-20%).

Immediate and significant decreases in problem behaviors were observed from the resurgence phase during implementation of FCT_2 (*m* = 5.17%, range = 0 – 17.5%). In addition, Robby exhibited low but consistent rates of $mand_1$ (*m* = 1.5%, range = 0 – 4.17%), several instances of $mand_2$ during the second observation (*m* = 0.5%; range = 0 – 2.5%), and two instances of $mand_3$ (*m* = 0.33%, range = 0 – 0.83%).

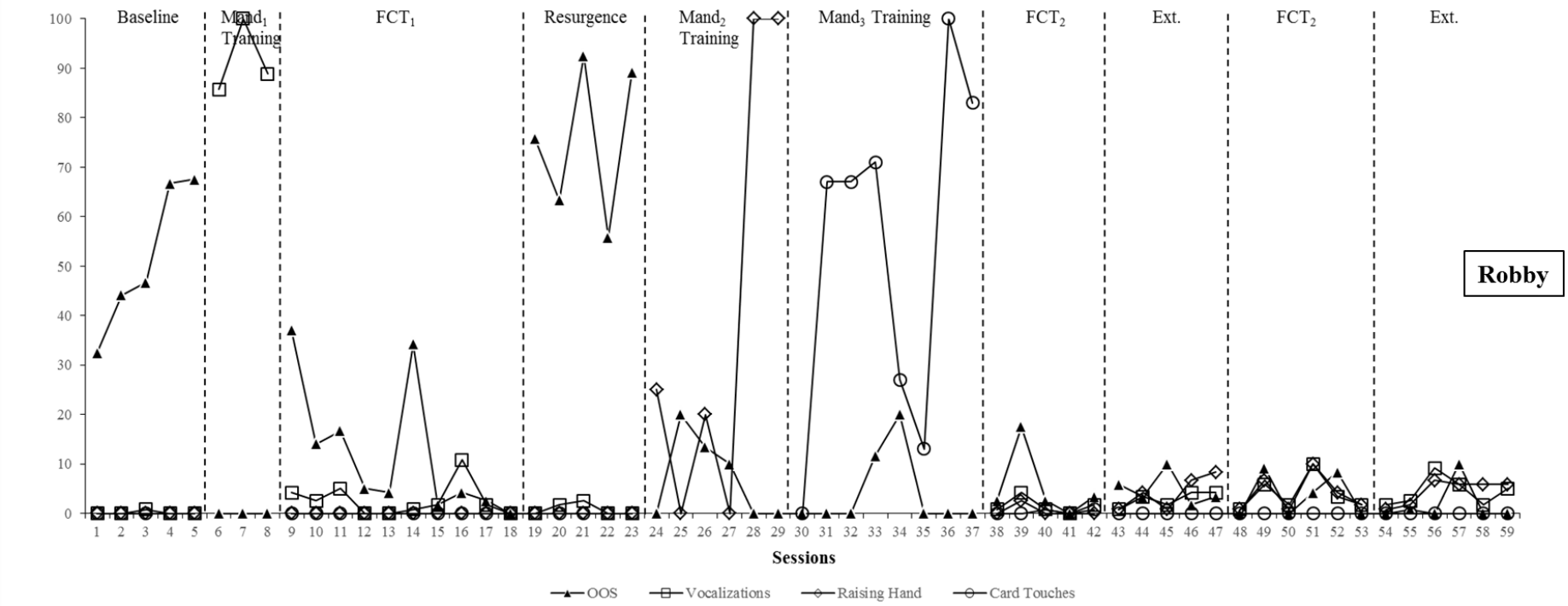

Figure 3. Robby's treatment evaluation data.

Percent of problem behavior (Out of Seat; OOS) and communication responses across training conditions and treatment evaluation phases.

Levels of problem behaviors observed during the extinction condition (*m* = 4.83%, range = 1.67 – 10%), when Robby's preferred mand (i.e., $mand_1$) was placed on extinction, were comparable to those observed in the previous condition. An increasing trend was observed for $mand_1$ (*m* = 2.83%; range = 0.83 – 4.17%) and $mand_2$ (*m* = 4.17%, range = 0.83 – 8.33%). Robby did not exhibit $mand_3$ during this condition.

During the replication of FCT_2, slightly variable rates of problem behavior were observed but rates remained at levels similar levels to the previous $FCT_2$and extinction phases (*m* = 4.33%, range = 0 – 9.17%). Slightly variable rates of mand1 (*m* = 4.67%; range = 0.83 – 10%) and $mand_2$ (*m* = 4.83%, range = 0.83 – 10%) were observed, but Robby's level of appropriate responding increased from the previous conditions. He did not exhibit $mand_3$ during this condition.

Overall, Robby engaged in fewer problem behaviors during the second extinction condition (*m* = 1.81%, range = 0 – 10%). Additionally, Robby exhibited similar rates of appropriate communication to the previous FCT_2 condition. Comparable rates of $mand_1$ (*m* = 4.31%, range = 1.67 – 9.17%) and an increasing trend for $mand_2$ was observed (*m* = 4.44%, range = 0.83 – 6.67%) with stability during the last three observations. Again, Robby did not exhibit $mand_3$ during this condition.

Table 3

Mean Percentages of Problem Behavior and Mands for Robby

Condition	**Problem Behavior (OOS)**	**Mand$_1$* (Vocal)**	**Mand$_2$ (Hand raise)**	**Mand$_3$ (Card Touch)**
Baseline	51.50%	0.17%	0%	0%
FCT_1	11.94%	2.67%	0%	0%
Resurgence	74.33%	0.83%	0%	0%
FCT_2	4.32%	2.80%	2.42%	0.15%
Extinction	3.18%	3.64%	4.32%	0%

*Indicates preferred mand

Nick

During Phase 1 of the intervention, an ABC design was also conducted with Nick to examine the effects of communication training and the subsequent resurgence effects when the trained mand was placed on extinction. During baseline, Nick demonstrated slightly variable rates of problem behaviors with an increasing trend (*m* = 31.81%, range = 5 – 53.33%). Nick acquired mand$_1$ at mastery criterion after 13 training sessions. Problem behaviors were observed during mand$_1$ training sessions (*m* = 14.28%, range = 3 – 26.6%) but decreased as rates of appropriate communication responses increased.

Nick demonstrated decreasing rates of problem behaviors across the FCT_1 condition (*m* = 8.89%, range = 0.83 – 20.83%) to near-zero levels. He also, however, demonstrated decreasing rates of mand$_1$ (*m* = 8.33%, range = 5 – 13.33%).

An immediate but slight increase in problem behaviors was observed upon implementation of the resurgence condition (*m* = 22.67%, range = 12.5 – 43.33%). Levels of problem behavior were higher than observed in FCT_1, indicating the occurrence

of resurgence. Nick exhibited few instances of $mand_1$ during the resurgence phase (*m* = 0.83%, range = 0-2.5%).

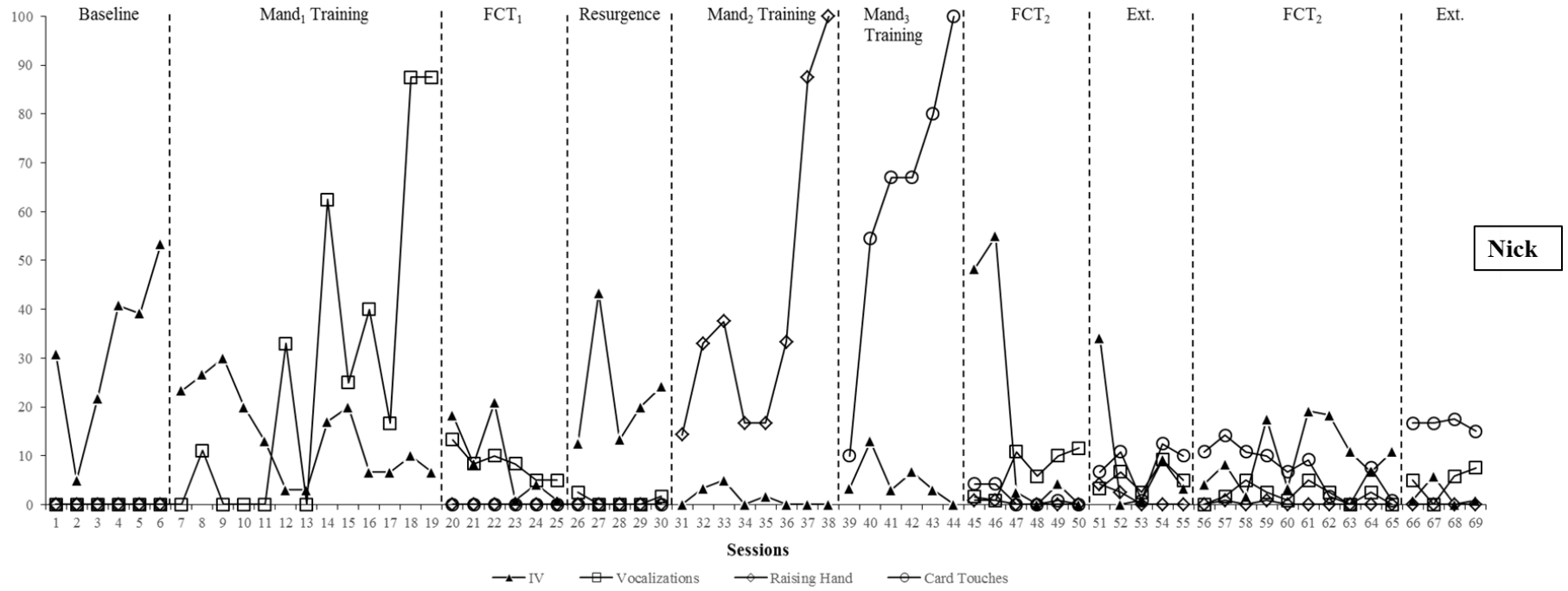

Figure 4. Nick's treatment evaluation data.

