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The Effects of Function-Based Antecedent and Consequent Interventions for Increasing Appropriate Behavior and Decreasing Disruptive Behavior of Preschool Students in the School Setting

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THE EFFECTS OF FUNCTION-BASED ANTECEDENT AND CONSEQUENT INTERVENTIONS FOR INCREASING APPROPRIATE BEHAVIOR AND DECREASING DISRUPTIVE BEHAVIOR OF PRESCHOOL STUDENTS IN THE SCHOOL SETTING

by

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Abstract of a Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
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ABSTRACT

THE EFFECTS OF FUNCTION-BASED ANTECEDENT AND CONSEQUENT INTERVENTIONS IN THE PRESCHOOL SETTING

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The Functional Behavior Assessment (FBA) literature suggests that function-based interventions are effective at improving problem behavior for individuals in a variety of settings. However, the FBA literature is limited in the number of studies that examine the relative effectiveness of function-based antecedent and consequent interventions for reducing problem behavior and increasing appropriate replacement behaviors. Additionally, while there has been a recent increase in the number of studies conducted in the school setting, only a limited number of studies include children in the preschool setting. The purpose of the present study was to extend the literature by examining the relative effectiveness of function-based antecedent and consequent interventions for reducing problem behavior and increasing appropriate replacement behavior for preschool children of typical development. The following study included four preschool-age children. Following a functional behavior assessment, the relative effectiveness of a function-based antecedent and consequent intervention was examined using an alternating treatments design (ATD). Results indicate that both the function-based antecedent intervention and consequent intervention were effective at decreasing problem behavior and increasing appropriately engaged behavior, with the function-based antecedent intervention being more effective than the function-based consequent intervention for two of the four participants.

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CHAPTER I

INTRODUCTION AND REVIEW OF THE LITERATURE

A student's first few years of schooling mark a critical developmental period during which children learn the academic, behavioral, and social skills needed to succeed in their formal years of school. Preschool-age students who frequently display problem behaviors have helped to illustrate this notion; statistically, they face a higher probability of exhibiting behavior problems in formal years of schooling (Dunlap et al., 2006). If left unaddressed, behavioral problems in the early years could lead to emotional and behavioral disorders, school dropout, and continued behavior problems into adolescence and adulthood (Egger & Agnold, 2006). Thus, effective early intervention methods are essential for success in future years of schooling (Webster-Stratton & Herman, 2009) for preschool children who display substantial emotional and behavioral difficulties. In addition to negatively impacting the student exhibiting the problem behavior, these behaviors also affect teachers, parents, and peers (Gresham, Lane, & Beebe-Frankenberger, 2005). Students exhibiting problem behavior in the classroom negatively impact the learning environment, requiring school personnel to take time away from class-wide academic instruction to address the problem behavior (De Martini-Scully, Bray, & Kehle, 2000). Historically, attempts by school personnel to manage problem behavior have relied heavily on punitive punishment procedures, often including frequent and repeated placement in alternative settings (e.g., in-school suspension). However, there has been a shift in recent years to a more preventative approach, utilizing positive behavior support systems to improve student behavior both at a school-wide and individual level (Algozzine & Algozzine, 2007).

When a student exhibits frequent problem behavior in the school setting, a functional behavior assessment (FBA) may be used to determine the most effective intervention methods for improving the behavior. An FBA includes a variety of assessment methods primarily used to determine the antecedents and consequences surrounding the student's problem behavior. Once the function of the problem behavior has been identified, the results of the FBA are incorporated into the development of function-based interventions that may prove effective (Gresham, Watson, & Skinner, 2001). During the FBA assessment procedure, both indirect and direct methods may be employed to aid in the development of a hypothesis regarding the function of the student's problem behavior. Indirect methods may include teacher and student interviews, a review of the student's academic records (e.g., absentee data, office discipline referrals), and related rating scales. Direct methods include direct observations of the student's behavior during times with the highest reported occurrence of problem behavior. Additionally, a functional analysis may be conducted to examine and confirm the hypothesis regarding the function of the student's problem behavior. Once the FBA is complete, the assessment data are used to guide the development of function-based interventions to improve student behavior. These function-based interventions involve manipulating the environmental variables maintaining the problem behavior in a manner that decreases the probability of future occurrences of the behavior (Ingram, Lewis-Palmer, & Sugai, 2005).

Function-based interventions may include antecedent-based intervention methods, consequent-based intervention methods, or a combination of both. The common goal of all function-based intervention methods is to manipulate the environmental variables

surrounding the problem behavior in a way that reduces future occurrences of problem behavior. Antecedent-based interventions focus on manipulating environmental events occurring prior to the problem behavior in an effort to reduce the likelihood of the behavior occurring in the future. Consequent-based interventions focus on manipulating the environmental events following the problem behavior with the goal of reducing future occurrences of the behavior. Traditionally, the function-based intervention literature has included predominately consequent-based interventions, emphasizing the importance of manipulating environmental variables following the problem behavior (Conroy, Dunlap, Clarke, & Alter, 2005; Smith & Iwata, 1997). However, in recent years there has been an increase in the number of studies examining the effectiveness of antecedent-based interventions (Conroy et al., 2005; Kern & Clemens, 2007). Recent literature reviews have indicated the effectiveness of both antecedent- and consequent-based interventions for improving student behavior (Conroy et al., 2005; Kern & Clemens, 2007; Petschner, Rey, & Bailey, 2009; Smith & Iwata, 1997; Whitaker, 1996).

Despite the increase in studies evaluating function-based antecedent interventions, the majority of function-based intervention studies include either consequent-based interventions or a combination of consequent- and antecedent-based intervention methods, with a limited number of studies exclusively examining the effectiveness of antecedent interventions (Conroy et al., 2005; Smith & Iwata, 1997). As a result, additional research evaluating the effectiveness of function-based antecedent interventions is warranted (Conroy et al., 2005). Moreover, the function-based literature could be strengthened by including studies that evaluate the relative effectiveness of function-based consequent and antecedent interventions.

In addition to limited studies evaluating the effectiveness of function-based antecedent interventions, some other limitations to the function-based intervention literature exist. First, the majority of function-based intervention studies include individuals with disabilities (Solnick & Ardoin, 2010). Second, there is a paucity of research evaluating the acceptability of functional assessment and function-based interventions (Conroy et al., 2005). Finally, while many studies demonstrate the effectiveness of functional assessment and function-based interventions in residential, hospital, and traditional school settings, relatively fewer studies have been conducted in preschool settings such as Head Start (Dufrene, Doggett, Henington, & Watson, 2007). Consequently, these limitations lessen the external validity of function-based interventions, calling into question their use in a wide variety of applied settings. The following review of the literature describes the history, evolution, and treatment utility of functional assessment, especially as it pertains to traditional school and preschool settings.

Review of the Literature

Functional Behavior Assessment (FBA)

The central purpose of conducting an FBA is to determine the function of the problem behavior. Specifically, an FBA identifies antecedent variables preceding the problem behavior and the consequences that follow to determine the environmental variables that trigger and maintain problem behavior. When an FBA is conducted in the school setting, it may include a three-step procedure (i.e., gathering indirect information, conducting direct observations, completing a functional analysis) to determine the function of the problem behavior. Information gathered during the FBA procedures is

then incorporated in the development of an effective function-based intervention for improving student behavior. Indirect methods, the first step in the FBA process, include gathering information related to the problem behavior from secondary sources (e.g., discipline records, teacher interviews). Indirect assessment data are used to develop operational definitions for the problem behavior and appropriate replacement behaviors, as well as to gather initial information regarding the environmental variables surrounding the behavior (i.e., antecedents, consequences). Since the indirect procedures included in an FBA do not include direct observations and analyses of the problem behavior, they should not be considered the sole method in determining the environmental variables triggering and maintaining the problem behavior (Cooper, Heron, & Heward, 2007). Rather, indirect methods should be used as an important preliminary step in determining the function of the problem behavior (Sterling-Turner, Robinson, & Wilczynski, 2001).

Some of the indirect methods that may be included in the development of initial hypotheses are a review of the student's pertinent medical and academic history, interviews with related school personnel, and social and emotional rating scales relevant to the referral concern (Sterling-Turner et al., 2001). There are various types of interviews that may be included in an FBA; however, several key components that should be incorporated in all functional assessment interviews have already been identified (see Gresham et al., 2001; Sterling-Turner et al., 2001). The first essential component is that interviews be structured so that information can be gathered about the environmental and behavioral components in need of further assessment. This includes information pertinent to developing operational definitions for the identified problem behavior and appropriate replacement behavior. It is also important to identify the school activities

that result in a higher occurrence of the problem behavior, allowing the practitioner to determine the best time to complete the second step of the FBA process.

Once the practitioner has gathered information about the target problem behavior and the surrounding environmental variables, operational definitions can be developed for each problem behavior. Additionally, direct observations can be conducted at the time reported as most problematic during the teacher interview. By conducting direct observations, the practitioner is able to directly examine the occurrence of problem behavior in the natural setting (e.g., classroom) in order to gather further information regarding the topography of the behavior.

In addition to directly observing the problem behavior, direct observations also include the examination of the antecedents and consequences occurring in close temporal proximity to the problem behavior. This information is used to gather further information regarding the environmental variables surrounding the problem behavior. The Antecedent-Behavior-Consequent (ABC) direct observation method is regularly included in FBA procedures and involves recording the occurrence of problem behavior, in addition to the antecedents and consequences occurring in close temporal proximity, in a narrative format (Gresham et al., 2001; Sterling-Turner et al., 2001). Another direct observation method includes a quantitative account of the antecedent events, problem behavior, and consequent events. The results of the quantitative direct observation can then be examined using conditional probability assessment methods, which allow for the quantification of the observation results to determine which specific antecedents precede a problem behavior and which specific consequences follow the behavior (Cooper et al., 2007).

The results of the indirect and direct assessment may be compared to determine any similarities and differences in the data regarding the experimental variables maintaining the problem behavior (Cooper et al., 2007). Once the results of the descriptive assessment are examined, the information can be used to develop hypotheses regarding the function of the problem behavior. The third step of the assessment process, a functional analysis, can be used to verify the hypotheses developed during the descriptive assessment.

A functional analysis involves experimentally manipulating the environmental events related to the problem behavior in a way that mimics the events occurring in their natural setting. The analysis is completed to determine which environmental variable leads to the highest occurrence of problem behavior (Cooper et al., 2007). Traditionally, the conditions included in an experimental analysis are control, access to attention, escape from demands, and access to tangibles. These conditions allow for testing different contingencies to determine which consequence or combination of consequences reinforces the problem behavior. Specifically, (a) the access to attention condition tests positive reinforcement in the form of access to attention, (b) the escape from demands condition tests for negative reinforcement in the form of termination of task demands, (c) the access to tangibles condition tests for positive reinforcement in the form of access to tangibles and/or activities, and (d) the control condition includes no demands (i.e., no establishing operation for escape) and noncontingent attention (i.e., no establishing operation for attention), providing a control condition to which other conditions can

be compared. During the analysis, the occurrence of the problem behavior is recorded throughout each condition (Cooper et al., 2007) and data are visually examined to determine the condition resulting in the highest occurrence of problem behavior (Cooper et al., 2007).

There are various approaches to functional analysis that can be used to examine the function of a problem behavior, with each design having both strengths and weaknesses depending on the context in which the analysis is being conducted. Traditional functional analysis methods first employed by Iwata, Dorsey, Slifer, Bauman, and Richman (1982) were used to determine the function of SIB. This specific type of approach to functional analysis included four conditions (i.e., attention, escape, alone, control) repeated over several sessions until visual analysis of the data revealed clear divergence between conditions. Although this type of analysis has gained extensive empirical support, it is limited in that it can require a considerable amount of time to complete the assessment (i.e., average functional analysis takes six and a half hours; Lydon, Healy, O'Reilly, & Lang, 2012). Another limitation involves the relatively small number of studies demonstrating its effectiveness for identifying the function of more typical problem behaviors (noncompliance, off-task, out-of-seat) in a school setting. To address these limitations, Northup et al. (1991) offered a brief functional analysis (BFA) procedure for determining the function of an individual's problem behavior. This approach to functional analysis included one or two repeated sessions for each condition and typically included a contingency reversal phase to further verify the results of the BFA. The contingency reversal phase includes a reversal of the contingencies identified as maintaining the problem behavior during the BFA. The Northup et al. (1991)

alternative approach to the often time-consuming Iwata et al. (1982) procedures demonstrated that BFA could be completed in approximately 45 min and was effective at identifying the function of the participants' problem behaviors. Additionally, further studies have extended the generalizability of BFA procedures by demonstrating their usefulness in identifying the function of problem behavior for students with and without disabilities in a classroom setting (Broussard & Northup, 1995; Doggett, Edwards, Moore, Tingstrom, & Wilczynski, 2001).

While the functional analysis literature has evolved considerably since Iwata et al.'s seminal 1982 study, the overall functional analysis literature includes a large number of studies conducted in restrictive and analogue settings with individuals with disabilities, and often focused on determining the function of severe behavior problems such as SIB and aggressive behavior. However, more recently, a number of studies have expanded the literature by including individuals of typical development in more naturalistic settings. Below is a review of the functional analysis research literature and a description of the evolution of functional analysis methodology.

Carr (1977) provided an important impetus for the development of functional analysis by emphasizing the importance of assessing the function of an individual's problem behavior prior to the development of intervention methods, reasoning that the function of a problem behavior is idiosyncratic in nature. Carr's literature review indicated that SIB, a behavior frequently examined in the earlier functional analysis literature, could be maintained by one of three environmental variables: positive reinforcement (e.g., social attention), automatic reinforcement (e.g., self-stimulation), or negative reinforcement (e.g., escape from demands). To verify Carr's (1977) hypothesis

regarding the idiosyncratic nature of behavior, further experimental analyses of the function of problem behavior were needed. Iwata et al. (1982) evaluated Carr's hypothesis by conducting an experimental analysis of the effects of specific environmental events on the occurrence of SIB in participants with disabilities. The experimental conditions included demand, alone, social disapproval, and a control condition. The demand condition tested negative reinforcement in the form of escape from task demands, the alone condition tested automatic reinforcement in the form of sensory stimulation, the social disapproval condition tested positive reinforcement in the form of access to attention, and the control condition included non-contingent access to preferred items and attention and served as a comparison condition. Iwata et al. found that the function of SIB varied among individuals, thus supporting Carr's hypothesis that the function of SIB may be idiosyncratic.