Percent of problem behavior (Inappropriate Vocalizations; IV) and communication responses across training conditions and treatment evaluation phases.

During Phase 2 of the intervention, Nick was taught two additional mands and a DCDC sequence was used to evaluate the effects of training additional mands on the resurgence of problem behavior. Nick acquired $mand_2$ at mastery criterion after eight training sessions and he demonstrated mastery of mand3 after six training sessions.

An immediate increase in problem behaviors was observed during the first two observations of the FCT_2 condition but then decreased to low and stable levels (*m* = 18.33%, range = 0 – 55%). Nick exhibited $mand_1$ at an increasing rate across the condition (*m* = 6.77, range = 0.83 – 11.6%). He exhibited few instances of $mand_2$ and several instances of mand3, but these communication responses decreased across the condition.

When Nick's preferred mand was placed on extinction, an immediate increase in problem behaviors was observed with overall levels of problem behavior increasing slightly (*m* = 9.49%, range = 0 – 34.16%). Rates of $mand_1$ decreased slightly overall from the previous condition (*m* = 5.33%, range = 2.5 – 9.16%). Few instances of $mand_2$ were observed (*m* = 1.33%, range = 0 – 4.16%) but an increase in rates of $mand_3$ were observed from the previous condition (*m* = 8.17%, range = 0.83 – 12.5%).

During the FCT_2 replication, Nick exhibited slightly variable rates of problem behaviors, but these behaviors remained within the same range as observed in the previous FCT_2 and extinction conditions (*m* = 10.07%, range = 1.67 – 19.16%). Additionally, low levels of $mand_1$ (*m* = 2%; range = 0 – 5%) and $mand_2$ (*m* = 0.17%; range = 0 – 0.83%) were observed. Nick demonstrated higher rates of $mand_3$, similar to rates observed in the previous extinction condition (*m* = 7.17%, range = 0 – 14.16%).

In the final extinction condition, an immediate and stable decrease in problem behavior was observed (*m* = 1.87%, range = 0 – 5.83%) and these diminished rates maintained across the condition. Nick also exhibited $mand_1$ at similar rates to previous FCT_2 and extinction conditions (*m* = 4.58%, range = 0 – 7.5%). An immediate and stable increase in $mand_3$ was observed and these rates remained elevated throughout the phase (*m* = 16.46%, range = 15 – 17.5%). Nick did not exhibit $mand_2$ during this phase.

Table 4

Mean Percentages of Problem Behavior and Mands for Nick

Condition	**Problem Behavior (IV)**	**$Mand_1$* (Vocal)**	**$Mand_2$ (Hand raise)**	**$Mand_3$ (Card Touch)**
Baseline	31.81%	0%	0%	0%
FCT^1	8.89%	8.33%	0%	0%
Resurgence	22.67%	0.83%	0%	0%
FCT^2	13.17%	3.79%	0.21%	5.06%
Extinction	6.10%	5%	0.74%	11.85%

*Indicates preferred mand

Effect Size

Effect sizes of behavior change for FCT_1, resurgence, and the effect size between FCT_2 and extinction were calculated using Tau-U (Parker et al., 2011). Effect sizes should be interpreted in combination with visual analysis. Tau-U evaluates non-overlapping data points between selected conditions and controls for trends within each comparison while yielding a conservative estimate of change. Tau-U scores range between 0 and 1 and scores of 0.0 – 0.20 indicate a small change, scores of 0.21 – 0.60 indicate a moderate change, scores between 0.61 – 0.80 indicate a large change, and

scores between 0.81 – 1.00 indicate a very large change. For each participant, Tau-U was calculated to compare baseline vs. FCT_1 and FCT_1 vs. resurgence to first evaluate the effects of FCT on problem behavior and then to evaluate the occurrence of resurgence of problem behaviors. Finally, FCT_2 vs. extinction was compared using weighted average Tau-U values to evaluate the effects of additional trained mands on the resurgence of problem behaviors. Note that, in this comparison, small effect sizes between FCT_2 and extinction conditions are ideal. That is, small effect sizes between these conditions indicate desired maintenance of low levels of problem behaviors when a preferred mand is placed on extinction. Table 5 displays the effect sizes of problem behavior for each comparison.

Jason

The Tau-U calculation comparing baseline vs. FCT_1 indicates a very large change for problem behavior (Tau-U = 1.00). The FCT_1 vs. resurgence comparison also indicates a very large change (Tau-U = 0.89). Comparisons between FCT_2 vs. extinction indicate a small change for problem behavior (Tau-U = 0.01).

Robby

For Robby, the baseline vs. FCT_1 comparison indicate a very large change (Tau-U = 0.92). The Tau-U value comparing FCT_1 vs. resurgence also indicates a very large change (Tau-U = 1.00). Finally, the comparison between FCT_2 vs. extinction indicates a small change (Tau-U = 0.05).

Nick

The baseline vs. FCT_1 comparison indicates a very large change for Nick's problem behaviors (Tau-U = 0.83) while the FCT_1 vs. resurgence comparison indicates a

large change (Tau-U = 0.67). The effect size value comparing FCT_2 vs. extinction indicates a moderate change (Tau-U = 0.46).

Table 5

Tau-U Values for Problem Behavior across all Participants

Comparison	**Jason**	**Robby**	**Nick**
BL vs. FCT_1	1.00 (Very Large)	0.92 (Very Large)	0.83 (Very Large)
FCT_1 vs. Resurgence	0.89 (Very Large)	1.00 (Very Large)	0.67 (Large)
FCT_2 vs. Ext.	0.01 (small)*	0.05 (small)*	0.46 (Moderate)*

Note: *Represents the weighted average Tau-U value for conditions.

Social Validity

Each participant's teacher, who was involved in the assessment and intervention procedures, completed rating scales evaluating the social validity of procedures used in the current study.

Assessment Rating Profile-Revised (ARP-R)

Teachers completed the ARP-R following the completion of their student's FBA to evaluate the acceptability of conducting such behavioral assessment procedures. Teachers rated items on a 6-point Likert scale. Overall, teachers found assessment procedures to be acceptable in addressing their student's behavior problems, with mean item ratings of 6.0 by Jason's teacher, 5.92 by Robby's teacher, and 4.67 by Nick's teacher. The only negative rating was noted by Nick's teacher, who indicated "slight

disagreement" with the item, "This assessment was a good way to handle the child's problems."

Behavior Intervention Rating Scale (BIRS)

Teachers responsible for implementing each participant's interventions completed the BIRS following the final intervention condition. Overall, teachers found the FCT intervention to be socially valid. Mean item ratings included 6.00 by Jason's teacher, 5.58 by Robby's teacher, and 4.92 by Nick's teacher. Additionally, Jason, Robby, and Nick's teachers found the intervention acceptable (m = 6.00; m = 5.58; m = 4.92), effective (m = 6.00; m = 5.33; m = 4.56), and quickly effective (m = 6.00; m = 5.00; m = 4.00).

CHAPTER IV – DISCUSSION

Results of the current study suggest that, within classroom settings, training multiple mand modalities serving the same function may reduce the resurgence of problem behaviors in students with developmental disabilities to a greater degree than teaching one mand within FCT. Consistent with prior studies (e.g., Fisher et al., 1993; Wacker et al., 1990; Casey & Merical, 2006) initial implementation of FCT led to a reduction in problem behavior for all participants. The intervention was deemed effective if problem behaviors occurred at diminished levels in the last two extinction phases compared to the first extinction (i.e., resurgence) phase. These results were demonstrated in two of the three participants.

Researchers conducted classroom-based brief functional analyses to determine maintaining environmental variables for each participant's problem behavior. During Robby's BFA, elevated rates of problem behaviors observed in the tangible function was replicated in a second tangible session due to the limited differentiation between the first tangible and escape conditions. During Nick's BFA, low, undifferentiated rates of problem behavior were observed within the first series. Additionally, high rates of IV were observed in the first contingency reversal condition, despite the expectation of low rates of problem behavior during this contingency. These rates may have occurred as a carryover effect from the previous extended tangible condition. High rates of problem behaviors in this condition may be conceptualized as an extinction burst when Nick no longer received immediate reinforcement following problem behavior. The DRO schedule implemented in the contingency reversal was not based on the participant's rates

of problem behavior within the tangible conditions. Rather, a pre-determined schedule was implemented that may have inflated behaviors given Nick's reinforcement history.

Additionally, resurgence of problem behavior was demonstrated for all participants when both behaviors (i.e., initial communication response and target problem behavior) was placed on extinction. This aligns with previous research demonstrating this phenomenon (e.g., Epstein, 1985; Volkert et al., 2009).

Small effects between FCT_2 and extinction conditions were demonstrated. This was desired given the hypothesis that providing students with additional mands in their repertoire would maintain low rates of problem behaviors in extinction conditions, yielding similarly low rates across all conditions. This effect of low rates across FCT_2 and extinction conditions was demonstrated for Robby and Nick. Jason however, demonstrated variable rates of FIE during all conditions of the study. That is, elevated rates of FIE were observed in several sessions of extinction as well as FCT_2 phases, yielding a similar average but wide range of responding across these conditions. This suggests that a confounding variable, at least partially, impacted Jason's target behavior.