The experimental functional analysis methods used in Iwata et al. (1982) included multiple experimental conditions with multiple sessions per condition, resulting in an extensive length of time devoted to the completion of the analysis. In applied settings (e.g., preschool classroom), this type of extensive analysis may not be feasible. Northup et al. (1991) addressed this limitation by determining the effectiveness of a BFA in an outpatient clinical setting. The BFA format included a five min session for each condition and the entire analysis was completed in 45 min. It is important to note that Northup et al. (1991) included a contingency reversal phase to verify the results of the BFA. The contingency reversal included DRA procedures to determine if the occurrence of an appropriate replacement behavior would increase when reinforced with the maintaining environmental variable while the problem behavior was placed on extinction

(i.e., reinforcement withheld). The contingency reversal phase was deemed an important verification of the brief format because each condition was implemented during a single 5-min session. Northup et al. (1991) found that the environmental events maintaining the problem behavior differed among participants, and that the environmental variable responsible for maintaining the problem behavior was also effective in increasing the occurrence of an appropriate replacement behavior. By further illustrating the idiosyncratic nature of behavior, Northup et al. (1991) supported the results of Carr (1977) and Iwata et al. (1982). Additionally, Northup et al. (1991) demonstrated that an analysis of the environmental variables maintaining the problem behavior was effective for identifying environmental manipulations that resulted in a decrease in problem behavior and an increase in appropriate replacement behavior. Finally, Northup et al. (1991) provided a more practical approach to functional analysis procedures in an applied setting (e.g., outpatient clinic) with individuals with less severe disabilities, thereby improving the generalizability of functional analysis procedures.

Following Northup et al.'s (1991) analysis of the effectiveness of BFA procedures for determining the maintaining variable of a participant's problem behavior in an outpatient clinic setting, the generalizability of functional analysis procedures has been further expanded. Researchers have evaluated functional analysis procedures in a variety of school settings (e.g., general education, special education) with a variety of student populations (e.g., students with mild disabilities, students without disabilities) presenting a myriad of problem behaviors (e.g., disruptive classroom behavior, off-task behavior).

Broussard and Northup (1995) examined the effectiveness of functional analysis procedures for identifying the variables maintaining three elementary-age participants' disruptive behaviors (e.g., inappropriate vocalization, out of seat behavior) in the classroom setting. Each participant's FBA included both descriptive assessment and functional analysis procedures to determine the function of the target problem behavior. A contingency reversal phase was conducted following each participant's functional analysis to determine if the maintaining variable was also effective at increasing an appropriate replacement behavior. Results indicated that the functional analysis procedures were effective at detecting the maintaining variable of each participant's problem behavior, and demonstrated treatment utility by linking two procedures that increased appropriate behavior. Additionally, the results of Broussard and Northup (1995) extended the generalizability of functional analysis literature by demonstrating the procedure's effectiveness at identifying the maintaining variable of problem behavior in a general education setting. The study did not include an analysis of the effectiveness of linking the results of the functional assessment to function-based interventions implemented over several sessions; thus, the treatment utility of the functional assessment procedures in the school setting was limited.

Doggett et al. (2001) further examined the effectiveness of FBA procedures for identifying the function of students' problem behaviors in the general education setting. The study included two elementary-age students referred for high occurrences of disruptive behavior (i.e., inappropriate vocalizations, out of seat, off-task) in the classroom setting. The results of the study further demonstrated the effectiveness of FBA procedures for identifying the function of a student's problem behavior in a general

education setting. However, the study did not examine the effectiveness of linking the functional analysis results to the development of function-based interventions, thereby failing to demonstrate the treatment utility of the functional analysis data.

Given the time needed to complete an FBA, it is important to examine whether function-based interventions are more effective than non-function-based interventions that do not require a formal assessment prior to the development of intervention methods. This is particularly relevant when considering the time pressure placed on practitioners working in an applied setting (e.g., school). Newcomer and Lewis (2004) examined the relative effectiveness of function-based and non function-based interventions for decreasing problem behavior exhibited by three elementary-age students in a general education setting. The results of the study indicated that function-based interventions were more effective than non-function-based interventions. However, there were several limitations that should be noted. First, evidenced-based treatment procedures were only incorporated into the function-based intervention procedures, thereby stacking the intervention analysis in favor of the function-based interventions. Second, it is unknown if function-based interventions or non-function-based interventions are more effective at increasing appropriate behavior. Furthermore, the intervention methods included multiple components; therefore, it is unknown which treatment component(s) resulted in the largest reduction of problem behavior.

Although there are clear limitations in the functional analysis literature, the results of recent meta-analyses have supported the effectiveness of these procedures. Hanley, Iwata, and McCord (2003) conducted a meta-analysis of the functional analysis literature and found 95.9% of the individual functional analyses to be effective at determining the

function of a variety of problem behaviors. The meta-analysis included 277 studies published in 34 journals. In regard to participant demographics, a majority of the studies included children (70.0%), and a large number of the studies included participants with disabilities (91.3%). Results of the meta-analysis indicated that almost a third (31.4%) of the functional analyses were conducted in school settings. A majority of the studies included functional analysis procedures to determine the function of SIB (64.6%) and aggression (40.8%), with a limited number of studies examining more typical problem behaviors exhibited in the classroom setting (e.g., noncompliance, tantrum behavior, inappropriate vocalizations). Although there are clear limitations in the functional analysis literature involving the generalizability of results to individuals without disabilities engaging in common problem behaviors, the authors indicated that functional analysis procedures were an effective approach to identifying the function of a problem behavior.

To determine the generalizability of functional analysis studies conducted in naturalistic settings alone, Solnick and Ardoin (2010) reviewed the literature on functional analysis conducted in school settings. Of the 39 functional analysis studies included in the review, 19 of the studies included functional analyses conducted in the regular classroom setting, and 17 studies were conducted in other settings within the school (e.g., resource room). The majority of the functional analyses conducted in a classroom setting were completed in self-contained classrooms (52.9%), and only a limited number of studies were conducted in preschool classroom settings (15.7%). Furthermore, a majority of the studies included participants with disabilities, with only 34% of participants being described as typically developing. The results of the study

indicated that functional analysis procedures in the school setting were effective for identifying the function of the problem behavior; however, some limitations were noted. Only 41% of the studies included data for function-based intervention results. As a result, there is limited information regarding treatment utility of functional analysis in school-based settings. Additionally, only 4.17% of the interventions that were linked to the functional analysis results included antecedent-based interventions. Therefore, while some studies have evaluated the effectiveness of function-based interventions in school settings, fewer of those studies have evaluated more than consequent-based interventions alone. Finally, the majority of studies included students with disabilities in self-contained classrooms, with far fewer studies being conducted in regular education classrooms and preschool settings. Consequently, there are still questions regarding the generalizability of functional analysis in school-based settings.

While the school-based FBA literature is limited in some critical ways, it is important to note that FBA procedures have been used in schools for more than two decades (Broussard & Northup, 1995; LeGray, Dufrene, Sterling-Turner, Olmi, & Bellone, 2010). Additionally, the term *FBA* is included in federal education legislation (IDEIA; Public Law 108-446 in 2004), and an FBA is legally required for students with disabilities exhibiting problem behaviors when (a) an FBA was not completed for the problem behavior prior to their placement in an alternative setting, (b) the IEP team indicates that the problem behavior is a manifestation of the student's disability, (c) a student is suspended from school for 10 days or more and the behavior was not a manifestation of their disability, or (d) a student is placed in an alternative setting for specific misconduct (e.g., drug use, weapons) (Steege & Watson, 2009). Given the long

history of FBA use in school settings and IDEIA requirements regarding FBA, it appears as though FBA will remain a relatively common practice in schools, at least in the near future. Therefore, it is clear, especially given the limitations to the school-based FBA literature already noted (e.g., limited treatment utility of assessment data), that continued research into school-based FBA practices is important. The following section includes a review of the function-based intervention literature by intervention type (i.e., antecedent, consequent, combined) and identifies limitations in the extant literature, especially as those limitations relate to the treatment utility of functional assessment.

Antecedent-Based Interventions

While there is an array of antecedent interventions included in the function-based intervention literature, all have one defining characteristic: antecedent environmental events related to the function of the problem behavior are manipulated to prevent the occurrence of the target behavior. In this way, antecedent interventions are considered preventative, whereas consequent interventions are more reactive (Cooper et al., 2007). Antecedent interventions can be placed in one of two categories: discriminative stimuli or motivating operations manipulations. A discriminative stimulus is a variable that signals the availability of the reinforcer, resulting in an increase or decrease of the target behavior (Cooper et al., 2007). A motivating operation is an antecedent variable that changes the effectiveness of a reinforcer, leading to an increase or decrease in the occurrence of a target behavior (Cooper et al., 2007). Motivating operations can be further defined as establishing operations or abolishing operations, where an establishing operation increases the effectiveness of the reinforcer, and an abolishing operation decreases the effectiveness of a reinforcer (Cooper et al., 2007). Traditionally, the

effectiveness of antecedent-based interventions has been under-studied in the applied behavior analysis literature (Conroy et al., 2007; Smith & Iwata, 2007). However, there is a growing body of research supporting the effectiveness of antecedent interventions for improving student behavior (Conroy et al., 2007). This literature review will focus solely on antecedent-based interventions that include manipulation of motivating operations, as this will be central to the research questions and procedures in this study.

One type of antecedent intervention with a substantial amount of research confirming its effectiveness for decreasing problem behavior is non-contingent reinforcement (NCR) (Cooper et al., 2007). NCR involves delivering the identified reinforcer responsible for maintaining the problem behavior on a fixed-time interval or variable-time interval schedule, regardless of the individual's behavior (Cooper et al., 2007). By manipulating the environment in such a way that the reinforcer maintaining the problem behavior is independent and regularly available to the participant, NCR acts as an abolishing operation, decreasing the student's motivation to engage in problem behavior to obtain access to the reinforcer (Cooper et al., 2007). The NCR literature indicates that NCR is an effective antecedent intervention method to address problem behaviors maintained by positive reinforcement (Khang, Iwata, DeLeon, & Wallace, 2000), negative reinforcement (Kodak, Miltenberger, & Romaniuk, 2003), and automatic reinforcement (Linberg, Iwata, Roscoe, Worsdell, & Hanley, 2003).

Although NCR has been shown to be effective at decreasing problem behavior maintained by various types of reinforcement, the literature is limited in the number of studies including participants with less severe disabilities in classroom settings. Jones, Drew, and Weber (2000) extended the literature by examining the effectiveness of NCR

for reducing disruptive behavior (i.e., inappropriate vocalization, playing with objects, out-of-seat) in an elementary-age student with ADHD in a classroom setting during an academic, clinic-based summer program. Following the completion of a functional analysis, the results, indicating that the problem behavior was maintained by peer attention, were linked to a function-based NCR intervention using a brief reversal design. During the NCR condition, the participant received 30 s of peer attention at the end of each 90 s interval. The results of the study indicated that the NCR intervention was effective at reducing disruptive behavior. However, data on the occurrence of appropriate behavior were not included; therefore, it is unknown if NCR also resulted in an increase of appropriate behavior. Additionally, treatment acceptability data were not included in the results, potentially limiting the external validity of the results. Furthermore, the authors recommended that future studies examine the effectiveness of NCR in general education classrooms with less dense schedules of reinforcement, indicating that "a 90 s fixed-time would be too frequent for teachers to provide attention in regular education classrooms" (Jones et al., 2000, p. 345).

Austin and Soeda (2008) further extended the function-based antecedent literature by evaluating the effectiveness of NCR in a general education classroom. Additionally, the study examined the effectiveness of a less dense NCR schedule (i.e., 4 min) that, according to Jones et al. (2000), would be more acceptable and feasible for teachers in general education classrooms. The study included two elementary-age students exhibiting disruptive behavior (i.e., out of seat, inappropriate vocalization) and off-task behavior in the classroom setting. Prior to the intervention analysis, an FBA was completed and the results indicated that the function of both students' problem behaviors

was access to teacher attention. The FBA results were linked to the development of the NCR intervention, which involved the students receiving teacher attention on a 4-min fixed-time interval schedule. The authors indicated that a 4-min fixed-time interval schedule was chosen by the teacher to ensure that the frequency of reinforcement was set at a time that was manageable for the classroom environment. Using an ABAB design, the effectiveness of the NCR intervention was evaluated. Results of the analysis indicated that a 4-min NCR schedule of reinforcement was effective at reducing both participants' problem behaviors. Additionally, the teacher verbally reported an improvement in student behavior and deemed the intervention appropriate for the classroom setting. Data on the occurrence of appropriate behavior were not included in the analysis; therefore, it is unknown if NCR also resulted in an increase in appropriate behavior.

In addition to NCR, other antecedent intervention studies have also been demonstrated to be effective for reducing problem behavior (Axelrod & Zank, 2012; Davis, Brady, Hamilton, McEvoy, & Williams, 1994; Fisher, Kuhn, & Thompson, 1998). High probability response sequence (HPRS) is an empirically supported antecedent intervention that involves the delivery of a series of demands that a participant is likely to comply with prior to delivering a command with a low probability of compliance (Cooper et al., 2007). Research indicates that HPRS is an effective intervention for reducing problem behavior in individuals with severe disabilities in an analogue setting (Davis et al., 1994) and in children with less severe disabilities in a general education setting (Axelrod & Zank, 2012). Other antecedent interventions found to be effective include incorporating the student's task preference (McComas, Hoch, Paone, & El-Roy,

2000), allowing the student to choose materials (Fisher, Thompson, Piazza, Crosland, & Gotjen, 1997), self-monitoring (Kern, Child, Dunlap, Clarke, & Falk, 1994), and peer-mediated interventions (Goldstein, Kaczmarek, Pennington, & Shafer, 1992).

While some studies have examined singular antecedent-based intervention manipulations, others have evaluated multi-component antecedent-based interventions. For example, Kern et al. (1994) examined the effectiveness of function-based antecedent interventions for reducing disruptive (i.e., tantrum behavior, SIB) and off-task behavior for an elementary-age student with less severe disabilities in a classroom setting. Prior to developing the intervention methods, an FBA was conducted and indicated that the student's problem behavior was maintained by escape from task demands. The FBA results were linked to a function-based antecedent intervention that included self-monitoring, shorter academic tasks, and, for one setting, manipulation of the type of academic task. The results indicated that the function-based intervention package was effective at increasing on-task behavior across academic settings. A limitation noted by the authors was that the intervention package included several function-based antecedent variables; thus, it is unknown which of the antecedent intervention components led to the effectiveness of the intervention. Additionally, although the teachers were involved in the FBA and intervention analysis procedures, treatment acceptability data were not included in the analysis, limiting the social validity of the results.

McComas et al. (2000) further examined the effectiveness of a function-based antecedent intervention package for decreasing problem behavior in a school setting. The study included three elementary-age students with disabilities exhibiting disruptive behavior (i.e., destructive behavior, SIB, aggression) in the classroom setting. A multi-

element design was used and included the examination of a functional analysis and an intervention analysis. The FBA results indicated that escape from academic demands was the function of the disruptive behavior across participants. The function-based antecedent intervention included in the treatment analysis focused on the manipulation of academic tasks. Specifically, the intervention methods were individualized: one participant's antecedent intervention included a manipulation of instructional strategies (i.e., availability of checker pieces during math activity), the second included a choice-making component, and the third included the elimination of repeated academic assignments. The results of the treatment analysis indicated that the function-based antecedent intervention conditions were effective at reducing problem behavior for two of the three participants, and were effective at increasing compliance for one participant when compared to the control condition. The study included several limitations, particularly related to the external validity of the results. Although school personnel conducted the intervention sessions, and a treatment integrity evaluation was included, treatment acceptability data were not included in the results. Additionally, the study only included students with disabilities, potentially limiting the generalizability of the results to non-disabled populations.

Burke, Hagan-Burke, and Sugai (2002) expanded the function-based antecedent intervention literature by further examining the effectiveness of function-based antecedent intervention methods in a general education classroom setting. The study included an elementary-age student with a learning disability exhibiting off-task and disruptive behavior. An FBA was completed prior to the examination of the intervention methods, indicating that the participant's problem behavior was maintained by escape

from task demands. The FBA results were linked to the development of a function-based antecedent intervention that included a pre-teaching vocabulary session prior to the reading activity where the student was exhibiting the problem behavior. An alternating treatments design (ATD) was used to examine the effectiveness of the intervention. The results of the analysis indicated that the function-based antecedent intervention was effective at reducing the problem behavior relative to a control condition. Although Burke et al. (2002) did demonstrate the effectiveness of function-based antecedent interventions in a general education setting with a student with less severe disabilities, the study was not without limitations. First, the researchers conducted all of the intervention sessions; therefore, it is unknown if the intervention methods would have been effective if teachers served as the primary interventionists. Second, treatment integrity data were not included in the results, undermining confidence that changes in student behavior can be attributed to the intervention. Third, treatment acceptability data were not obtained by the student's teacher, further limiting the social validity of the results.

Hoff, Ervin, and Friman (2005) addressed the limitation of the social validity of function-based intervention methods by including student and teacher acceptability ratings of the function-based antecedent procedures. The study examined the effectiveness of function-based antecedent interventions for decreasing disruptive behavior (i.e., inappropriate vocalization, throwing objects, out-of-seat behavior) in a middle-school student diagnosed with attention deficit hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD). FBA data indicated that the student's disruptive behavior was maintained by access to peer attention and escape from the academic demands. Following the completion of the FBA, the functional assessment

results were linked to the development of function-based interventions that included the manipulation of antecedent events hypothesized to occasion the problem behavior. Hoff et al. (2005) evaluated antecedent intervention procedures that included changing the seating arrangement so the participant no longer sat next to a preferred peer, an increase in the availability of preferred reading materials, and a combination of both antecedent intervention methods. Function-based antecedent intervention methods were directly compared using an alternating treatments design (ATD). The results of the study indicated that when the participant no longer sat next to a preferred peer and had preferred academic reading material available, he no longer engaged in disruptive behavior to access attention and escape from task demands. Thus, the antecedent intervention functioned as an abolishing operation, decreasing the likelihood that the student would engage in disruptive behavior to gain access to the preferred reinforcer. Additionally, student and teacher acceptability ratings were included in the results, indicating that the teacher found the intervention methods to be acceptable. One limitation from the Hoff et al. study was that data on the occurrence of appropriate behavior were not included in the results; therefore, it is unknown if the interventions were effective for increasing appropriate behavior.

Although the breadth of the antecedent intervention literature is gradually increasing, there is still a limited number of studies including children of typical development. Furthermore, studies reporting treatment integrity and treatment acceptability data are scant. Smith and Iwata (1997) conducted a literature review of antecedent interventions in the applied behavior analysis literature and found a limited number of studies examining the effectiveness of antecedent interventions, indicating that

only 11.1% of behavioral interventions included an antecedent intervention component. The results of the review indicated that the limited number of studies including antecedent interventions revealed that such interventions were effective in decreasing problem behavior maintained by positive reinforcement, automatic reinforcement, and negative reinforcement. However, the authors stressed the importance of further evaluation of the effectiveness of antecedent interventions in isolation for reducing problem behavior.

While antecedent interventions have been found to be effective, there are still important limitations to address. Limitations include determining the level of effectiveness with students of typical development, the level of treatment integrity when implemented by school personnel, and the level of treatment acceptability. Furthermore, generalizability of the antecedent-based procedures is in question due to limited demonstrations across numerous settings, with preschool settings being particularly limited.

Consequent-Based Interventions

Consequent-based interventions account for a substantial amount of the function-based intervention literature. At the core of consequent-based interventions lies operant conditioning, where the consequences following the target behavior predict future occurrences of the behavior (Cooper et al., 2007). Thus, it is the consequences occurring in close temporal proximity to a given behavior that control future occurrence of that behavior (Cooper et al., 2007). Reinforcement is an essential characteristic of many consequent-based interventions, where reinforcement, whether negative or positive, changes the frequency of the target behavior when administered in close temporal

proximity to the target behavior (Cooper et al., 2007). When developing individualized behavior plans, some research suggests that consequent-based interventions are essential for the intervention to be effective (Kern & Clemons, 2007). However, it is important to note that consequent-based interventions are considered more reactive in nature and may require greater response effort than antecedent-based procedures. For example, reinforcement-based programs require monitoring behavior and delivering the reinforcer following occurrence of behavior, whereas antecedent-based programs do not include such careful monitoring of behavior but, rather, implementation of the antecedent procedure alone.

A large amount of the function-based literature indicates that consequent-based intervention methods are effective for reducing problem behavior. An exhaustive review of the literature on consequent-based interventions is beyond the scope of this study; therefore, the following sections will instead focus on one empirically supported consequent-based intervention procedure: differential reinforcement of alternative behavior. Differential reinforcement involves providing reinforcement contingent on either the absence of the problem behavior or the occurrence of an appropriate replacement behavior, while simultaneously withholding reinforcement for the target behavior (Cooper et al., 2007). Differential reinforcement of alternative behavior (DRA) involves reinforcing the occurrence of a predetermined appropriate replacement behavior. DRA is an empirically supported and commonly used consequent-based intervention for reducing problem behaviors (Petscher et al., 2009). Since DRA focuses not only on decreasing the problem behavior but also on reinforcing an appropriate replacement behavior, DRA increases the likelihood that the student will develop appropriate

behaviors (Cooper et al., 2007). Because of this, DRA may fall under the umbrella term of positive behavior support more readily than other differential reinforcement procedures that are not intended to increase an appropriate replacement behavior (Cooper et al., 2007; LeGray et al., 2010). DRA has been found to be effective in participants with developmental disabilities exhibiting disruptive behavior (Richman, Wacker, Asmus, & Casey, 1998), SIB, and aggressive behavior (Vollmer, Roane, Ringdahl, & Marcus, 1999). Additionally, DRA has also been found to be effective for decreasing less intense problem behaviors (e.g., off-task behavior) (Meyer, 1999). The function-based intervention literature indicates that DRA is an effective intervention for reducing problem behaviors; however, most of the studies were conducted in restrictive settings with individuals with disabilities, limiting the generalizability of the results.

While function-based DRA studies in traditional school settings are limited relative to function-based DRA studies in more restrictive settings, there is emerging literature demonstrating the effectiveness of function-based DRA studies in traditional school settings. Lucas (2000) found DRA in combination with time-out (TO) to be effective for reducing problem behavior (i.e., aggression) in a two-year-old of typical development in the home environment. Wright-Gallo, Higbee, Reagon, and Davey (2006) extended the DRA literature further by examining the effectiveness of DRA for decreasing problem behavior in a school setting. Two students with emotional and behavioral disorders exhibiting disruptive behavior (e.g., inappropriate vocalization, out-of-seat) in a special education classroom were included in the study. A classroom-based functional analysis was completed prior to the treatment analysis, indicating that the function of both students' disruptive behavior was escape from task demands, and peer

and teacher attention. The DRA intervention methods were linked to the functional analysis results and included DRA being delivered when the student exhibited the appropriate replacement behavior (i.e., raising hand or verbally requesting either a break or attention). Initially, reinforcement was delivered after every occurrence of the appropriate replacement behavior; however, the schedule was thinned to where the student received the identified reinforcer after 50% and 75% of the occurrences of the appropriate replacement behavior. The results of the study indicated that DRA was effective for reducing both participants' disruptive behaviors; furthermore, DRA was effective when the reinforcement schedule was thinned to 50% of the occurrences of the appropriate replacement behavior, but not when thinned to 75%. The study did not include data on the occurrence of academically engaged behavior throughout the assessment. Since the appropriate replacement behavior did not require the participants to be academically engaged to gain access to the reinforcer, it is unknown if the intervention was effective for improving on-task behavior during the academic task.

Petscher and Bailey (2008) compared the relative effectiveness of DRA and extinction alone for reducing problem behavior, and they found DRA to be more effective for reducing disruptive behavior for five students in a school setting. Furthermore, LeGray et al. (2010) examined the relative effectiveness of DRA and differential reinforcement of other behavior (DRO) for reducing problem behavior (i.e., inappropriate vocalization) for three typically developing preschool-age participants in a school setting. Both function-based intervention procedures were found to be effective for reducing inappropriate vocalization across participants; however, DRA was found to be more effective than DRO across participants. Treatment acceptability was evaluated

across teachers, with results indicating that all three teachers found the intervention methods acceptable. While DRO and DRA were found to be effective for reducing problem behavior, the intervention's impact on appropriate replacement behavior was not included in the treatment analysis. Therefore, it is unknown if the intervention methods also improved appropriate replacement behavior.

Halphen (2012) addressed this limitation by examining the relative effectiveness of DRA and DRO for decreasing problem behavior and increasing academically engaged behavior for two elementary students in the general education setting. The results of the FBA indicated that one student's problem behavior was maintained by access to tangibles and attention, while the other student's problem behavior was maintained by escape from task demands. The results of the FBA were used to develop individualized DRA and DRO interventions for each student. The results were analyzed using an Alternating Treatments Design (ATD) with three conditions: DRA, DRO, and a non-treatment control condition. Additionally, the intervention resulting in the lowest occurrence of problem behavior and the highest occurrence of academically engaged behavior was further verified in isolation during a verification phase. The results of the study suggest that both DRA and DRO were effective at reducing problem behavior and increasing academically engaged behavior for both participants when compared to the control condition. However, the study included only two participants, limiting the internal and external validity of the results. Additionally, the results of the study did not yield information related to the relative effectiveness of DRA and DRO, limiting the scope of the study.

LeGray, Dufrene, Mercer, Olmi, and Sterling (2013) further examined the effectiveness of DRA by evaluating the relative effectiveness of DRA with and without a pre-teaching component for decreasing inappropriate vocalization and increasing appropriate vocalization for four young children in a general education classroom setting. The results of each student's FBA indicated that inappropriate vocalization was maintained by access to attention. The FBA results were linked to the DRA intervention, which included the student receiving access to attention following the first occurrence of appropriate vocalization following a 30-s absence of inappropriate vocalization. The pre-teaching component was conducted immediately prior to the DRA condition and included the teacher reviewing with the student the behavioral contingencies for receiving access to attention and the problem behavior from which they should refrain. The DRA and DRA + pre-teaching conditions were examined using a BCBC design and conditions were counterbalanced across participants. The results of the study indicated that DRA + pre-teaching was more effective at reducing inappropriate vocalization and increasing appropriate vocalization maintained by access to attention than DRA alone. Additionally, treatment acceptability data indicated that the teachers found the FBA procedures and the intervention procedures acceptable.

Petscher et al. (2009) conducted a review of the DRA literature over the past 30 years with results indicating that DRA was an effective intervention method for decreasing problem behaviors. Of the 116 studies that met the criteria to be included in the review, 79 studies included a functional analysis prior to implementation of the DRA intervention. When studies did include functional analysis procedures, treatment utility was high, demonstrating their value as an assessment method for developing effective

interventions. The results of the review confirmed the effectiveness of DRA for decreasing problem behavior and improving appropriate behavior. Additionally, although the results of the review did indicate limitations in the DRA literature regarding the large portion of the studies that focused primarily on participants with disabilities exhibiting severe problem behaviors (i.e., aggression, SIB, food refusal), the results regarding the overall effectiveness of DRA were favorable. To address the aforementioned limitations, Petscher et al. recommended that future studies include individuals of typical development engaging in more typical and frequent problem behavior (e.g., noncompliance, inappropriate vocalization) to further examine the effectiveness of DRA.

Relative Effectiveness of Antecedent- and Consequent-Based Interventions

Over the past few decades, there has been a shift in the function-based assessment literature. Traditionally, function-based interventions focused primarily on consequent-based interventions and their effectiveness for reducing problem behavior for individuals with disabilities in restrictive settings (Smith & Iwata, 1997). Recent studies have placed a larger emphasis on the external validity of function-based interventions, expanding the literature by including participants of typical development in less restrictive settings (e.g., schools) and by placing more of an emphasis on increasing appropriate behavior (Conroy et al. 2005). However, current literature reviews indicate that limitations still exist in the function-based literature, especially with regard to the limited number of studies examining the relative effectiveness of function-based antecedent and consequent interventions (Conroy et al., 2005; Smith & Iwata, 1997). Additionally, there is still

limited research regarding the independent and relative effectiveness of function-based antecedent interventions and consequent interventions for improving student behavior (Conroy et al., 2005; Smith & Iwata, 1997).