In addition to effects of FCT on problem behavior, all participants demonstrated acquisition of target communication responses following mand training sessions. For Jason, however, it did not appear that communication responses were functionally related to his rates of behavior. This adds to the postulation that an uncontrolled variable may have impacted Jason's responding.

In addition to the direct effects of mand training on an increase in communication responses during classroom observations, researchers could have served as a discriminative stimulus (S^D) for target communication responses. Given that the

researchers, rather than teachers, conducted mand training sessions, entering the classroom for the observation may have signaled to the participants the availability of reinforcement contingent on the previously trained mands. Anecdotally, however, all teachers reported that their student occasionally exhibited appropriate communication responses during periods of the day in which researchers were not present.

During extinction phases for Nick and Robby, researchers observed the emergence of non-preferred mands. Nick's engagement in $mand_3$ (i.e., card touches) increased when vocal mands did not produce reinforcement, while Robby's rates of $mand_2$ (i.e., hand-raising) increased when vocalizations were placed on extinction, all while maintaining low rates of IV or OOS behavior. This finding is unsurprising given similar results by Berg et al. (2015), who demonstrated the resurgence of previously trained mand modalities under conditions in which a more recently trained mand from the same response class was placed on extinction. These findings also align with this study's hypothesis that increasing a student's repertoire of mand topographies may serve as a generalization programming technique to promote the independent use of novel strategies to solicit reinforcement. Both Nick and Robby demonstrated response generalization across change agents (i.e., researcher to teacher) by exhibiting mands in the classroom alternative to those previously reinforced.

Implications for Applied Practice

The results of the present study may have implications for teachers and school-based practitioners. First, teachers rated both the functional analysis and treatment procedures as acceptable, suggesting that similar assessment and intervention techniques may be socially acceptable to implement in other school settings.

Furthermore, the functional assessment did reveal convergence among all three elements of the assessment. That is, for all three participants, teacher ratings on the FAIR-T II, conditional probability observations, and the functional analysis indicated the same functional variable(s) maintaining each participant's target problem behavior. The only discrepancy occurred in Nick's FAIR-T II ratings. His teacher did not indicate a tangible function on the rating scale, only that he may try to access preferred items after engaging in problem behavior but that he is not allowed. Direct observations, however, indicated that Nick did receive access to preferred items following problem behavior. Although the convergent validity of assessment procedures was not addressed as a research question in the current study, the convergence of teacher report with results of direct observations and experimental functional analyses speaks to the validity of these procedures in a school setting. The assessment results in the current study suggest that indirect measures such as teacher ratings and non-controlled measures obtained via direct naturalistic observations may accurately inform behavioral interventions within classroom settings.

Given the extensive requirements of teachers to implement these procedures, it is also noteworthy that teachers were able to implement FCT procedures with high integrity throughout the course of the intervention. Teachers were instructed by the researcher to accurately implement extinction procedures as well as respond appropriately to participants' functional communication responses while continuing to manage regular ongoing classroom procedures. Teachers' high social validity ratings and high integrity indicates that functional communication using different mand modalities may be manageable when implemented by school staff within a classroom.

Although the current study demonstrated that teachers implemented procedures with high integrity during observation periods throughout the course of the intervention, there is evidence to indicate that lapses in teacher integrity are likely to occur when active consultation is discontinued and/or the presence of a consultant fades in the context of other behavioral interventions (e.g., DiGennaro, Martens, & Kleinmann, 2007; Noell et al., 2005). Furthermore, treatment outcomes are likely to suffer when procedures are not implemented with integrity (Sanetti & Kratochwill, 2009). This study intended to address declines in teacher integrity by taking proactive measures to establish multiple intervention modalities to ultimately prevent subsequent dips in treatment effectiveness. The study first replicated these treatment integrity problems by systematically placing previously acquired responses on extinction and demonstrating the occurrence of the resurgence of problem behaviors. First, resurgence demonstrated by all participants extends previous studies by replicating a decrease in the effectiveness of poorly implemented interventions. Second, the study highlights the importance of maintaining high treatment integrity, especially with students with disabilities. As an example, Wordsell, Iwata, Hanley, Thompson, and Kahng (2000) demonstrated within an FCT intervention that even low rates of treatment errors by interventionists may contribute to the ineffectiveness of that treatment. When teacher integrity does suffer, however, the current study suggests that this may be combated by increasing a student's communicative repertoire. As teachers "failed" to respond to their student's preferred mand, students often began exhibiting the other two trained mands to receive the same reinforcement, replacing the problem behaviors that were observed during the resurgence phase under similar conditions.

Limitations

Several limitations should be noted regarding the present study. First, the applied and complex nature of a classroom greatly limits the experimental control that can be obtained when conducting functional analyses and treatment procedures in this setting. Given that assessment and treatment were conducted in applied contexts, variables such as the presence of peers, behavioral history within the environment, and competing reinforcers may have limited the internal validity of the study. Alternative functional analysis procedures may be more time-efficient and feasible than traditional procedures, especially when conducted in applied contexts. Bloom, Iwata, Fritz, Roscoe, and Carreau (2011) found correspondence between results of classroom-conducted trial-based analyses and traditional procedures for 7 out of 10 participants; therefore, a trial-based procedure may have been more appropriate for use in the current study than a brief functional analysis. Future studies may examine the utility of conducting other FA designs to inform a school-based FCT intervention.

In addition, data collection procedures may have posed a limitation. PIR procedures involve the risk of overestimating rates of responding; therefore, participants' true rates of problem behaviors may be lower than what is represented from direct observation.

Another limitation of the study is that school staff did not implement mand training or the functional analysis. Since only researchers implemented these components, the current study cannot make conclusions about the acceptability or feasibility of teacher-directed assessment and training. The absence of teachers in mand training sessions may have introduced another limitation. During observations, the

participant was expected to solicit reinforcement from their teacher by engaging in target mands. No learning history was established between the participant and their teacher for this contingency prior to beginning observation sessions; therefore, participants may have engagement in fewer mands than they would have if teachers would have been involved in training sessions. Future studies should consider programming for generalization by incorporating teachers into mand training sessions.

Although brief, daily preference assessments were conducted before tangible functional analysis conditions and before each treatment observation with participants identifying with a tangible function, a comprehensive preference assessment using systematic caregiver reports and paired stimulus (Fisher et al., 1992) or multiple stimulus (DeLeon & Iwata, 1996) procedures was not conducted. Although caregiver report and brief session-by-session preference assessments may serve as a method for identifying child preferences (DeLeon et al., 2001), more thorough methods such as paired-stimulus preference assessments in conjunction with empirically-validated caregiver-report measures such as the Reinforcer Assessment for Individuals with Disabilities (RAISD) can more accurately predict reinforcer effectiveness (Fisher et al., 1992). Future studies should conduct empirically validated preference assessments to identify items that may be used in assessment and treatment sessions with greater utility.

Conclusion

Functional communication is one of the most important skills a child acquires to manage his or her environment and to obtain wants and needs. Children with disabilities often do not develop this functional communication through naturally occurring consequences as is common with typically developing children; therefore, systematic

procedures must be employed to help children obtain this skill and often reduce problem behaviors associated with limitations in verbal behavior. The main goal of FCT is to teach a communication response to replace disruptive behaviors that have come to serve as requests for a child's wants and needs. When treatment integrity fails during these interventions, however, problem behavior that was previously effective at obtaining wants and needs can resurface.

Previous studies have evaluated techniques to combat the resurgence of problem behaviors but the current study is unique in examining the use of multiple mands to increase a child's verbal repertoire to, in turn, decrease the likelihood that disruptions will re-emerge. The current study found that, at least for two participants, the targeted intervention was effective at maintaining reductions in problem behavior, even when a participant's most frequently used mand no longer produced reinforcement. Overall, results suggest that the intervention may be appropriate to reduce problem behaviors in children with disabilities who have a limited functional verbal repertoire. Future studies should include a more controlled examination of this technique to address the limitations in environmental control inherent in applied research. Teachers found this intervention socially valid and teachers and practitioners are encouraged to implement this intervention to reduce problem behavior for children with disabilities in a school setting and to address low treatment integrity in such complex settings.

APPENDIX A – Functional Informant Record for Teachers Version II

Functional Assessment Informant Record for Teachers-II

Teacher Name: _____

School: _____

Date: _____

Student Information

Name: _____

Date of Birth: _____ Age: _____

Gender: _____ Grade: _____

Race: African American Asian Caucasian Hispanic Native American

Other: _____

Classification: General Education Special Education Eligibility Category: _____

Problem Behaviors FAIR-T II

Please circle **1 to 3** problem behaviors only and rank the behaviors in order of severity with 1 being the most severe and 3 being the least severe.

Potential Problem Behaviors (only circle 3; rank in order of severity 1= most; 3 = least)	**Rank Order**
Off-task behavior (e.g., looking away from academic work/ teacher; failing to complete work)	1 2 3
Inappropriate Vocalizations (e.g., talking without permission; making sounds; calling out)	1 2 3
Fidgeting or playing with objects (e.g., tapping pencil; playing with toys)	1 2 3
Out of Seat or Area (e.g., leaving assigned seat or area; student leaves classroom)	1 2 3
Non-complaint behavior (e.g., failing to follow adult instructions)	1 2 3
Disrespectful behavior (e.g., arguing with adults, using profanity)	1 2 3
Aggressive Behavior (e.g., hitting, kicking, biting others; throwing objects at others)	1 2 3
Self-injurious Behavior (e.g., hurting oneself)	1 2 3

Bullying (e.g., picking on peers; making fun of others; coercive comments)	1 2 3
Tantrum (e.g., yelling, screaming, crying, throwing oneself on the floor)	1 2 3
Inappropriate social behvaior (e.g., staring at others; too close in physical proximity)	1 2 3
Failure to speak/talk in class (e.g., will not talk to others despite ability to do so)	1 2 3
Emotional behavior (e.g., student shuts down; student cries excessively outside of tantrums)	1 2 3
Sleeping in class (e.g., student lays head down or sleeps during instruction)	1 2 3
Other behavior: _____	1 2 3

1. Rate how *manageable* the behavior is:

a. Problem Behavior 1	1 Manageable	2	3	4	5 Unmanageable
b. Problem Behavior 2	1 Manageable	2	3	4	5 Unmanageable
c. Problem Behavior 3	1 Manageable	2	3	4	5 Unmanageable

2. Rate how *disruptive* the behavior is:

a. Problem Behavior 1	1 Mildly	2	3	4	5 Very
a. Problem Behavior 2	1 Mildly	2	3	4	5 Very
a. Problem Behavior 3	1 Mildly	2	3	4	5 Very

3. How often does the behavior occur *per day* (please circle)?

a. Problem Behavior 1	< 1 - 3	4 - 6	7 - 9	10 - 12	> 13
a. Problem Behavior 2	< 1 - 3	4 - 6	7 - 9	10 - 12	> 13
a. Problem Behavior 3	< 1 - 3	4 - 6	7 - 9	10 - 12	> 13

4. How many *months* has the behavior been present?

a. Problem Behavior 1	< 1	2	3	4	entire school year
a. Problem Behavior 2	< 1	2	3	4	entire school year
a. Problem Behavior 3	< 1	2	3	4	entire school year

5. How long does the problem behavior last in duration?

a. Problem Behavior 1	< 1 min	1 - 5 min	6 - 10 min	> 10 min
b. Problem Behavior 2	< 1 min	1 - 5 min	6 - 10 min	> 10 min
c. Problem Behavior 3	< 1 min	1 - 5 min	6 - 10 min	> 10 min

6. For each problem behavior, provide an appropriate replacement behavior that you would like the student to perform instead of the current problem behavior.

a. Problem Behavior 1	a. Replacement Behavior:_____
b. Problem Behavior 2	b. Replacement Behavior:_____
c. Problem Behavior 3	c. Replacement Behavior:_____

Antecedents:

0= never happens 1 = happens a little 2 = happens some
3 = happens very often
Please circle the corresponding number for each of the three behaviors listed.

I.	**Academic Task Demand**	Behavior 1	Behavior 2	Behavior 3
1	Does the behavior occur during a certain *type* of task?	0 1 2 3	0 1 2 3	0 1 2 3
2	Does the behavior occur during *easy* tasks?	0 1 2 3	0 1 2 3	0 1 2 3
3	Does the behavior occur during *difficult* tasks?	0 1 2 3	0 1 2 3	0 1 2 3
4	Does the behavior occur during *certain subject areas*?	0 1 2 3	0 1 2 3	0 1 2 3

5	Does the behavior occur during *new* subject material?	0 1 2 3	0 1 2 3	0 1 2 3
II.	**Transitions**			
6	Does the behavior occur when a request is made to *stop* an activity?	0 1 2 3	0 1 2 3	0 1 2 3
7	Does the behavior occur when a request is made to *begin a new activity*?	0 1 2 3	0 1 2 3	0 1 2 3
8	Does the behavior occur during *transition* periods (academic subjects or locations)?	0 1 2 3	0 1 2 3	0 1 2 3
III.	**Academic Settings**			
9	Does the behavior occur in *certain settings*?	0 1 2 3	0 1 2 3	0 1 2 3
10	Does the behavior occur in *large group*?	0 1 2 3	0 1 2 3	0 1 2 3
11	Does the behavior occur in *small group*?	0 1 2 3	0 1 2 3	0 1 2 3
12	Does the behavior occur in *independent work*?	0 1 2 3	0 1 2 3	0 1 2 3
13	Does the behavior occur in *one-to-one interaction*?	0 1 2 3	0 1 2 3	0 1 2 3
IV.	**Non-Classroom Settings**			
14	Does the behavior occur in the *bathroom*?	0 1 2 3	0 1 2 3	0 1 2 3
15	Does the behavior occur at *recess*?	0 1 2 3	0 1 2 3	0 1 2 3
16	Does the behavior occur in the *cafeteria*?	0 1 2 3	0 1 2 3	0 1 2 3
17	Does the behavior occur on the *bus*?	0 1 2 3	0 1 2 3	0 1 2 3
18	Does the behavior occur in *other situations*? Specify other: _____ _____ _____			
V.	**Presentation Style**			
19	Does the behavior occur when items are presented *auditorily*?	0 1 2 3	0 1 2 3	0 1 2 3
20	Does the behavior occur more often during motor activities?	0 1 2 3	0 1 2 3	0 1 2 3
21	Does the behavior occur when items are presented *visually*?	0 1 2 3	0 1 2 3	0 1 2 3
VI. Time of Day				

22	Does the behavior occur in the morning (before lunch)?	0 1 2 3	0 1 2 3	0 1 2 3
23	Does the behavior occur in the afternoon (after lunch)?	0 1 2 3	0 1 2 3	0 1 2 3
VII.	**Physiological**			
24	Does the behavior occur when the student is having complications with a medical condition?	0 1 2 3	0 1 2 3	0 1 2 3
25	Does the behavior occur if the student appears to be hungry?	0 1 2 3	0 1 2 3	0 1 2 3
33	Does the behavior occur if the student appears to be tired?	0 1 2 3	0 1 2 3	0 1 2 3
VII I.	**Other**			
26	Does the behavior occur when a *disruption* occurs in the normal routine?	0 1 2 3	0 1 2 3	0 1 2 3
27	Does the behavior occur when the student's *request has been denied*?	0 1 2 3	0 1 2 3	0 1 2 3
28	Does the behavior occur when a *specific person is in the room*?	0 1 2 3	0 1 2 3	0 1 2 3
29	Does the behavior occur when a *specific person is absent from the room*?	0 1 2 3	0 1 2 3	0 1 2 3
30	Are there any other behaviors that usually *precede* the problem behavior? What?	0 1 2 3	0 1 2 3	0 1 2 3
31	Is there anything you could do that would *ensure* the occurrence of the behavior? What?	0 1 2 3	0 1 2 3	0 1 2 3
32	Are there any events occurring in the child's home that seem to *precede* the occurrence of the behavior at school? What?	0 1 2 3	0 1 2 3	0 1 2 3
34	Does anything else preceed the problem behavior that is likely to "set it off"?	0 1 2 3	0 1 2 3	0 1 2 3

Consequences:

Please circle the corresponding number for each of the three behaviors listed.				
I.	**Positive Reinforcement: Access to Preferred Activities or Items**	Behavior 1	Behavior 2	Behavior 3
1	Does someone provide the student with access to an activity after the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
2	Does someone provide the student with access to a toy or item after the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
3	Does the student take possession of an activity after the behvaior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3

19	Are upcoming social interactions with adults avoided after the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
20	Specific individuals stopped interacting with this student due to the behavior?	0 1 2 3	0 1 2 3	0 1 2 3
V.	**Automatic Reinforcement:**			
21	Does the student display the behavior when alone without interaction from others?	0 1 2 3	0 1 2 3	0 1 2 3
22	Does the student appear to be calm or relaxed as a result of performing the behavior?	0 1 2 3	0 1 2 3	0 1 2 3
23	Does the student appear to be excited or aroused as a result of performing the behavior?	0 1 2 3	0 1 2 3	0 1 2 3
24	Does the student appear to obtain pleasure or enjoyment from performing the behavior itself?	0 1 2 3	0 1 2 3	0 1 2 3
25	Does the student appear to obtain stimulation (visual, auditory, motor) as a result of performing the behavior?	0 1 2 3	0 1 2 3	0 1 2 3
VI.	Other Problems	0 1 2 3	0 1 2 3	0 1 2 3
26	Are there other problem behaviors that often occur after the behavior is exhibited? If yes, describe: _____			
VII	**Intervention**			
27	Does the student typically receive praise or any positive consequence when behavior occurs that you would like to see instead of the problem behavior? If yes, describe: _____			

APPENDIX B – Assessment Rating Profile-Revised (ARP-R)

Please circle the number that best describes your agreement or disagreement with each statement.