Although there is an insufficient amount of research studies including component analyses of antecedent and consequent interventions, a limited number of studies have examined the relative effectiveness of these intervention procedures, both in restrictive and more naturalistic settings. Kodak et al. (2003) examined the relative effectiveness of non-contingent escape (NCE) and differential negative reinforcement of other behavior (DNRO) for decreasing disruptive behavior for two young children with disabilities in the home environment. Prior to the analysis of the function-based intervention procedures, it was determined that the participants' problem behaviors were maintained by escape from task demands; therefore, each intervention procedure manipulated environmental contingencies related to the specified function of the problem behavior. The intervention procedures, NCE and DNRO, were evaluated using an ATD. The NCE condition included the participant receiving a break initially every 10 s and then thinning the schedule to every 2 min. The DNRO condition included the child receiving a break if he or she did not engage in disruptive behavior initially for 10 s, then thinning the reinforcement schedule to be contingent on 2 min absence of disruptive behavior. Results indicated that both DRO and NCR were equally effective for increasing compliance and decreasing disruptive behavior across participants, demonstrating the effectiveness of both function-based antecedent and consequent interventions. The researchers implemented all of the intervention methods; therefore, it is unknown if the results would have remained the same if the participants' parents implemented the

intervention procedures. Although treatment acceptability data were examined, the acceptability ratings were based on parents' acceptability of treatment results after watching various video vignettes of the treatment session, limiting the generalization of the treatment acceptability. Additionally, the study included only children with disabilities, further limiting the generalizability of the results.

Mueller, Edwards, and Trahant (2003) examined the relative effectiveness of three function-based interventions for decreasing problem behavior for three elementary-age students with disabilities. The teachers functioned as the primary interventionists, and treatment integrity and treatment acceptability were examined. Following a functional analysis, it was determined that all three participants' problem behaviors were maintained by escape from task demands. A treatment analysis was conducted to determine the most effective intervention for each participant and included DNRA, DRA, and NCR. DNRA consisted of the participant receiving a 20-s break contingent on the occurrence of appropriate behavior on a 30-s fixed-interval schedule. DRA consisted of the participant receiving a token following the occurrence of appropriate behavior on a 30-s fixed-interval schedule. Each token represented a 15-s break from academic tasks, with the break being delivered at the end of each session. NCR consisted of the participant receiving a token on a 30-s fixed-interval time schedule independent of the student's behavior. At the end of the session, the student could exchange the tokens for 5 min of access to a preferred activity. The results of the treatment analysis in conjunction with the teacher's reported treatment preference were used to choose the optimal function-based intervention for each participant. NCR was used with one participant and DRA was used with the other two participants. The results indicated that both NCR and

DRA were effective for reducing problem behavior. However, results from the teacher acceptability ratings indicated that the teachers found only DRA to be an acceptable function-based intervention. One limitation of the study is that it did not include data on task engagement; therefore, the effectiveness of DRA and NCR for increasing appropriate behavior is unknown. The authors recommended further analysis of the results, indicating that future research should consider conducting treatment analysis with other types of function-based interventions and should include behaviors maintained by other types of reinforcement (e.g., access to attention). Additionally, it was recommended that future research should further examine methods for including teachers in the FBA process and function-based intervention procedures.

Ingvarsson, Kahng, and Hausman (2009) examined the relative effectiveness of NCR and contingent reinforcement for reducing problem behavior with three preschool-age children in a school setting (speech and language preschool program). One of the participants was identified as having language delays, and the other two participants were identified as typically developing. The participants were referred by their teacher due to high occurrences of aggression, inappropriate vocalization, and disruptive behavior. The study included three experiments − experiment one included a functional analysis of the problem behaviors, experiment two examined the effectiveness of different density schedules of reinforcement on student behavior, and experiment three directly compared NCR and contingent reinforcement. The functional analysis results indicated that the problem behavior was maintained by escape from task demands. The functional analysis results were linked to the development of intervention methods used in experiments one and two and included the student receiving an edible reinforcer during NCR and

contingent reinforcement procedures. Results from the second experiment indicated that there were undifferentiated results for low density (LD) and high density (HD) contingent reinforcement. Results from the third experiment indicated that both NCR and contingent reinforcement were equally effective at reducing problem behavior and increasing compliance for two of the three participants. During the functional analysis, it was determined that escape from task demands (30-s break from task demands) was the function of the problem behavior; however, edible reinforcers were used as the reinforcer during intervention analysis procedures. This inconsistency between the reinforcer identified as the function of the problem behavior and the reinforcer used during intervention sessions limits the results. It is unknown if escape from task demands, used during the intervention procedures would have produced different results. Additionally, treatment integrity was inconsistent throughout the intervention procedures, limiting the interval validity of the results.

Meta-Analyses Evaluating Treatment Utility of FBA

Gresham et al. (2004) conducted a meta-analysis designed to evaluate the effectiveness of FBA procedures and positive behavioral interventions in improving student behavior in the school setting. The analysis included studies published in the *Journal of Applied Behavioral Analysis* between the years 1991 and 1999. The effect size of each type of intervention procedure was evaluated, and the results indicated that the function-based interventions were not superior to the non-function-based interventions. Furthermore, non-function-based studies yielded the highest average effect size. Specifically, the mean of the non-function-based studies yielded ES = 6.77, PND = 66.15; experimental FBA ES = 4.60, PND = 51.41; descriptive FBA ES = 0.70, PND =

57.89; and the combined FBA procedures ES = 2.18, 67.11. While the results of the review question the treatment utility of function-based assessment, Gresham et al. (2004) recommended interpreting the results with caution due to the limitations of the statistical methods (i.e., limitations of determining the effect size of single-case designs) and the large variability in the effect size of each function-based intervention method. Additionally, results indicated a limited number of studies including only antecedent interventions, with function-based interventions conducted in school settings focusing predominately on reactive rather than preventative approaches. The authors suggested that future studies further examine the utility of FBA procedures and the effectiveness of function-based interventions in the school setting to determine under what conditions these assessment procedures and intervention methods are warranted.

Conroy et al.'s (2005) descriptive analysis of the effectiveness of positive behavioral interventions further examined the generalizability of function-based interventions in the school setting. While the results of the analysis support the use of positive behavioral interventions, several limitations were discussed. One notable limitation was the number of studies reporting treatment integrity and treatment acceptability data, with only 8% of studies including treatment integrity and 26% including treatment acceptability. This is problematic in that less research is available regarding teachers' implementation and acceptability of positive behavior supports. Additionally, only 30% of the studies included antecedent intervention methods. This is important because less research evaluating the effectiveness of antecedent-based behavioral interventions is available. Furthermore, there were a limited number of studies involving children of typical development. The authors recommended that future studies

address the limitations to external validity by including treatment acceptability data and students of typical development. Additionally, the authors suggested that future research examine the most effective treatment components by conducting component analyses.

Purpose

The FBA literature has evolved considerably over the past three decades. In particular, there has been an increase in FBA research conducted in traditional educational settings with students without developmental disabilities. Findings from school-based FBA studies indicate that FBA in schools is useful for identifying antecedent- and consequent- based procedures that are effective for improving student behavior. However, the literature is limited in the number of studies examining the relative effectiveness of function-based antecedent and consequent interventions for reducing problem behavior and increasing appropriate replacement behaviors. Additionally, the function-based literature is limited in the number of studies including students of typical development in a general education setting, particularly in preschool settings. Furthermore, only a limited number of studies examine parent and teacher acceptability of the behavioral intervention methods. The purpose of the current study was to examine the relative effectiveness of function-based antecedent and consequent intervention procedures for decreasing problem behavior and increasing appropriate replacement behavior in preschool children of typical development. Furthermore, treatment acceptability data was included to determine the social validity of the intervention methods in the school setting.

Research Questions

1. Are there differences in the effectiveness of a function-based antecedent intervention and consequent intervention for decreasing problem behavior?
2. Are there differences in the effectiveness of a function-based antecedent intervention and consequent intervention for increasing appropriate replacement behavior?
3. Are there differences in teachers' ratings of intervention acceptability for function-based antecedent interventions versus function-based consequent interventions?

CHAPTER II

METHOD

Participants and Setting

Four preschool children in center-based classrooms in a rural southeastern state were included in the study. All four children were referred by their primary teachers due to a high occurrence of problem behavior in the classroom setting. To participate in the study, the child had to meet the following criteria: (a) the child had to be referred by his or her respective teacher or other school personnel for problem behavior in the classroom, (b) the referred behavior must be reported to occur frequently throughout the day, (c) the problem behavior had to occur during at least 20% of the observed intervals during a screening observation, (d) the child must not have had a behavior intervention plan in place at the time of the study, and (e) the child must not have been diagnosed with a moderate or severe cognitive disability. All of the experimental procedures (i.e., assessment and intervention sessions) were conducted in the child's regular classroom during the time reported as most problematic. Both parental and teacher consent were obtained prior to each child's participation in the study (See Appendixes A and B). Furthermore, permission from The University of Southern Mississippi Institutional Review Board was obtained prior to conducting the study (see Appendix C).

The study was conducted in a Head Start center located in a rural southeastern state. The Head Start center's demographics included approximately 99% minority students (i.e., 68% African American, 16% biracial or multiracial, 15% Hispanic). The Head Start center had been implementing Positive Behavior Interventions and Supports (PBIS; Sugai et al., 2000) for one full year prior to the start of the study.

Jimmy

Jimmy was a four-year-old African American male in a Head Start classroom with approximately 20 four and five-year old children. Jimmy received speech and language therapy several days a week throughout the study. His primary referral concern was out-of-area behavior, with his teacher indicating that he was frequently out of his area and was noncompliant with repeated teacher requests to return to his designated area. She further reported that Jimmy's noncompliance with returning to his designated area would often lead to tantrum behavior. His teacher indicated that his out-of-area behavior was disruptive and occurred frequently throughout the school day (5-9 times per day), with a duration of approximately 1-5 min.

Center time was reported as the time of day when Jimmy engaged in the most out-of-area behavior. Center time consisted of various activities that were rotated on a day-to-day basis, with students being assigned to one of several areas each day (e.g., book, housekeeping, art, block, and puzzle area). During center time, there were four to five children assigned to each area. Jimmy's teacher indicated that although he engaged in frequent out-of-area behavior during all centers, he engaged in this behavior most frequently in the book area. While students were in the book area, they were instructed to stay seated in the designated area and to actively look at one book at a time. Jimmy's primary teacher was present during all observation sessions.

Jimmy's primary teacher, Ms. Poppins, was a 27-year-old African American female with a bachelor's degree in childcare. Ms. Poppins had been teaching for three years prior to the beginning of the study.

Mike

Mike was a three-year-old African American male in a Head Start classroom with approximately 20 three-year-old children. He received speech and language services several days a week throughout the duration of the study. His primary referral concern was off-task behavior during the academic activities presented during morning drill. Mike's teacher reported that off-task behavior during morning drill was disruptive and occurred multiple times (1-4 times) per drill, each occurrence lasting approximately 1-5 min.

Morning drill activities included direct instruction activities related to reciting and recognizing days of the week, months of the year, colors, shapes, and numbers. Specifically, Mike's teacher would instruct children to answer questions as a group or individually. Participation in the activity included looking at and attending to the academic activity displayed on a large bulletin board, answering questions both as a group and individually, and staying in the designated area. Children were seated in designated spots on the carpet and were to remain seated throughout the duration of the morning drill (approximately 15 minutes). Mike's primary teacher was present during all observation sessions.

Mike's primary teacher, Ms. Doubtfire, was a 27-year-old African American female with a bachelor's degree in childcare. Ms. Doubtfire had been teaching for two years at the start of the study.

Alfie

Alfie was a four-year-old African American male in a Head Start classroom with approximately 20 three- and four-year-old children. He was not receiving any special

education services at the time of the study. His primary referral concern was out-of-area behavior. Alfie's teacher reported that his out-of-area behavior was unmanageable and disruptive, indicating that it occurred multiple times per day (i.e., 1-5 times) lasting for more than 10 min.

Alfie's teacher indicated that he engaged in out-of-area behavior most often during morning drill. During morning drill, the children were instructed to sit in their designated spots on the carpet while the teacher reviewed the days of the week, months of the year, colors, shapes, and numbers with the children, directing questions both to the group and to individual students. Participation in the activity included looking at the designated activity posted on a bulletin board, answering questions both individually and as a group, and singing educational songs. Morning drill lasted approximately 15 min and Alfie's primary teacher was present during all observation sessions.

Alfie's primary teacher, Ms. Mitten, was a 46-year-old African American female with a bachelor's degree in early childhood. Ms. Mitten had been teaching for one year and did not have a current class-wide intervention plan in place at the start of the study.

Jack

Jack was a three-year-old African American male in a Head Start classroom with approximately 20 three- and four-year-old children. He received speech and language services several days a week throughout the duration of the study. His primary referral concern was disruptive behavior (i.e., out-of-area, tantrum behavior) in the classroom setting. His teacher reported that his out-of-area behavior was unmanageable and disruptive, indicating that out-of-area behavior typically preceded tantrum behavior.

Jack's teacher reported that center time was the time of the day when Jack engaged in the most out-of-area behavior. Center time consisted of various activities that rotated daily (e.g., storybook, housekeeping, art, blocks, puzzle area). The block area was reported as the specific center where Jack engaged in the most out-of-area behavior. The block area was conducted in a specific area of the room where students were instructed to play appropriately with the blocks (i.e., sharing the blocks, avoiding throwing the blocks, keeping the blocks in their designated area). There were four to five children assigned to each area during center time. Jack's teacher was present during all observation sessions.

Jack's primary teacher was also Ms. Mitten (see the above description for age, race, gender, and education). However, Jack did not participate in the study until the following academic school year; therefore, Alfie and Jack were not in the same classroom when data were gathered.