Statement	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1. This was an acceptable assessment strategy for the child's problems	1	2	3	4	5	6
2. Most teachers would find this approach to assessment appropriate for problems in addition to this child's current problems	1	2	3	4	5	6
3. This assessment proved effective in identifying the child's problems	1	2	3	4	5	6
4. I would suggest the use of this assessment to other teachers	1	2	3	4	5	6
5. I would be willing to receive assessment results such as those described with a student transferring into my school	1	2	3	4	5	6
6. The assessment would be appropriate for a variety of children	1	2	3	4	5	6
7. The assessment was a fair way to identify the child's problems	1	2	3	4	5	6
8. This assessment was reasonable for the problems described	1	2	3	4	5	6
9. I liked the assessment procedures used in this assessment	1	2	3	4	5	6
10. This assessment was a good way to handle the child's problems	1	2	3	4	5	6
11. Overall, this assessment was beneficial for the child	1	2	3	4	5	6
12. This assessment was helpful in the development of intervention strategies	1	2	3	4	5	6

APPENDIX C – Behavior Intervention Rating Scale (BIRS)

1=Strongly Disagree, 2=Disagree, 3=Slightly Disagree, 4=Slightly Agree,

5=Agree, 6=Strongly Agree

1.	This would be an acceptable intervention for the child's problem behavior.	1 6	2	3	4	5
2.	Most teachers would find this intervention appropriate for behavior problems in addition to the one described.	1 6	2	3	4	5
3.	The intervention should prove effective in changing the child's problem behavior.	1 6	2	3	4	5
4.	I would suggest the use of this intervention to other teachers.	1 6	2	3	4	5
5.	The child's behavior problem is severe enough to warrant use of this intervention.	1 6	2	3	4	5
6.	Most teachers would find this intervention suitable for the behavior problem described.	1 6	2	3	4	5
7.	I would be willing to use this in the classroom setting.	1 6	2	3	4	5
8.	The intervention would *not* result in negative side effects for the child.	1 6	2	3	4	5
9.	The intervention would be appropriate for a variety of children.	1 6	2	3	4	5
10	The intervention is consistent with those I have used in classroom settings.	1 6	2	3	4	5
11.	The intervention was a fair way to handle the child's problem behavior.	1 6	2	3	4	5
12.	The intervention is reasonable for the behavior problem described.	1 6	2	3	4	5
13.	I like the procedures used in the intervention.	1 6	2	3	4	5

14.	The intervention was a good way to handle this child's behavior problem.	1 6	2	3	4	5
15.	Overall, the intervention would be beneficial for the child.	1 6	2	3	4	5
16.	The intervention would quickly improve a child's behavior.	1 6	2	3	4	5
17.	The intervention would produce a lasting improvement in the child's behavior.	1 6	2	3	4	5
18.	The intervention would improve a child's behavior to the point that it would not noticeably deviate from other classmates' behavior.	1 6	2	3	4	5
19.	Soon after using the intervention, the teacher would notice a positive change in the problem behavior.	1 6	2	3	4	5
20	The child's behavior will remain at an improved level even after the intervention is discontinued.	1 6	2	3	4	5
21.	Using the intervention should not only improve the child's behavior in the classroom, but also in other settings (e.g., other classrooms, home).	1 6	2	3	4	5
22.	When comparing this child with a well-behavior peer before and after the use of the intervention, the child's and the peer's behavior would be more alike after using the intervention.	1 6	2	3	4	5
23.	The intervention should produce enough improvement in the child's behavior so the behavior no longer is a problem in the classroom.	1 6	2	3	4	5
24.	Other behaviors related to the problem behavior also are likely to be improved by the intervention.	1 6	2	3	4	5

APPENDIX D – Observation Form: Phase 1

Student name: _____ Date:_____
Observer:_____

Interval	Target Bx	Mand		Interval	Target Bx	Mand
1.1				**11.1**		
1.2				**11.2**		
1.3				**11.3**		
1.4				**11.4**		
1.5				**11.5**		
1.6				**11.6**		
2.1				**12.1**		
2.2				**12.2**		
2.3				**12.3**		
2.4				**12.4**		
2.5				**12.5**		
2.6				**12.6**		
3.1				**13.1**		
3.2				**13.2**		
3.3				**13.3**		
3.4				**13.4**		
3.5				**13.5**		
3.6				**13.6**		
4.1				**14.1**		
4.2				**14.2**		
4.3				**14.3**		
4.4				**14.4**		
4.5				**14.5**		
4.6				**14.6**		
5.1				**15.1**		
5.2				**15.2**		
5.3				**15.3**		
5.4				**15.4**		
5.5				**15.5**		
5.6				**15.6**		
6.1				**16.1**		
6.2				**16.2**		
6.3				**16.3**		
6.4				**16.4**		

6.5				**16.5**		
6.6				**16.6**		
7.1				**17.1**		
7.2				**17.2**		
7.3				**17.3**		
7.4				**17.4**		
7.5				**17.5**		
7.6				**17.6**		
8.1				**18.1**		
8.2				**18.2**		
8.3				**18.3**		
8.4				**18.4**		
8.5				**18.5**		
8.6				**18.6**		
9.1				**19.1**		
9.2				**19.2**		
9.3				**19.3**		
9.4				**19.4**		
9.5				**19.5**		
9.6				**19.6**		
10.1				**20.1**		
10.2				**20.2**		
10.3				**20.3**		
10.4				**20.4**		
10.5				**20.5**		
10.6				**20.6**		

Intervals w/Target behavior: _____/120 = _____%

Intervals w/Mand: _____/120 = _____%

APPENDIX E – Observation Form: Phase 2

Student name: _____Date: _____

Observer:_____

	Target Bx	**Mand 1**	**Mand 2**	**Mand 3**			**Target Bx**	**Mand 1**	**Mand 2**	**Mand 3**
1.1						**11.1**				
1.2						**11.2**				
1.3						**11.3**				
1.4						**11.4**				
1.5						**11.5**				
1.6						**11.6**				
2.1						**12.1**				
2.2						**12.2**				
2.3						**12.3**				
2.4						**12.4**				
2.5						**12.5**				
2.6						**12.6**				
3.1						**13.1**				
3.2						**13.2**				
3.3						**13.3**				
3.4						**13.4**				
3.5						**13.5**				
3.6						**13.6**				
4.1						**14.1**				
4.2						**14.2**				
4.3						**14.3**				
4.4						**14.4**				
4.5						**14.5**				
4.6						**14.6**				
5.1						**15.1**				
5.2						**15.2**				
5.3						**15.3**				
5.4						**15.4**				
5.5						**15.5**				
5.6						**15.6**				

6.1						**16.1**				
6.2						**16.2**				
6.3						**16.3**				
6.4						**16.4**				
6.5						**16.5**				
6.6						**16.6**				
7.1						**17.1**				
7.2						**17.2**				
7.3						**17.3**				
7.4						**17.4**				
7.5						**17.5**				
7.6						**17.6**				
8.1						**18.1**				
8.2						**18.2**				
8.3						**18.3**				
8.4						**18.4**				
8.5						**18.5**				
8.6						**18.6**				
9.1						**19.1**				
9.2						**19.2**				
9.3						**19.3**				
9.4						**19.4**				
9.5						**19.5**				
9.6						**19.6**				
10.1						**20.1**				
10.2						**20.2**				
10.3						**20.3**				
10.4						**20.4**				
10.5						**20.5**				
10.6						**20.6**				

Intervals w/Target behavior: _____/120 = _____%

Intervals w/Mand 1: _____/120 = _____%

Intervals w/Mand 2: _____/120 = _____%

Intervals w/Mand 3: _____/120 = _____%

APPENDIX F – Functional Analysis Tangible Condition Protocol

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Condition: TANGIBLE

Operational Definition and Measurement of Target Behaviors

Target Behavior:	*Individualized for each student* (FIE – fingers in ear, OOS – out of seat, or IV – inappropriate vocalizations)
Definition:	*Individualized for each student* (FIE – covering the openings of one or both ears with his hands or fingers; OOS – student's bottom does not make contact with his designated seat for 3s or more, or entire body is removed from designated area for 3s or more; IV – audible vocalizations that are not relevant to the task demand, including crying and screaming)
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

Session Duration:	10 minutes
Setting:	Classroom
Type of activity:	Determined through consultation with teachers
Materials:	Participant's preferred item/toy. Have all preferred items in view of the participant.

Procedures:

1) Say, "[Participant's name], would you like to play with _____?"

2) Allow the participant to engage with the preferred item for 2 minutes.

3) After the participant is engaged with the preferred item, take the item away and place it in the child's view but out of his or her reach.

4) Instruct the participant to sit in his or her assigned seat [present class activity that in the past has been related to the occurrence of the target behavior].

5) Say "[Participant's Name], it's time to listen and do some work."

6) The experimenter will then begin the activity that in the past has been related to the occurrence of the target behavior.

7) Contingent on occurrence of the target behavior:
    a. Present the child with the preferred item for a period of 30 seconds.

8) Do not respond to any other problem behavior.

APPENDIX G – Functional Analysis Attention Condition Protocol

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Condition: ATTENTION

Operational Definition and Measurement of Target Behaviors

Target Behavior:	*Individualized for each student* (FIE – fingers in ear, OOS – out of seat, or IV – inappropriate vocalizations)
Definition:	*Individualized for each student* (FIE – covering the openings of one or both ears with his hands or fingers; OOS – student's bottom does not make contact with his designated seat for 3s or more, or entire body is removed from designated area for 3s or more; IV – audible vocalizations that are not relevant to the task demand, including crying and screaming)
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

Session Duration:	10 minutes
Setting:	Classroom
Type of activity:	Determined through consultation with teachers
Materials:	Task-related items

Procedures:

1. Instruct the participant to sit in the designated area. [Present class activity that in the past has been related to the occurrence of the target behavior].

1. Say "[Participant's Name], it's time to listen and do some work."

2. Divert your attention from the child to other work (e.g., desk work, assisting other children).

5. Contingent on each occurrence of target behavior:
    - Provide a disapproving comment (or specific type of attention identified in the descriptive analysis)
    - Interact with the student for 30 seconds.
    - Then divert your attention again back to the work at your desk.

6. Do not respond to any other problem behavior.

APPENDIX H – Functional Analysis Escape Condition Protocol

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Condition: ESCAPE

Operational Definition and Measurement of Target Behaviors

Target Behavior:	*Individualized for each student* (FIE – fingers in ear, OOS – out of seat, or IV – inappropriate vocalizations)
Definition:	*Individualized for each student* (FIE – covering the openings of one or both ears with his hands or fingers; OOS – student's bottom does not make contact with his designated seat for 3s or more, or entire body is removed from designated area for 3s or more; IV – audible vocalizations that are not relevant to the task demand, including crying and screaming)
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

Session Duration:	10 minutes
Setting:	Classroom
Type of activity:	Determined through consultation with teachers
Materials:	Any work-related materials

Procedures:

1. Instruct the participant to sit in his or her designated area.

2. Say "[Participant's Name], it's time to listen and do some work."

3. Experimenter will present student with instructions typical of the academic activity. [Present class activity that in the past has been related to the occurrence of the target behavior].

4. Wait 5 seconds for independent initiation of activity
   - If student independently initiates task, the teacher will provide praise and deliver next command as needed.
   - If student does not initiate within 5 seconds, the experimenter will use a verbal and gestural prompt (for example, say "[student, answer the question.]" while pointing to the teacher) and wait 5 seconds for initiation.
     - If student complies with the verbal/gestural prompt within 5 seconds, the experimenter will provide praise and move to the next command as needed.
     - If the student does not comply within 5 seconds, the experimenter will use physical guidance to have student comply (e.g., say, "Student, answer the question," while using gestural prompts to assist in handing you the pencil.)
       - DO NOT PRAISE STUDENT IF PHYSICAL GUIDANCE IS NEEDED.

5. Contingent on each occurrence of target behavior:
   - Remove work-related materials and provide a 30 second break.
   - Repeat the instruction after the 30 second break.
   - DO NOT PROVIDE STUDENT WITH ANY ATTENTION.

6. Contingent on compliance with a verbal or verbal and gestural prompt:
   a. Provide descriptive praise
   b. REMEMBER: Do not provide praise if physical guidance was required.
   c. Point to the next problem and repeat instruction.

7. Do not respond to any other problem behavior.

APPENDIX I – Functional Analysis Control Condition Protocol

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Condition: CONTROL

Operational Definition and Measurement of Target Behaviors

Target Behavior:	*Individualized for each student* (FIE – fingers in ear, OOS – out of seat, or IV – inappropriate vocalizations)
Definition:	*Individualized for each student* (FIE – covering the openings of one or both ears with his hands or fingers; OOS – student's bottom does not make contact with his designated seat for 3s or more, or entire body is removed from designated area for 3s or more; IV – audible vocalizations that are not relevant to the task demand, including crying and screaming)
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

Session Duration:	10 minutes
Setting:	Classroom
Type of activity:	Preferred toy (e.g., magazines, puzzles, books)
Materials:	Student's preferred materials/toys. Have all preferred items present.

Procedures:

1. Say, "[Participant's name], would you like to play with these _____?"

2. Seat participant at the designated area.

3. Interact with the student by providing a neutral comment every 30 seconds or by responding to each appropriate response from the student.

4. Provide descriptive praise for appropriate nonacademic activity engagement.

5. Provide any assistance necessary using a least-to-most prompt for appropriate toy play if requested or needed.

6. Do not respond to any problem behavior.

APPENDIX J – Contingency Reversal Protocol

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Operational Definition and Measurement of Target Behaviors

Target Behavior:	*Individualized for each student* (FIE – fingers in ear, OOS – out of seat, or IV – inappropriate vocalizations)
Definition:	*Individualized for each student* (FIE – covering the openings of one or both ears with his hands or fingers; OOS – student's bottom does not make contact with his designated seat for 3s or more, or entire body is removed from designated area for 3s or more; IV – audible vocalizations that are not relevant to the task demand, including crying and screaming)
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

Session Duration:	10 minutes
Setting:	Classroom
Type of activity:	Identified through consultation with teachers
Materials:	Any Work-related Materials

Procedures: Designed after the identification of the functional analysis condition with the highest occurrence of problem behavior

APPENDIX K – FCT_1Condition (Phase1) Protocol

Student Name: _____ Teacher: _____
Date: _____ Protocol: FCT (Phase 1)

Materials:

- Any materials necessary for the student's FCT procedure (e.g., picture cards)
- Any tangible reinforcers necessary based on results of the student's BFA
- Academic materials used in the setting

Operational definitions:

- Problem behavior – identified through the functional assessment process
- Independent mand – determined through teacher consultation

Data Collection:

- Setting: determined through teacher consultation
- Session duration: 20 minutes
- Independent mand: Momentary Time Sampling
- Problem behavior: determined by topography of the behavior

Procedures:

1. When the session begins, the teacher will conduct his/her typical instruction

2. If the target student engages in an independent mand, the teacher will provide the programmed consequence based on results of the BFA.

3. If the target student engages in the target problem behavior, the teacher will ignore the behavior, withholding attention and other forms of reinforcement

4. The teacher will ignore any other instances of inappropriate behavior.

5. If the student engages in behaviors that may cause harm to self or others, the teacher will interrupt that behavior using minimal contact and social attention. Prior to the start of the intervention, the teacher will be trained response procedures for this circumstance.

APPENDIX L – Extinction Condition (Phase 1) Protocol

Student Name: _____ Teacher: _____

Date: _____ Protocol: Extinction (Phase 1)

Materials:

- Academic materials used in the setting

Operational Definitions:

- Problem behavior – identified through the functional assessment process
- Independent mand – determined through teacher consultation

Data Collection:

- Setting: determined through teacher consultation
- Session duration: 20 minutes
- Independent mand: Momentary Time Sampling
- Problem behavior: determined by topography of the behavior

Procedures:

1. When the session begins, the teacher will conduct his/her typical instruction.

2. The teacher will ignore all instances of independent mands and will not provide reinforcement or attention following instances of mands.

3. If the target student engages in the target problem behavior, the teacher will ignore the behavior, withholding attention and other forms of reinforcement

4. The teacher will ignore any other instances of inappropriate behavior.

5. If the student engages in behaviors that may cause harm to self or others, the teacher will interrupt that behavior using minimal contact and social attention. Prior to the start of the intervention, the teacher will be trained response procedures for this circumstance.

APPENDIX M – FCT_2 Condition (Phase 2) Protocol

Student Name: _____ Teacher: _____

Date: _____ Protocol: FCT (Phase 2)

Materials:

- Any materials necessary for the student's FCT procedure (e.g., picture cards)
- Any tangible reinforcers necessary based on results of the student's BFA
- Academic materials used in the setting

Operational Definitions:

- Problem behavior – identified through the functional assessment process
- Independent mand 1– determined through teacher consultation
- Independent mand 2 – determined based on the first mand and through teacher consultation
- Independent mand 3 – determined based on the first mand and through teacher consultation

Data Collection:

- Setting: determined through teacher consultation
- Session duration: 20 minutes
- Independent mand: Momentary Time Sampling
- Problem behavior: determined by topography of the behavior

Procedures:

1. When the session begins, the teacher will conduct his/her typical instruction

2. If the target student engages in any of the trained mands independently, the teacher will provide the programmed consequence based on results of the BFA.

3. If the target student engages in the problem behavior, the teacher will ignore the behavior, withholding attention and other forms of reinforcement

4. The teacher will ignore any other instances of inappropriate behavior.

5. If the student engages in behaviors that may cause harm to self or others, the teacher will interrupt that behavior using minimal contact and social attention. Prior to the start of the intervention, the teacher will be trained response procedures for this circumstance.

APPENDIX N – Extinction Condition (Phase 2) Protocol

Student Name: _____ Teacher: _____

Date: _____ Protocol: Extinction (Phase 2)

Materials:

- Academic materials used in the setting

Operational Definitions:

- Problem behavior – identified through the functional assessment process
- Independent mand – determined through teacher consultation

Data Collection:

- Setting: determined through teacher consultation
- Session duration: 20 minutes
- Independent mand: Momentary Time Sampling
- Problem behavior: determined by topography of the behavior

Procedures:

6. When the session begins, the teacher will conduct his/her typical instruction.

7. If the student engages in the first mand, the teacher will ignore, withholding the previous programmed consequence and any other forms of reinforcement.

8. If the student engages in the second or third mand, the teacher will provide the programmed consequence.

9. If the target student engages in the target problem behavior, the teacher will ignore the behavior, withholding attention and other forms of reinforcement

10. The teacher will ignore any other instances of inappropriate behavior.

11. If the student engages in behaviors that may cause harm to self or others, the teacher will interrupt that behavior using minimal contact and social attention. Prior to the start of the intervention, the teacher will be trained response procedures for this circumstance.

APPENDIX O – Procedural Integrity Form Tangible Condition

Student: _____ Session: _____
Teacher: _____ Date: _____
Observer: _____ Condition: TANGIBLE

This form is used to assess the level of procedural integrity for each implemented functional analysis tangible condition. Record if the researcher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each FA control condition.

	YES	NO	N/A
1. Participant is seated in their assigned seat.	____	____	____
2. Experimenter has restricted student access to preferred items available in the classroom	____	____	____
3. Experimenter presents the student with identified activity	____	____	____
4. Contingent on problem behavior, experimenter presents student with preferred item for 30 seconds	____	____	____
5. Experimenter does not respond to other problem behavior	____	____	____
6. Experimenter does not present academic demands to the student	____	____	____
• Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX P – Procedural Integrity Form Attention Condition

Student: _____ Session: _____
Teacher: _____ Date: _____
Observer: _____ Condition: ATTENTION

This form is used to assess the level of procedural integrity for implemented functional analysis attention condition. Record if the researcher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each FA attention condition.