Materials

Functional Assessment Informant Record for Teachers – Preschool Version (FAIR-T P II)

The FAIR-T P II (Doggett et al., 2001; see Appendix E) is a modified version of the FAIR-T P, a semi-structured teacher interview used to gather information about the problem behavior and to develop hypotheses about the function of the problem behavior. Supporting data suggest that the FAIR-T P is an effective instrument for identifying the problem behavior, the antecedents and consequences surrounding the problem behavior, and the function of the problem behavior for children in center-based classrooms (Dufrene et al., 2007; LeGray et al., 2010). Furthermore, the results of the FAIR-T P

have been found to match data from experimental functional analyses (Dufrene et al., 2007; LeGray et al., 2010). The FAIR-T P has been found to have sufficient treatment utility, with data indicating that interventions based on FAIR-T P results were effective for improving children's behavioral performance (Dufrene et al., 2007; LeGray et al., 2010; Poole, Dufrene, Sterling, Tingstrom, & Hardy, 2012). The original FAIR-T P included a semi-structured interview format, but the FAIR-T P II includes a rating scale format that teachers use to identify 1-3 problem behaviors in order of severity and then rate the extent to which a variety of antecedent and consequent events surround problem behaviors.

The FAIR-T P II includes four sections: Teacher and Child Demographics, Problem Behaviors, Antecedents, and Consequences. The Teacher and Child Demographic section is used to gather information about the teacher and child, including the teacher's perception of the child's current developmental level and his use of appropriate social skills. Additionally, the teacher is asked to identify specific days, times, and classroom activities when the problem behaviors occur most frequently. In the Problem Behaviors section of the FAIR-T P II, teachers are instructed to rank order up to three problem behaviors according to their level of severity. Behaviors identified as most problematic are rated on a scale of 0 to 3 (i.e., 0 = Never Happens, 3 = Happens Very Often) to determine the level of occurrence, duration, and disruptiveness of each problem behavior. There are 27 items included in the Antecedent section of the rating scale. In this section the teacher is asked to rate how often the problem behavior occurs during the specified antecedent variables. In the Consequence section, teachers are instructed to rate how often each of the 20 listed consequences follows the occurrence of the problem

behavior. Once the teacher completed the FAIR-T P II, a follow-up meeting was conducted during which the primary researcher reviewed the information provided in the FAIR-T P II and developed operational definitions for each of the problem behaviors. The information from the FAIR-T P II was then used to develop hypotheses regarding the function of the problem behavior.

Assessment Rating Profile-Revised (ARP-R)

A modified version of the Assessment Rating Profile-Revised (ARP-R; Eckert, Hintze, & Shapiro 1999; see Appendix F) was used to determine teachers' acceptability of the assessment procedures used during the FBA. Two modifications were made to the ARP-R: the designation "school psychologist" was replaced with "teacher," and the tense of the document was changed from present to past tense. A 6-point Likert scale is used to measure the 12 items included in the ARP-R, with higher ratings indicating greater agreement with the assessment procedures (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, indicating sufficient psychometric properties of the instrument. Additionally, factor analysis has verified that the scale is a one-factor instrument for teachers' acceptability ratings (Eckert et al., 1999).

Intervention Rating Profile-15 (IRP-15).

A modified version of the Intervention Rating Profile-15 (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985; see Appendix G) was used to assess teachers' acceptability of intervention procedures. Two modifications were included: the teacher was given the IRP-15 following the completion of data collection and the rating scale was changed from present to past tense. A 6-point Likert scale (1 = strongly disagree to 6 = strongly

agree) is used to measure the 15 items included in the IRP-15. Scores range from 15 to 90, with higher scores representing greater acceptance of the intervention. Von Brock and Elliot (1987) indicated that a score of 52.5 is the cutoff score for adequate teacher acceptance of the intervention. The IRP-15 has been found to have sufficient psychometric properties including strong internal consistency with a Crohnbach's alpha of .98, and all items load on a single factor (item ratings ranging from .85 to .95; Martens et al., 1985), even when slight modifications are included in the IRP-15 (Freer & Watson, 2000).

Dependent Measures and Data Collection Procedures

Two dependent measures were included in the study: problem behavior and appropriate replacement behavior. Each participant's problem behavior and appropriate replacement behavior were determined through consultation with respective teachers (i.e., FAIR-T P II and follow-up interview) and the screening observation. Jimmy, Alfie, and Jack's problem behavior was identified as out-of-area. Out-of-area behavior was defined as sitting/standing at least two feet out of the designated area (i.e., getting out of assigned seat or designated spot on the carpet) or crawling or spinning any distance from the designated area. Appropriately engaged behavior was defined as being within at least two feet of their area and attending to the designated activity (e.g., looking in the direction of the activity, appropriately manipulating designated activity items, answering questions posed by teacher). Mike's identified problem behavior was off-task behavior. Off-task behavior was defined as directing eyes away from the academic task (e.g., looking around the room or at other children, attending to items unrelated to the academic task). For Mike, appropriately engaged behavior was defined as directing eyes towards

the academic task during lecture and having academically related vocalizations at appropriate times (e.g., individual and group oral responses). Both problem behaviors and appropriate replacement behaviors were measured using momentary time sampling; the observer recorded the behavior if it occurred at the end of each 10-s interval. In-ear electronic MP3 devices provided audio cues for the beginning and end of each interval, with a third cue towards the end of each interval notifying the observer when to look up and record the target behaviors. Observations were 15 min in duration and were completed in each participant's classroom during the activity reported by the teacher as most problematic. Observations were conducted by trained undergraduate and graduate students during routine classroom activities. To minimize the likelihood of reactivity, observers chose an unobtrusive location in the classroom to collect data. Observers obtained the operational definitions for the dependent measures and procedural guidelines for each session prior to data collection. Moreover, all observers demonstrated 90% agreement with the primary researcher before collecting data for this study.

Design and Data Analysis

A classroom-based BFA was used to systematically examine the function of each child's problem behavior. BFAs included a brief multi-element experimental design and were conducted in a similar manner to LeGray et al. (2010). Each condition was conducted for 10 min. Periodically, more than one condition was conducted in one day; however, no single condition was implemented on more than two consecutive occasions, and a 5-min break was included between sessions conducted on the same day. To further verify the results of the BFA, a contingency reversal phase was completed when clear divergence (i.e., at least 20%) was observed between one of the functional analysis

conditions and the other conditions. The contingency reversal phase included a brief BAB design with one datum per condition. The B phase consisted of a reversal of the contingency related to the highest occurrence of problem behavior during the BFA. The A phase was a replication of the designated BFA condition. If there was no clear divergence between conditions during the BFA, an extended analysis was conducted to further evaluate the function of the problem behavior.

An alternating treatments design (ATD; Cooper et al., 2007) was used to evaluate the relative effectiveness of the function-based antecedent and consequent intervention for decreasing problem behavior and increasing appropriate replacement behavior, allowing for a rapid and direct comparison of the two interventions (Barlow & Hayes, 1979; Cooper et al., 2007). A control condition was also included to evaluate the effectiveness of the two intervention conditions to a non-intervention control condition. To allow for visual analysis of the level, trend, and variability of each condition and its unique effects on the dependent measures, data from each condition were plotted individually. The condition with the most divergence from other conditions (i.e., lowest occurrence of the problem behavior and highest occurrence of the appropriate replacement behavior) was deemed the most effective intervention. To minimize multiple treatment interference (one of the major threats to internal validity for the ATD [Barlow & Hayes, 1979]) each condition was implemented during a separate session. Additionally, the conditions were rapidly alternated in a semi-random order and were counterbalanced across each session to further control for carryover and sequencing effects. To determine the semi-random order of conditions, the researcher randomly drew from a bag prior to each session a piece of paper marked with one of the three

conditions. However, no single condition was conducted on more than two consecutive occasions. To further control for multiple treatment interference, a verification phase followed the alternating treatments phase for three of the four children. During the verification phase, the intervention evaluated to be most effective was implemented in isolation for several sessions to confirm the results of the ATD.

Procedures

FAIR-T P II

Following a behavioral referral from the teacher, teachers individually completed the FAIR-T P II. The FAIR-T P II rating scale was used to obtain information from each teacher regarding the child's behavior in the classroom. A follow-up meeting was conducted upon completion of the FAIR-T P II to review the information provided by the teacher and to develop operational definitions for each child's problem behaviors and appropriate replacement behaviors. Additionally, the information was used to develop hypotheses about the function of each child's problem behavior.

Screening Observation

To verify the frequent occurrence of the problem behavior, a screening observation was conducted subsequent to the teacher interview. The screening observation was conducted during the time identified by the teacher as most problematic. The observation was conducted for 15 min, during which time three of the four participants (i.e., Jimmy, Mike, Alfie) exhibited problem behavior in at least 20% of the observed intervals. Jack exhibited slightly lower levels of problem behavior (i.e., 16%) during the observed intervals. However, since Jack's problem behavior was near the preset threshold for problem behavior and his teacher reported substantial concerns and

requested intervention assistance, he was allowed to remain in the study. Prior to the screening observation, the teacher was instructed to conduct class using her typical teaching strategies. Feedback pertaining to child behavior was not provided to the teacher or child at any point during the screening observation.

BFA

Following the screening observation, a classroom-based BFA was employed to examine the function of each participant's problem behavior and to confirm the results from the FAIR-T P II (LeGray et al., 2010). The data from the classroom-based BFA were evaluated to verify the hypotheses about the function of each participant's problem behavior. The BFA was hypothesis-based; therefore, the results from the FAIR-T P II and screening observation determined the conditions included in the BFA. The hypothesis-based BFA also included a control condition. During the control condition, each participant had free access to preferred activities and non-contingent adult attention; therefore, it was hypothesized that the control condition would result in low occurrences of problem behavior. The results of the BFA were used to develop idiosyncratic function-based antecedent and consequent interventions for each participant. Each child's teacher implemented all functional analysis sessions. Information from the FAIR-T P II and the screening observation for three of the four participants (i.e., Jimmy, Mike, Alfie) suggested that their problem behavior might be maintained by access to teacher attention and/or to escape academic demands. For Jack, results from the FAIR-T P II and the screening observation suggested that his problem behavior might be maintained by access to teacher attention, access to tangible items, and/or to escape academic demands. Descriptions of each condition included in the BFA are included below.

A teacher training was completed before the BFA was conducted. The protocol used to train each teacher included an operational definition of the child's problem behavior, specific examples of each problem behavior, and detailed instructions for each step of the BFA. During the training the primary researcher provided each teacher with an overview of the BFA procedures, modeled the BFA procedures and the problem behavior, and delivered corrective feedback after observing each teacher demonstrate the BFA procedures. Additionally, an experimenter was present during every BFA session. During the BFA sessions, the experimenter prompted the teacher to implement the BFA procedures using a neon-colored sign as a cue. Each BFA condition had a different color sign to assist the teacher with discriminating between BFA conditions.

Tangible condition. A reinforcer menu (see Appendixes H and I for protocols), with descriptive images placed above each teacher reported preferred item, was used to assess participant's preferred tangible items prior to the implementation of the tangible session (Cooper et al., 2007). Specifically, the menu included four items that the teacher reported the child preferred to play with. A corresponding picture was included next to each item. Prior to each tangible session, the child was instructed to pick one item he wanted to play with. Immediately after the preference assessment, the child was given 2-min access to the highly preferred item. The tangible condition (see Appendix J for protocol) was conducted during the same activity as the attention and escape conditions. Contingent on the occurrence of the target problem behavior, the teacher provided the participant with access to the preferred item for 30 s. All other problem behaviors were ignored.

Attention condition. During the attention condition (see Appendix K for protocol), the teacher was positioned next to the child and delivered neutral attention in the form of a typical conversation for approximately 2 min prior to the classroom activity. At the end of the 2 min, the teacher notified the child that it was time to begin the designated classroom activity and removed all social attention from the child. At this time the teacher engaged in classroom-related work (e.g., giving group or individual instructions) in an area of the room that was visible to the child. Following the occurrence of the target problem behavior, the teacher delivered brief social attention to the child in the form of reprimands (e.g., "stop that!"). After delivering brief reprimands, the teacher diverted her attention away from the child. All other problem behaviors were ignored.

Escape condition. During the escape condition (see Appendix L for protocol), the teacher engaged in classroom-related work (e.g., giving group or individual instructions) in an area of the room that was visible to the child. Following the occurrence of the target problem behavior, the teacher withdrew the task from the child and turned away from the child for 30 s. At the end of the 30-s escape interval, the task was re-presented, and the teacher instructed the child to get back to work. All other problem behaviors were ignored. A three-prompt hierarchy was used to ensure that the child did not escape task demands for any behavior other than the target problem behavior. This method included: (a) a verbal command, (b) a verbal command plus a physical prompt, and (c) a verbal command and hand-over-hand guidance. Specifically, if the child engaged in non-compliance for the task instruction, but did not exhibit the target problem behavior, the teacher reinstated the verbal command with the addition of an academically related

physical prompt. If the child still did not comply with the command, the verbal command and hand-over-hand guidance were used to ensure that the child did not escape the academic activity following any behavior other than the target problem behavior (LeGray et al., 2010).

Control condition. During the control condition (see Appendix M for protocol), no demands were given to the child. The condition was conducted in an area of the classroom that was away from the other children and regular classroom activities. The condition included free access to teacher-reported preferred tangible items and a non-academic task (e.g., coloring, puzzles). The child engaged in a non-academic task while the teacher delivered neutral attention every 30 s (e.g., "You are putting a puzzle together."). All problem behaviors were ignored.

Contingency reversal phase. A contingency reversal (see Appendix N for protocol) was included to confirm the results of the BFA. The contingency reversal phase included a brief BAB design. During the B phase, the contingency with the highest occurrence of problem behavior was reversed via a differential reinforcement of other behavior (DRO) procedure. Specifically, when the child did not engage in the problem behavior for 30 s, the reinforcer was delivered, whereas if the child did engage in the target behavior, the DRO interval was reset. During the A phase, the BFA condition with the highest occurrence of problem behavior was replicated.

Intervention Analysis

Following the BFA, two function-based interventions (i.e., an antecedent intervention and a consequent intervention) were implemented for each child. Prior to the intervention analysis, teachers were trained on intervention methods using a detailed

protocol that included the following: (a) operational definitions of the problem behavior and appropriate replacement behavior, (b) examples of both types of behaviors, and (c) explicit instructions for each step of the intervention. The session included providing the teacher with an overview of the intervention strategies, modeling the target behaviors and intervention methods, instructing the teacher to role-play implementing the intervention procedures, and providing the teacher with corrective feedback. Clarification about the details of the intervention methods was also delivered when deemed necessary. In addition to providing direct training to the teacher for intervention implementation, an experimenter was present during every intervention session. During the intervention sessions, the experimenter prompted the teacher to implement critical intervention steps by cueing the teacher using neon colored paper. Additionally, a different color sheet of paper was used for each condition to aid the teacher in discriminating between condition procedures.

Function-based antecedent intervention. Each participant's function-based antecedent intervention was determined according to the results of the FBA. The function-based antecedent intervention was linked to one of the functions included in the hypothesis-based BFA (e.g., access to attention, access to tangibles, or escape from demands). For this study, antecedent function-based interventions included manipulating motivational operations. Specifically, an abolishing operation procedure was used as the function-based antecedent intervention. Each child's FBA indicated that attention was the probable function of his target problem behavior. Following evaluation of the results of the FBA, the function-based antecedent intervention chosen for all three children was noncontingent reinforcement (NCR) (Austin & Soeda, 2008). The NCR intervention

included a protocol (see Appendix O for Function-Based Antecedent Intervention Protocol) with detailed teacher instructions on the administration of the intervention condition. During each session, the teacher delivered attention on a fixed-time schedule (e.g., every 60 s), independent of the child's behavioral performance. The attention delivered to each child during the NCR condition was both conversational and descriptive in nature (e.g., "You are playing with the blocks." "You're playing in your area." "In the block area we keep the blocks on the floor and share.") (Austin & Soeda, 2008; Banda & Sokolosky, 2012). The teacher, functioning as the primary interventionist, was prompted by the researcher every 60 s to deliver the designated reinforcement (i.e., attention).

*Function-based consequent intervention***.** DRA (see Appendix P) was used as the function-based consequent interventions for each child's problem behavior. DRA is an empirically supported function-based intervention that has been found to be effective for decreasing problem behavior for preschool age children exhibiting problem behaviors in the classroom (LeGray et al., 2010). During the session, the teacher, functioning as the primary interventionist, implemented all steps of the DRA protocol. Following a 60-s absence of the target problem behavior (i.e., fixed interval 60-s reinforcement schedule), reinforcement was delivered subsequent to the first occurrence of the appropriate replacement behavior. If the target problem behavior occurred at any point during the 60-s interval, the interval was reset (i.e., extinction). Attention was identified as the function of all four children's problem behavior. Therefore, reinforcement included the teacher providing attention (e.g., "I like how you raised your hand.") for the occurrence of appropriate replacement behavior following each 60-s interval in which the problem behavior did not occur. The researcher used a colored sheet of paper as a visual cue to

prompt the teacher when to implement the designated reinforcement. The occurrence of problem behavior resulted in planned ignoring (i.e., extinction). Specifically, the teacher withheld reinforcement following the occurrence of the problem behavior.

Control condition. The control condition consisted of the teacher's normal teaching methods and classroom management techniques. The primary researcher instructed the teacher to use only her typical teaching techniques and to refrain from using the specified antecedent intervention or consequent intervention during this condition. The control condition allowed for a direct observation of the occurrences of target problem behaviors and appropriate replacement behaviors in the absence of either of the function-based interventions.

Interobserver Agreement, Procedural Integrity, and Treatment Integrity

Interobserver Agreement (IOA) was conducted for at least 30% of sessions across all conditions. IOA was calculated separately for each dependent variable (i.e., problem behavior and appropriately engaged behavior) by dividing the total number of agreements (occurrence and nonoccurrence) by the total number of agreements and disagreements, multiplied by 100. Additionally, Kappa was calculated for each IOA observation as a statistical measure to further evaluate IOA (Watkins & Pacheco, 2000). Specifically, Kappa was used to account for the agreements and disagreements between observers due to chance, yielding a more statistically sound calculation of IOA (Watkins & Pacheco, 2000). Observers included graduate and undergraduate students who had demonstrated at least 90% agreement with the primary researcher prior to collecting data. Prior to conducting observations, observers were provided with operational definitions of all behaviors to be recorded.

For Jimmy and Mike, IOA was completed for 83% of functional analysis sessions for problem behavior with a mean agreement of 99.2% (range: 96-100%; Kappa = .994) and 96.4% (range: 90-100%; Kappa = .886), respectively. IOA was completed for 86% of Alfie's functional analysis sessions for problem behavior with a mean agreement of 99% (range: 96-100%; Kappa = .922). IOA was completed for 100% of Jack's functional analysis sessions for problem behavior with a mean agreement of 99% (range: 98.3-100%; Kappa = .96). In regard to intervention sessions, IOA was completed for 72% of Jimmy's sessions, 54% of Mike's sessions, 77% of Alfie's sessions, and 75% of Jack's sessions for both problem behavior and appropriate replacement behavior. For problem behavior, the mean IOA was 96.3% (range: 90-100%; Kappa = .881), 95.3% (range: 90-100%; Kappa = .815), 98.7% (range: 95-100%; Kappa = .924), and 98.9% (range: 96.6-100%; Kappa = .956), respectively. For the appropriate replacement behavior, the mean IOA was 96.4% (range: 90-100%; Kappa = .785), 94.5% (range: 90-100%; Kappa = .811), 96.8% (range: 91.6-100%; Kappa = .944), and 97.8% (range: 94.4-100%; Kappa = .914), respectively.

Procedural integrity observations (see Appendixes Q-T for integrity checklists) included a checklist of procedural steps for each BFA condition. Furthermore, treatment integrity evaluations were completed for the antecedent-based intervention, consequent-based intervention, and control sessions in the ATD (see Appendixes U-W for integrity checklists) and verification phase. Treatment integrity evaluations included a checklist of procedural steps for each function-based intervention and control condition. IOA for both procedural and treatment integrity checks were completed for at least 30% of sessions.

For all four participants, procedural integrity was completed for 100% of functional analysis sessions with procedural integrity of 100% for all sessions. For Jimmy, treatment integrity was completed for 61% of intervention sessions, with an average integrity of 97.2% (range: 70-100%). IOA was completed for 100% of Jimmy's BFA procedural integrity checks and 64% of his treatment integrity checks, yielding 100% IOA for procedural and treatment integrity checks across phases.

For Mike, treatment integrity was completed for 62.5% of intervention sessions with an average integrity of 100%. IOA was completed for 100% of Mike's BFA procedural integrity checks and 73% of his treatment integrity checks, yielding 100% IOA for procedural and treatment integrity checks across phases. For Alfie, treatment integrity was completed for 77% of intervention sessions with an average integrity of 100%. IOA was also completed for 92% of Alfie's BFA procedural integrity checks and 71% of his treatment integrity checks, yielding 99% (range: 90-100%) IOA for procedural integrity checks and 100% for the treatment integrity checks. For Jack, treatment integrity was completed for 100% of intervention sessions, and integrity was 100% for all sessions. IOA was completed for 100% of Jack's BFA procedural integrity checks and 80% of his treatment integrity checks, yielding 100% IOA for procedural and treatment integrity checks across phases.

When treatment integrity fell below 90%, the teacher implementing treatment was provided with performance feedback in an effort to increase treatment integrity for that condition. During one intervention session, treatment integrity fell below the 90% criterion. Jimmy's teacher was provided with performance feedback following a DRA session that was completed with low integrity (70% treatment integrity). Performance

feedback included information regarding the steps the teacher implemented with integrity, along with suggestions on how to enhance implementation of the steps in need of improvement (Noell et al., 2005).

CHAPTER III

RESULTS

Functional Analysis

Jimmy

Results of Jimmy's BFA are included in Figure 1. Jimmy's BFA data were collected over six days, lasting approximately 10 min each day. The control condition did not result in any occurrence of out-of-area behavior. The attention condition resulted in out-of-area during 26.6% of the observed intervals. Yielding the lowest occurrence of out-of-area behavior, the escape condition resulted in out-of-area behavior during 8.3% of the observed intervals. The BFA yielded a clear divergence between the attention condition and the escape and control conditions; thus, a contingency reversal phase was conducted to verify the results of the BFA. During the B condition, Jimmy did not engage in any occurrence of out-of-area behavior. The A condition, where the attention condition was replicated, resulted in out-of-area behavior for 10% of the observed intervals. Although the A condition resulted in lower levels of out-of-area behavior when compared to the BFA attention condition, it did result in a higher occurrence of out-of-area behavior in comparison to the B condition. Additionally, both B conditions did not result in any occurrence of problem behavior, suggesting that teacher attention was an effective reinforcer for reducing the target problem behavior. Therefore, based on the results of the functional analysis, it was determined that the function of Jimmy's out-of-area behavior was access to teacher attention.

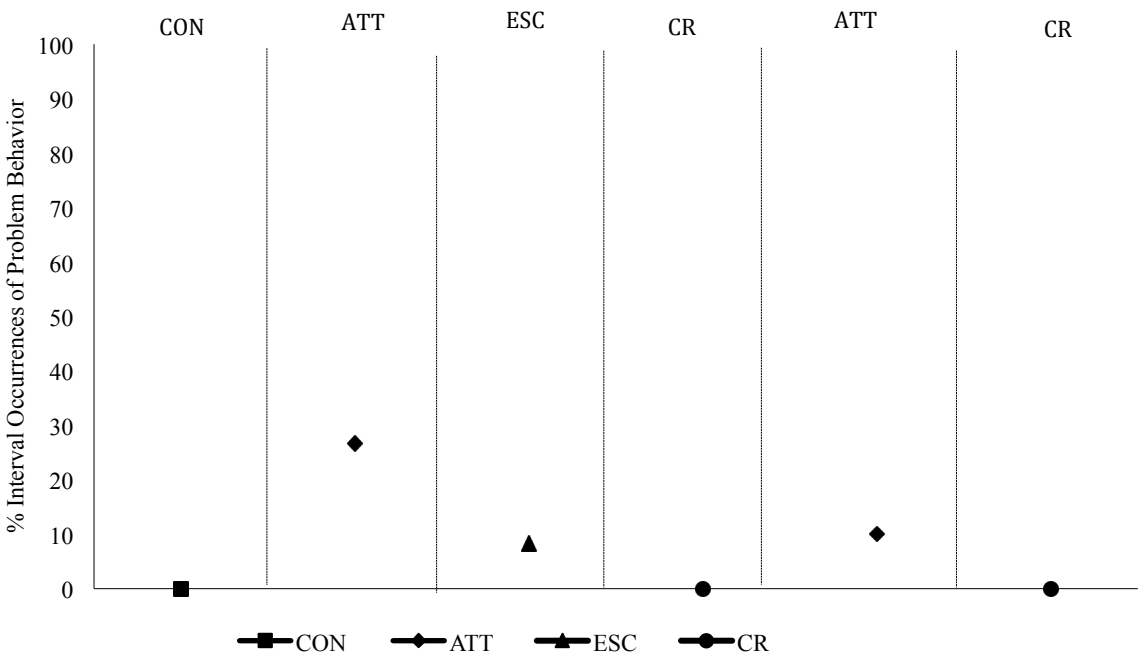

Figure 1. Results of Jimmy's functional analysis.

Mike

Results of Mike's BFA are included in Figure 2. Mike's BFA data were collected over six days, lasting approximately 10 min each day. The first condition (i.e., attention) resulted in off-task behavior occurring during 93% of the observed intervals. The control condition did not result in any occurrence of off-task behavior. The escape condition resulted in off-task behavior occurring in 28% of observed intervals, indicating a 65% divergence relative to the attention condition. Thus, a contingency reversal phase was conducted to verify the results of the BFA. The first session during the B condition resulted in a low occurrence of off-task behavior (i.e., 13% occurrence of off-task behavior). The A condition resulted in a rapid increase in off-task behavior (i.e., 71.6% occurrence of off-task behavior). The second session of the B condition resulted in a high level of off-task behavior (i.e., 85% occurrence of off-task behavior). Although the second session of the B condition did not result in low levels of problem behavior, the

BFA resulted in a clear divergence between the attention and escape condition. Additionally, there was a clear divergence between the first session of the B condition and the A condition during the contingency-reversal phase. As a result, it was determined that the function of Mike's off-task behavior was access to teacher attention.

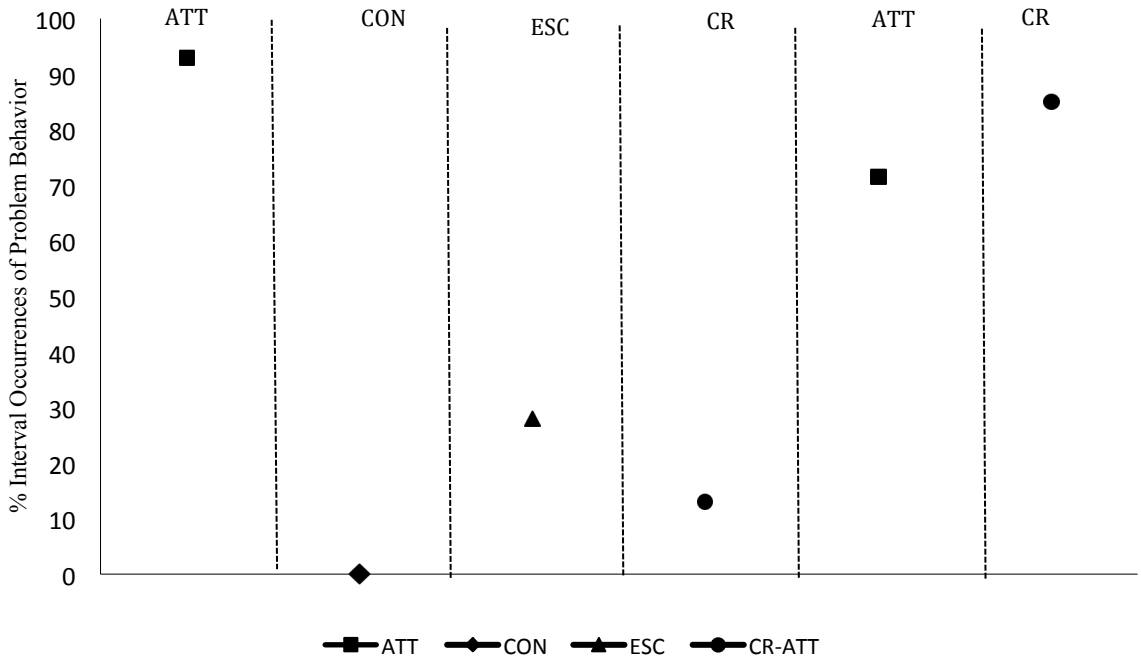

Figure 2. Results of Mike's functional analysis.