	YES	NO	N/A
1. Participant is seated in the designated area of target activity	____	____	____
2. Experimenter presents task-related items to child	____	____	____
4. Experimenter interacts with the student until the student engages in the task	____	____	____
5. Experimenter says, "It's time to start the activity, it's time to listen and do some work"	____	____	____
6. Experimenter diverts attention to his/her work materials	____	____	____
7. Contingent on student exhibiting target behavior			
a. Experimenter provides a disapproving comment	____	____	____
b. Interacts with the student for 30 seconds	____	____	____
c. Following 30 seconds of interaction, diverts his/her attention back to the work materials	____	____	____
8. Does not respond to any other problem behavior	_____	____	____
• Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX Q – Procedural Integrity Form Escape Condition

Student: _____ Session: _____
Teacher: _____ Date: _____
Observer: _____ Condition: ESCAPE

This form is used to assess the level of procedural integrity for each implemented functional analysis escape condition. Record if the researcher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each FA demand condition.

	YES	NO	N/A
1. Participant is within designated area of target activity	____	____	____
2. Experimenter presents student with identified task demand	____	____	____
3. Experimenter provides verbal instructions to student to complete the identified task	____	____	____
4. Experimenter waits 5 seconds for compliance	____	____	____
a. The student complies			
i. Provides descriptive praise	____	____	____
ii. Moves to the next demand	____	____	____
b. The student does not comply within 5 seconds			
i. Restates the instructions with verbal and gestural prompts	____	____	____
ii. Waits 5 seconds for compliance	____	____	____
A. Student complies			
1. Provides descriptive praise	____	_____	____
2. Moves to the next demand	____	____	____
B. Student does not comply			
1. Restates the instructions and provides hand-over-hand guidance	____	____	____
5. Experimenter does not respond to any other problem behavior	____	____	____
6. When student exhibits problem behavior			
a. Removes task demand for 30 seconds	____	____	____
b. After 30 seconds, re-presents the task demand	____	____	____
• Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX R – Procedural Integrity Form Control Condition

Student: _____ Session: _____

Teacher: _____ Date: _____

Observer: _____ Condition: CONTROL

This form is used to assess the level of procedural integrity for each implemented functional analysis control condition. Record if the researcher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each FA control condition.

	YES	NO	N/A
1. Participant is within designated area of target activity	____	____	____
2. Experimenter provided student with access to preferred materials available in the classroom	____	____	____
3. Experimenter provides neutral attention every 30 seconds	____	____	____
4. Experimenter does not respond to problem behavior	____	____	____
5. Experimenter does not present academic demands to the student	____	____	____
Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX S – Procedural Integrity Form Contingency Reversal

Student: _____ Session: _____
Teacher: _____ Date: _____
Observer: _____ Condition: CONTINGENCY REVERSAL (B)

This form is used to assess the level of procedural integrity for each implemented functional analysis escape condition. Record if the researcher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each FA demand condition.

	YES	NO	N/A
1. Participant is within designated area of target activity	____	____	____
2. Experimenter presents student with identified task demand	____	____	____
3. Experimenter provides verbal instructions to student to complete the identified task	____	____	____
4. Experimenter waits 5 seconds for compliance	____	____	____
a. The student complies			
i. Provides descriptive praise	____	____	____
ii. Moves to the next demand	____	____	____
b. The student does not comply within 5 seconds			
i. Restates the instructions with verbal and gestural prompts	____	____	____
ii. Waits 5 seconds for compliance	____	____	____
A. Student complies			
1. Provides descriptive praise	____	_____	____
2. Moves to the next demand	____	____	____
B. Student does not comply			
1. Restates the instructions and provides hand-over-hand guidance	____	____	____
5. Experimenter does not respond to any other problem behavior	____	____	____
6. Each 30-s interval following the absence of problem behavior, the experimenter removes the task demand for 30 seconds	____	____	____
7. When student exhibits problem behavior			
a. Restarts the 30-s interval	___	____	____
b. After 30 seconds, removes the task demand	___	___	____
Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX T – Mand Training Protocol

Length of session: 5 minutes

Instructor: Primary researcher

Materials:

- Academic materials necessary for a low preference task (determined through consultation with the teacher)
- If relevant, any tangible item used as the identified reinforcer
- If relevant, picture cards displaying the identified reinforcer

Procedures:

1. Present the task demand by saying: "[Name], time to work on _____."
    a. If the student does not comply after 5 seconds, verbally prompt the student again to begin working.
2. Wait 10 seconds, then physically (i.e., hand over hand guidance) or vocally (e.g., "say 'break'") prompt the student to mand.
3. If the student engages in problem behavior, delay reinforcement and the prompt for reinforcement for at least 5 seconds following the problem behavior.
4. After an 80% reduction in problem behaviors across two consecutive sessions, increase the prompt delay by 10 seconds.
5. Mand training is terminated when the student engages in independent mands (i.e., unprompted) for 80% of opportunities across two consecutive sessions.

Procedures for training multiple mands:

1. The same prompt delay procedures will be used to teach the two additional mands.
2. Alternate between prompts for the initial and new mands.
3. Mand training is terminated when the student independently engages in all three mands for 80% of opportunities across two consecutive sessions.

APPENDIX U – Treatment Integrity Form FCT_1 Condition (Phase 1)

Student: _____ Teacher: _____
Date: _____ Observer: _____
Protocol: FCT (Phase 1)

This form is used to assess the level of procedural integrity for each implemented FCT session. Record if the teacher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each group instruction session.

	YES	NO	N/A
1. Following the occurrence of an independent mand, The teacher delivered the programmed consequence	____	____	____
2. The teacher ignored all instances of problem behavior	____	____	____
3. Following self-injurious or harmful behaviors, the teacher interrupts the behavior using minimal contact and social attention.	____	____	____

APPENDIX V – Treatment Integrity Form Extinction Condition (Phase 1)

Student: _____ Teacher: _____
Date: _____ Observer: _____
Protocol: Extinction (Phase 1)

This form is used to assess the level of procedural integrity for each implemented FCT session. Record if the teacher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each group instruction session.

1. The teacher ignores all instances of mands
    a. Number of instances of mands: _____
    b. Number of instances in which teacher ignores mands: _____
    c. **Percent**: _____

2. The teacher ignored all instances of problem behavior
    a. Number of instances of problem behavior: _____
    b. Number of instances in which teacher ignores problem behavior: _____
    c. **Percent**: _____

3. Following self-injurious or harmful behaviors, the teacher interrupts the behavior using minimal contact and social attention. YES NO N/A

APPENDIX W – Treatment Integrity Form FCT_2 Condition (Phase 2)

Student: _____ Teacher: _____
Date: _____ Observer: _____
Protocol: FCT (Phase 2)

This form is used to assess the level of procedural integrity for each implemented FCT session. Record if the teacher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each group instruction session.

	YES	NO	N/A
4. Following the occurrence of any of the three trained independent mands, the teacher delivered the programmed consequence	____	____	____
5. The teacher ignored all instances of problem behavior	____	____	____
6. Following self-injurious or harmful behaviors, the teacher interrupts the behavior using minimal contact and social attention.	____	____	____

APPENDIX X – Treatment Integrity Form Extinction Condition (Phase 2)

Student: _____ Teacher: _____
Date: _____ Observer: _____
Protocol: Extinction (Phase 2)

This form is used to assess the level of procedural integrity for each implemented FCT session. Record if the teacher behaviors were implemented as planned (Yes) or not implemented as planned (No) during each group instruction session.

	YES	NO	N/A
7. The teacher ignored all instances of the initial mand.	____	____	____
8. The teacher ignored all instances of problem behavior.	____	____	____
9. Following the occurrence of the second or third mand, the teacher delivered the programmed consequence.	____	____	____
10. Following self-injurious or harmful behaviors, the teacher interrupts the behavior using minimal contact and social attention.	____	____	____

APPENDIX Y – Parental Permission Document

BACKGROUND

Your child_____ is being asked to participate in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully. Ask if there is anything that is not clear or if you would like more information. Take time to decide whether you will allow your child to take part in the study.

The purpose of this research study is to evaluate the effects of Functional Communication Training (FCT) on the problem behaviors of children with autism spectrum disorders, speech/language, or other developmental disabilities. Often, children who do not develop typical speech exhibit disruptive behaviors to communicate their wants and needs. Participants will be taught appropriate communication techniques to be used with teachers as alternatives to problem behaviors. FCT has been shown to be effective in clinical and school settings evidenced by decreases in problem behaviors. The current research project aims to evaluate whether greater decreases in problem behaviors are observed after teaching multiple communication techniques (i.e., vocalizations, manual signs, and picture card exchanges) compared to teaching just one technique.

The research will be conducted by Emily Ness, a doctoral student in school psychology and Dr. Keith Radley, assistant professor of school psychology at the University of Southern Mississippi.

STUDY PROCEDURE

Assessment

If you allow your child to participate in this study, your child's problem behaviors in the school setting will be assessed. First, his or her teacher will complete a rating scale to determine the type and frequency of the problem behavior, setting(s) in which it typically occurs, and consequences that typically follow the behavior. Next, a functional analysis will be conducted in the school setting. With instruction from the researcher, teachers will systematically provide consequences (e.g., attention, break from work, preferred activity) to the child when he or she exhibits the target behavior. This will temporarily increase the behavior to determine the reason your child engages in it. This analysis is necessary in determining what communication response to teach your child in order to decrease the problem behavior.