Alfie

Alfie's functional analysis data were collected over 13 days, lasting approximately 10 min each day. During Alfie's BFA (see Figure 3), the attention and escape conditions both resulted in low occurrences of out-of-area behavior (i.e., out-of-area occurring during 6.6% of observed intervals). As a result, an extended analysis was conducted to further examine the function of Alfie's out-of-area behavior. During the extended analysis, the attention condition resulted in an average of 74.5% (range: 25-97%) occurrence of out-of-area behavior. The escape condition resulted in an average of 32.5% (range: 5-65%) occurrence of out-of-area behavior. The control condition did not

result in any occurrence of out-of-area behavior. Due to the clear divergence between the attention condition and both the escape and control conditions, it was determined that Alfie's out-of-area behavior was maintained by access to teacher attention.

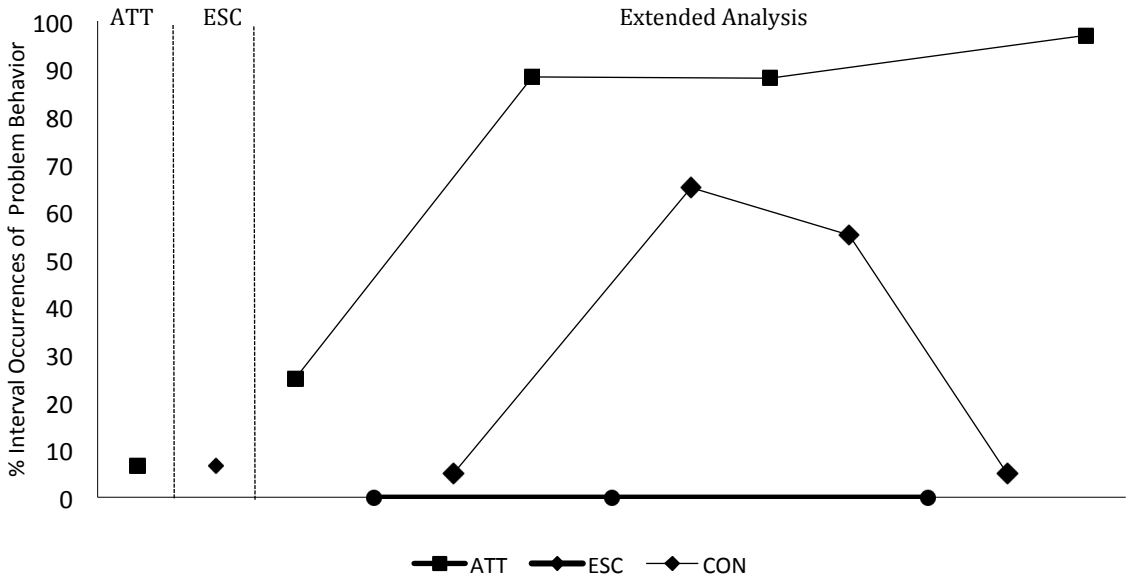

Figure 3. Results of Alfie's functional analysis.

Jack

Jack's BFA results are included in Figure 4. Jack's BFA data were collected over seven days, lasting approximately 10 min each day. The escape and control conditions did not result in any occurrence of out-of-area behavior. The tangible condition resulted in out-of-area behavior during 21.6% of the observed intervals. The attention condition resulted in out-of-area behavior during 41.6% of intervals, yielding at least a 20% divergence between the tangible, escape, and control conditions. Thus, a contingency reversal phase was conducted to verify the results of the BFA. During the first B condition, Jack engaged in out-of-area behavior during 5% of the observed intervals. Jack's out-of-area behavior immediately increased during the A condition, resulting in out-of-area behavior during 27% of the observed intervals. During the

second B condition, Jack's out-of-area behavior immediately decreased, yielding a 10% occurrence of out-of-area behavior during the observed intervals. As a result, it was determined that Jack's out-of-area behavior was maintained by access to teacher attention.

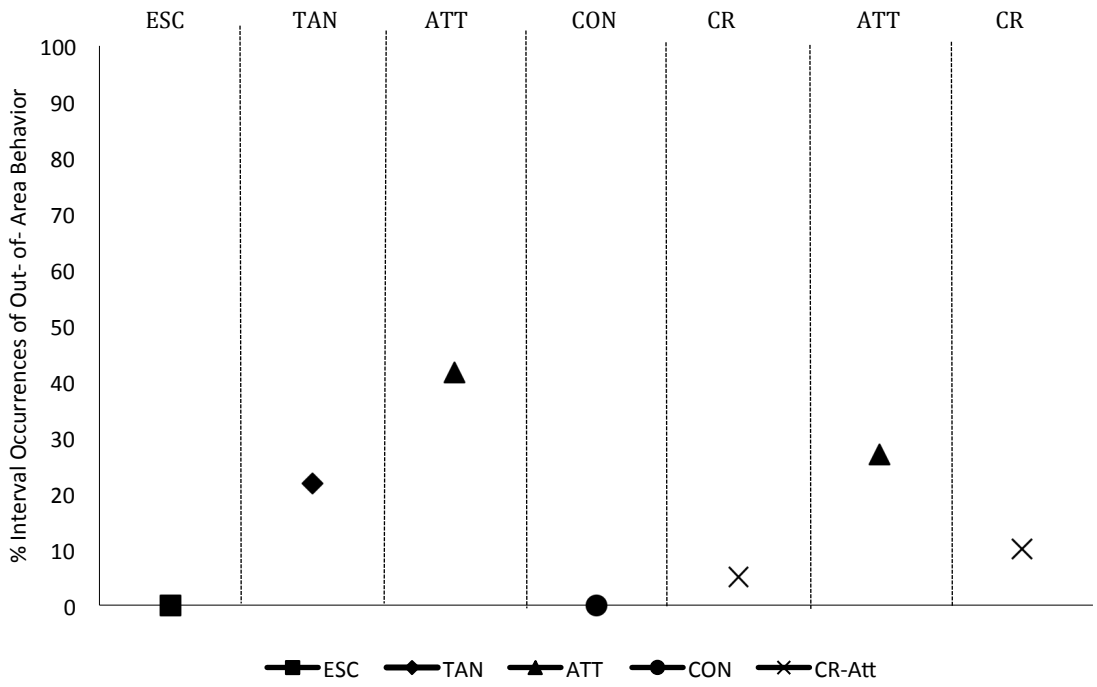

Figure 4. Results of Jack's functional analysis.

Intervention Analysis

Jimmy

Figures 5 and 6 include intervention analysis results for out-of-area and appropriately engaged behavior, respectively. The NCR condition resulted in out-of-area behavior occurring during a mean of 3.6% (range: 0-7.7%) of the observed intervals and appropriately engaged behavior occurring during a mean of 93.7% (range: 84-100%) of the observed intervals. The DRA condition resulted in out-of-area behavior occurring during a mean of 27.3% (range: 13-24%) of the observed intervals and appropriately engaged behavior occurring during a mean of 65.3% (range: 54-80) of the observed

intervals. The control condition resulted in out-of-area behavior occurring during an average of 28.6% (range: 17-47%) of the observed intervals and appropriately engaged behavior occurring during 57.6% (range: 53-62%) of the observed intervals.

Due to the clear divergence between conditions, a verification phase was completed with the NCR condition. During the verification phase, NCR resulted in out-of-area behavior occurring during 4.4% (range: 0-10%) of the observed intervals and appropriately engaged behavior occurring during an average of 93.9% (range: 87-97.7%) of the observed intervals.

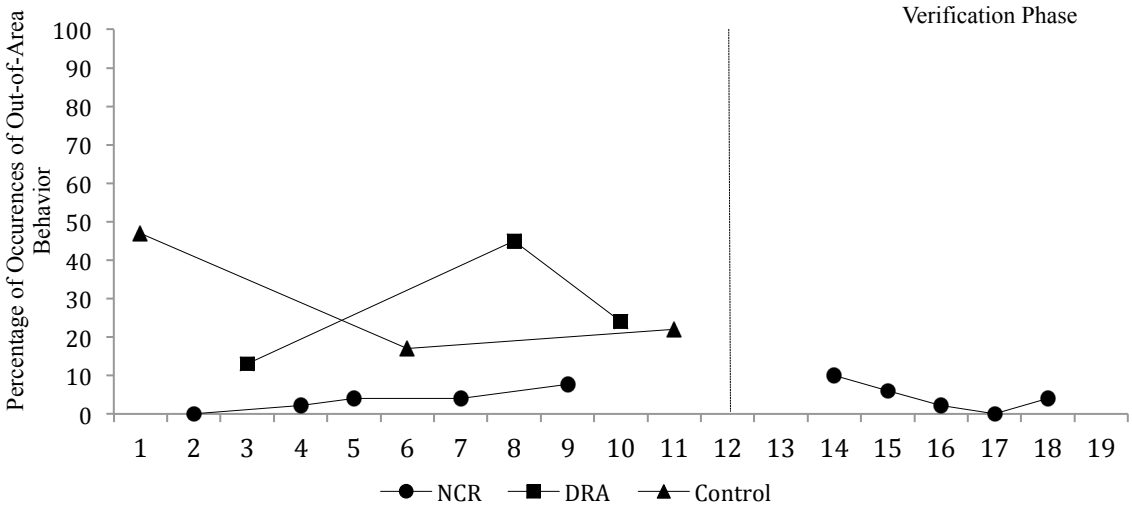

Figure 5. Jimmy's level of out-of-area behavior.

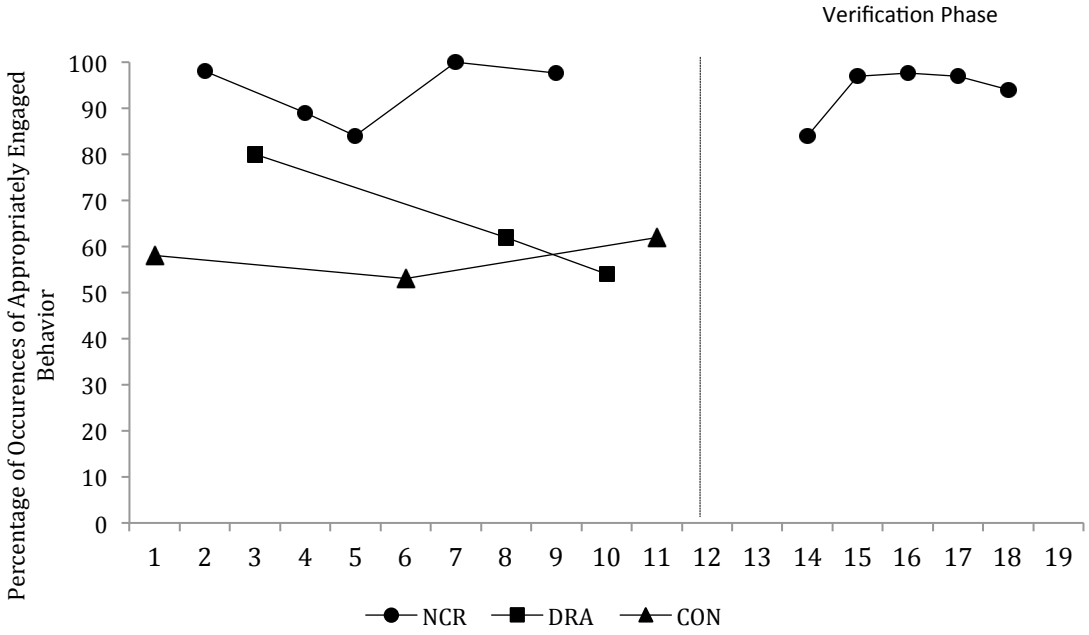

Figure 6. Jimmy's level of appropriately engaged behavior.

Mike

Figures 7 and 8 include intervention analysis results for Mike's off-task and appropriately engaged behavior, respectively. The NCR condition resulted in off-task behavior occurring during an average of 15.9% (range: 7.7-25%) of the observed intervals and appropriately engaged behavior occurring during an average of 86.3 (range: 81-92%) of the observed intervals. Data from the DRA condition indicated that off-task behavior occurred during an average of 36.2% (range: 16-65%) of the observed intervals and appropriately engaged behavior occurred during an average of 68.2% (range: 34-95%) of the observed intervals. During the control condition, off-task behavior occurred during an average of 86.3% (range: 74-95.1%) and appropriately engaged behavior occurred during an average of 16.3% (range: 10.9-25%) of the observed intervals.

Due to clear divergence between conditions, a verification phase was completed with the NCR condition. During the verification phase, NCR resulted in off-task behavior occurring during an average of 31.7% (range: 12-46%) of the observed intervals and appropriately engaged behavior occurring during an average of 70.6% (range: 53-88.8%) of the observed intervals. The verification phase yielded variable data for both the occurrence of off-task behavior (average of 31.7; range: 12-46) and appropriately engaged behavior (average of 70.6; range: 53-88.8). Furthermore, data from the last two NCR intervention sessions yielded an increasing trend for off-task behavior and a decreasing trend for appropriately engaged behavior; thus, a modified intervention was developed and implemented. The modified intervention included both antecedent and consequent-based components. Specifically, a pre-teaching + NCR component was implemented where Mike reviewed the target appropriate replacement behavior (i.e., appropriately engaged behavior) with his teacher immediately prior to completing the NCR intervention. Additionally, a sticker chart was included as an added consequent-based intervention. Specifically, if Mike received a predetermined number of stickers for engaging in appropriate behavior during the session, he would get to choose one out of three highly preferred rewards at the end of the intervention session.