Intervention

Your child will be taught three communication techniques using verbal and physical prompts. During intervention, teachers will provide access to your child's determined consequence (e.g., attention, break) after he or she engages in the appropriate communication technique. All instances of problem behaviors will be ignored. During some phases of the intervention, teachers will ignore both problem behaviors and communication responses. This is necessary to experimentally evaluate the effects of the intervention. The duration of these phases, however, will be minimized to provide the student with the intervention as much as possible.

RISKS
The risks of this study are minimal. There is a risk that your child may find it difficult to learn the communication techniques. There is also risk that your child may experience some distress when target behaviors are first ignored by teachers and during phases in which problem behaviors and communication responses are ignored. If you or your child feels upset in any way as a result of their participation, you may tell Dr. Radley, who can help to alleviate any distress. If your child does not enjoy participating, they may request to stop at any time. In order to minimize risk, students' safety and well-being will be monitored continuously. In addition to the risks listed above, your child may experience previously unknown or unforeseen risk.

BENEFITS
Potential benefits from participating in this study include decreases in problem behaviors in school and, subsequently, an improvement in school functioning and increases in instruction time. Your child may also learn more appropriate ways to communicate with adults and peers.

ALTERNATIVE PROCEDURES
If you do not want your child to participate in this study, your child will continue with his or her regularly scheduled school activities. Your decision to participate will not affect other services already being provided for your child or potential future services your child may need.

CONFIDENTIALITY
Any personal information that is collected about your child will be kept strictly confidential. Names and any other identifying information will be withheld on reports or manuscripts. The hard copies of the study materials will be stored in a locked filing cabinet. Electronic data will be stored on files on a computer, both of which will be password protected. Only members of the research team will have access to this information. The results of this study may be presented at professional conferences and/or published in a professional journal. If this occurs, your child's personal information will be protected.

PERSON TO CONTACT
If you have questions, complaints, or concerns about the research or related matters, or if you feel your child has been harmed as a result of participation in the study, please contact Dr. Radley or Emily Ness either by phone or by e-mail.

Keith Radley
(601) 266-6748
keith.radley@usm.edu

Emily Ness
(320) 491-5928
Emily.ness@eagles.usm.edu

INSTITUTIONAL REVIEW BOARD
This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the

chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

VOLUNTARY PARTICIPATION

It is up to you to decide whether to allow your child to take part in this study. Participation is strictly voluntary. Refusal to allow your child to participate or the decision to withdraw your child from this research will involve no penalty, prejudice or loss of benefits to which your child is otherwise entitled. This will not affect the services your child is provided their school. You may choose to withdraw your child at any time without providing a reason.

COSTS AND COMPENSATION TO PARTICIPANTS

There are no costs to participate in this study.

Your child may be given small rewards for participation in the study. The rewards will be different and may vary in cost. Examples of rewards include a snack or a small toy. Any reward that you or your child is not comfortable with will not be used.

CONSENT

By signing this consent form, I confirm I have read the information in this parental permission form and have had the opportunity to ask questions. I will be given a signed copy of this parental permission form. I voluntarily agree to allow my child to take part in this study.

_____
Child's Name

_____
Parent/Guardian's Name

_____ _____
Parent/Guardian's Signature Date

_____
Relationship to Child

_____
Name of Researcher or Staff

_____ _____
Signature of Researcher or Staff Date

APPENDIX Z – Teacher Consent Form

PURPOSE

You and your student_____ are being asked to participate in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully. Ask if there is anything that is not clear or if you would like more information.

The purpose of this research study is to evaluate the effects of Functional Communication Training (FCT) on the problem behaviors of children with autism spectrum disorders, speech/language, or other developmental disabilities. Often, children who do not develop typical speech exhibit disruptive behaviors to communicate their wants and needs. Participants will be taught appropriate communication techniques to be used with teachers as alternatives to problem behaviors. FCT has been shown to be effective in clinical and school settings evidenced by decreases in problem behaviors. The current research project aims to evaluate whether greater decreases in problem behaviors are observed after teaching multiple communication techniques (i.e., vocalizations, manual signs, and picture card exchanges) compared to teaching just one technique.

The research will be conducted by Emily Ness, a doctoral student in school psychology and Dr. Keith Radley, assistant professor of school psychology at the University of Southern Mississippi.

STUDY PROCEDURE

If you and your student participate in this study, the student's problem behaviors in the school setting will be assessed. First, you (the teacher) will complete a rating scale to determine the type and frequency of the problem behavior, setting(s) in which it typically occurs, and consequences that typically follow the behavior. Next, a functional analysis will be conducted in the school setting. With instruction from the researcher, teachers will systematically provide consequences (e.g., attention, break from work, preferred activity) to the child when he or she exhibits the target behavior. This will temporarily increase the behavior to determine the reason your child engages in it. This analysis is necessary in determining what communication response to teach your child in order to decrease the problem behavior.

The student will be taught three communication techniques using verbal and physical prompts. During intervention, teachers will provide access to the student's determined consequence (e.g., attention, break) after he or she engages in the appropriate communication technique. All instances of problem behaviors will be ignored. During some phases of the intervention, teachers will ignore both problem behaviors and communication responses. This is necessary to experimentally evaluate the effects of the intervention. The duration of these phases, however, will be minimized to provide the student with the intervention as much as possible.

RISKS
The risks of this study are minimal. There is a risk that your student may find it difficult to learn the communication techniques. There is also risk that the student may experience some distress when target behaviors are first ignored by teachers and during phases in which problem behaviors and communication responses are ignored. If you or the student feels upset in any way as a result of participation, you may tell Dr. Radley, who can help to alleviate any distress. If your child does not enjoy participating, they may request to stop at any time. In order to minimize risk, students' and teachers' safety and well-being will be monitored continuously. In addition to the risks listed above, you or your student may experience previously unknown or unforeseen risk.

BENEFITS
Potential benefits from participating in this study include decreases in problem behaviors in school and, subsequently, an improvement in school functioning and increases in instruction time. Your student may also learn more appropriate ways to communicate with adults and peers.

VOLUNTARY PARTICIPATION
If you do not want to participate in this study, you and your student will continue with regularly scheduled school activities. Your decision to participate will not affect other services already being provided or potential future services you or your student may need.

CONFIDENTIALITY
Any personal information that is collected about you and the student will be kept strictly confidential. Names and any other identifying information will be withheld on reports or manuscripts. The hard copies of the study materials will be stored in a locked filing cabinet. Electronic data will be stored on files on a computer, both of which will be password protected. Only members of the research team will have access to this information. The results of this study may be presented at professional conferences and/or published in a professional journal. If this occurs, your child's personal information will be protected. Confidentiality may be limited only under circumstances that warrant breaking confidentiality, including (a) if you or the student is in danger of causing self-injury, (b) suspected past or present child abuse, (c) dangers to others, (d) court order, or (e) medical emergencies.

INSTITUTIONAL REVIEW BOARD
This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the Manager of the IRB at 601-266-5997. Participation in this project is completely voluntary and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Any questions about the research should be directed to the Principal Investigator(s) using the contact information provided below.

Emily Ness
(320) 491-5928
Emily.ness@eagles.usm.edu

Keith Radley
(601) 266-6748
keith.radley@usm.edu

CONSENT

By signing this consent form, I confirm I have read the information in this teacher permission form and have had the opportunity to ask questions. I will be given a signed copy of this teacher permission form. I voluntarily agree to take part in this study.

_____
Teacher's Name

_____
Student's Name

_____
Name of Researcher or Staff

_____ _____
Signature of Researcher or Staff Date

APPENDIX AA – Assent to Participate in a Research Study

Purpose of the Research

We are asking you to take part in a research study because we are trying to learn more about how to help students communicate and behave better in school.

Procedure/Intervention/Method

If you agree to be in this study, you will learn different ways to communicate with your teachers and to ask for things you want. The researcher will teach you how to ask with words, ask with your hands, and how to use pictures or cards to communicate with teachers.

Risks

By participating in this group, there may be some risks. You might find it hard to learn the different ways to ask for things you want. And you might not like it if, sometimes, teachers do not give you what you want. If you have any questions, you can ask the researcher or your teachers any time. You also can choose not to participate at any time.

Benefits

Being in this study will help us to understand how to teach students how to communicate. You will learn how to communicate better with your teachers and get things you want more easily. You might also learn to get along better with teachers and other students and how to work better in school.

Alternative Procedures and Voluntary Participation

If you don't want to be in this study, you don't have to be in it. Remember, being in this study is up to you and no one will be upset if you don't want to participate. You can change your mind later if you want to stop. We will also ask your parents to give their permission for you to take part in this study. But even if your parents say "yes" you can still decide not to do this.

Confidentiality

All of your records about this research study will be kept locked up so no one else can see them. We will not use your name when we talk about this study and only your teachers will know that you are a part of this study.

Person to Contact

You can ask any questions that you have about the study. If you have a question later that you didn't think of now, you can call me, Dr. Radley, at (601) 266-6748.

Consent

Signing my name at the bottom means that I agree to be in this study. My parents and I will be given a copy of this form after I have signed it.

Printed Name

Sign your name on this line | Date

Printed Name of Person Obtaining Assent

Signature of Person Obtaining Assent | Date

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 15013001
PROJECT TITLE: The Effects of Training Multiple Mands with Functional Communication Training on the Resurgence of Problem Behaviors
PROJECT TYPE: New Project
RESEARCHER(S): Emily Ness
COLLEGE/DIVISION: College of Education and Psychology
DEPARTMENT: Psychology
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 02/06/2015 to 02/05/2016
Lawrence A. Hosman, Ph.D.
Institutional Review Board

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