During the modified intervention phase, off-task behavior occurred during an average of 12.9% (range: 8.3-20%) of the observed intervals and appropriately engaged behavior occurred during an average of 89.6% (range: 77.7-95) of the observed intervals. Data from the modified intervention suggest that a combination of antecedent- and consequent-based interventions were most effective at reducing Mike's off-task behavior and improving his appropriately engaged behavior.

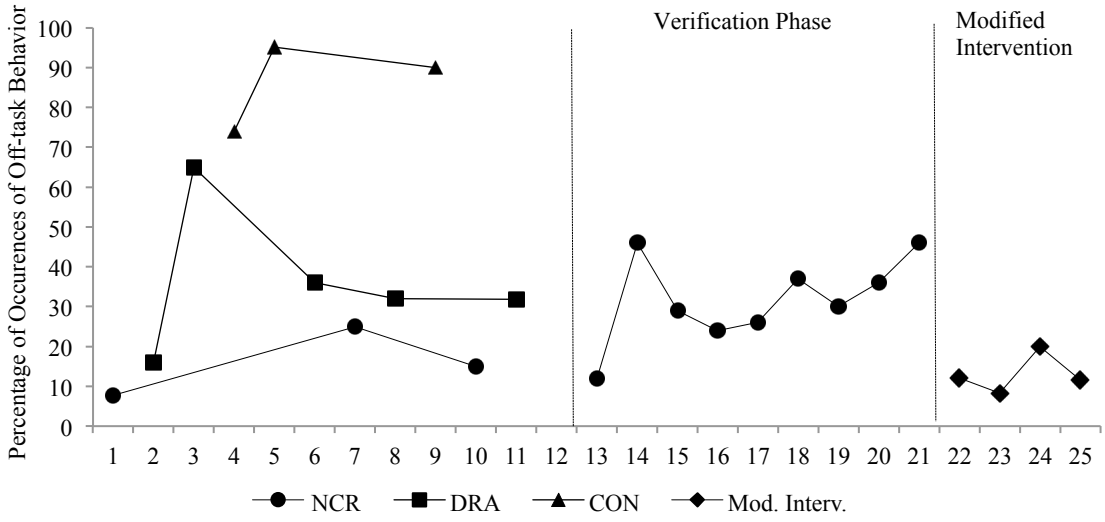

Figure 7. Mike's level of off-task behavior.

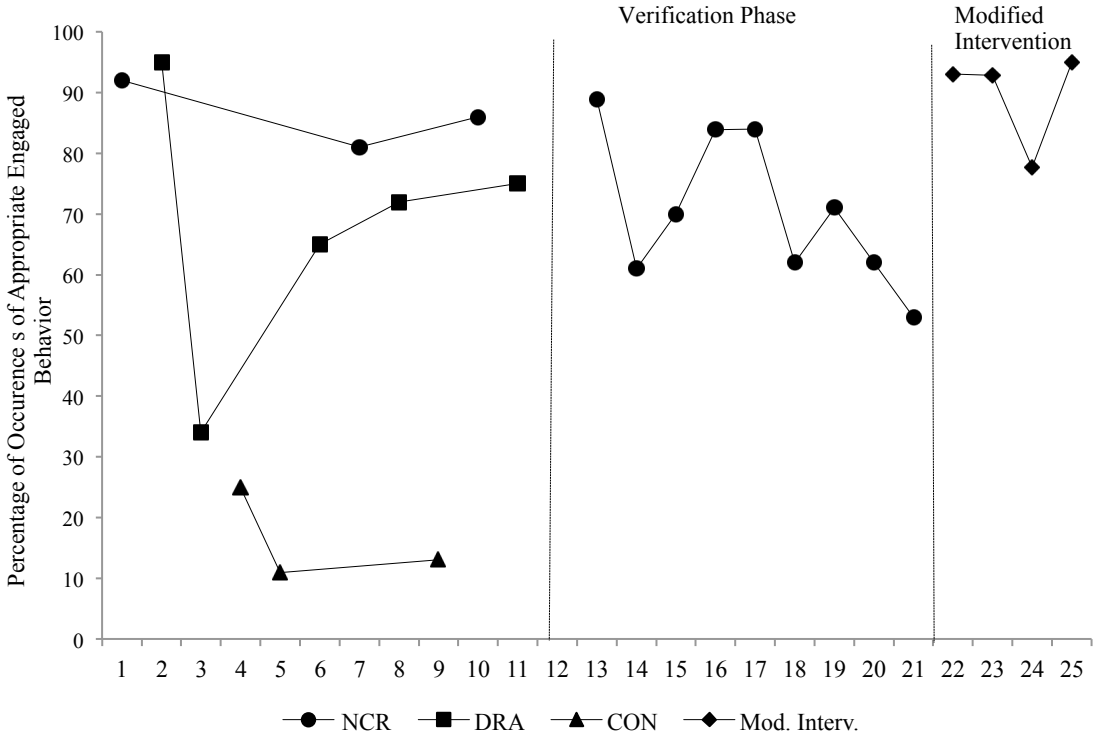

Figure 8. Mike's level of appropriately engaged behavior.

Alfie

Figures 9 and 10 display Alfie's intervention analysis results for out-of-area and appropriately engaged behavior, respectively. For the NCR condition, out-of-area behavior occurred during an average of 7.6% (range: 4-11%) of the observed intervals and appropriately engaged behavior occurred during an average of 73% (range: 60-73%) of the observed intervals. The DRA condition resulted in out-of-area behavior occurring during an average of 24.2% (range: 1.6-43%) of the observed intervals and appropriately engaged behavior occurring during an average of 59.8% (range: 42-80%) of the observed intervals. The control condition resulted in out-of-area behavior occurring during an average of 66.3% (range: 49-78%) of the observed intervals and appropriately engaged behavior occurring during an average of 17.3% (range: 12-23%) of the observed intervals.

Due to Alfie's extended absences (i.e., intermittently absent multiple days per week) and the end of the school year, further data for the intervention analysis and a verification phase were unable to be compiled. Therefore, it is unknown if, after further analysis of the problem behavior and the appropriate replacement behavior, the function-based antecedent or consequent intervention would have been more effective. Additionally, while there was a clear increase in appropriately engaged behavior for both NCR and DRA conditions, both were variable and resulted in only a moderate increase in Alfie's level of appropriately engaged behavior (i.e., a mean average occurrence of 73.3 and 58.8%, respectively). Therefore, it is unknown if this level of improvement would be meaningful to teachers in a preschool setting. The results do, however, suggest

that both the function-based antecedent and consequent interventions were more effective than the control condition at decreasing Alfie's out-of-area behavior and increasing his appropriately engaged behavior.

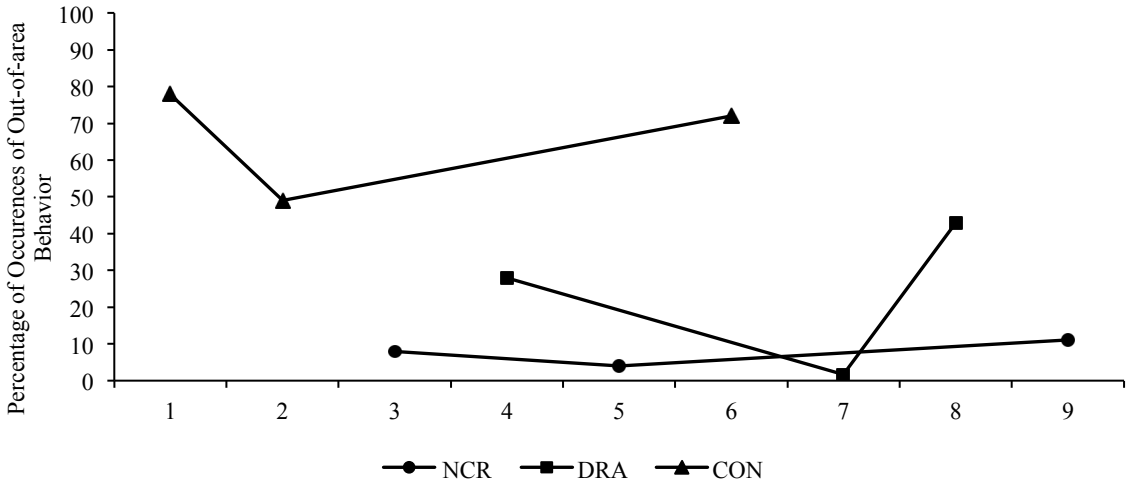

Figure 9. Alfie's level of out-of-area behavior.

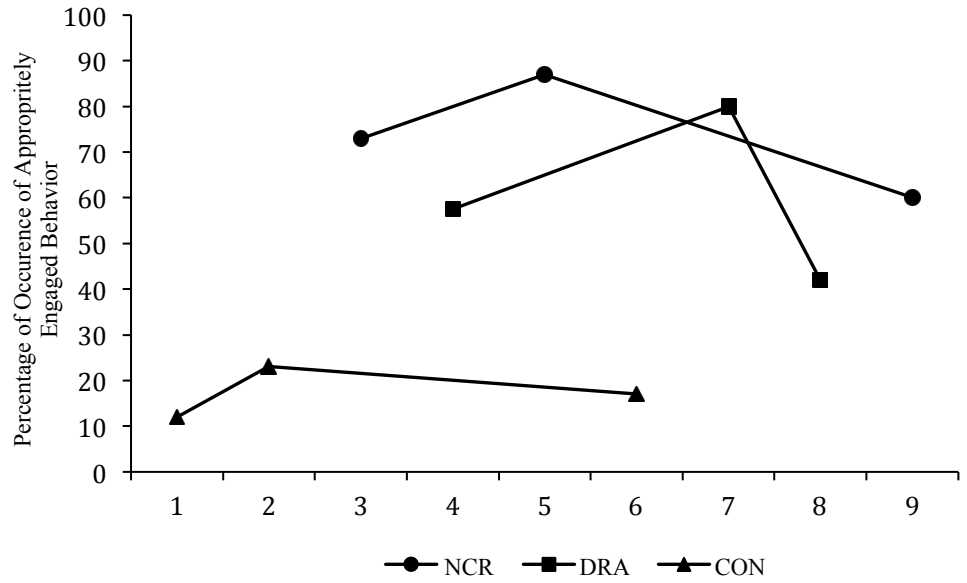

Figure 10. Alfie's level of appropriately engaged behavior.

Jack

Figure 11 and 12 include intervention analysis results for Jack's out-of-area and appropriately engaged behavior, respectively. The NCR condition resulted in out-of-area behavior occurring during an average of 19.6% (range: 3.33-40%) of the observed intervals, with appropriately engaged behavior occurring during an average of 84.4% (range: 65.6-96.7%) of the observed intervals. The DRA condition resulted in out-of-area behavior occurring during an average of 31.7% (range: 5.5-80%) of the observed intervals, with appropriately engaged behavior occurring during an average of 74.4% (range: 31.2-95.5%) of the observed intervals. During the control condition, out-of-area behavior occurred during an average of 59.5% (range: 3.33-90%) of the observed intervals and appropriately engaged behavior occurred during an average of 41.6% (range: 14.4-96.7%) of the observed intervals.

While both NCR and DRA were effective at decreasing out-of-area behavior and increasing appropriately engaged behavior when compared to the control condition, a comparison of the mean occurrence of appropriately engaged behavior and out-of area behavior for NCR and DRA revealed NCR to be slightly more effective at increasing appropriately engaged behavior and decreasing out-of-area behavior. However, since the divergence between the two interventions during the intervention analysis was limited, Jack's teacher was asked to pick which intervention she preferred to continue during the verification phase. She indicated that she preferred NCR and that she would like to continue implementing this intervention during the verification phase. Therefore, a verification phase was completed with the NCR condition. During the verification phase, NCR resulted in out-of-area behavior occurring during an average of 5.3% (range: 0-

11.7%) of the observed intervals, with appropriately engaged behavior occurring during an average of 93.4% (range: 88.2-97.8%) of the observed intervals.

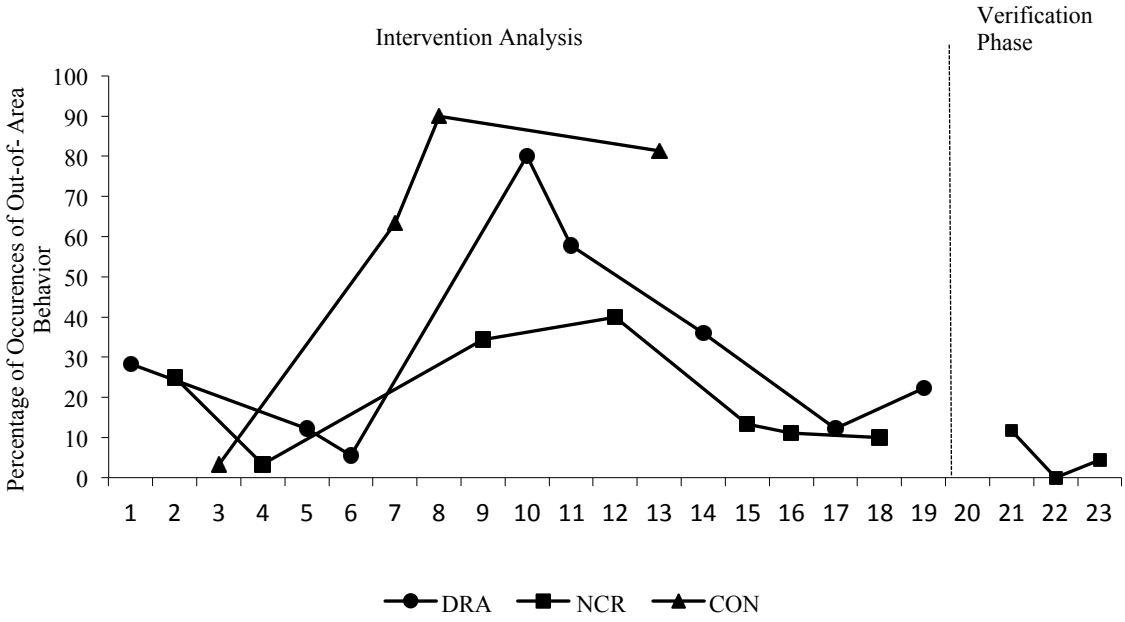

Figure 11. Jack's level of out-of-area behavior.

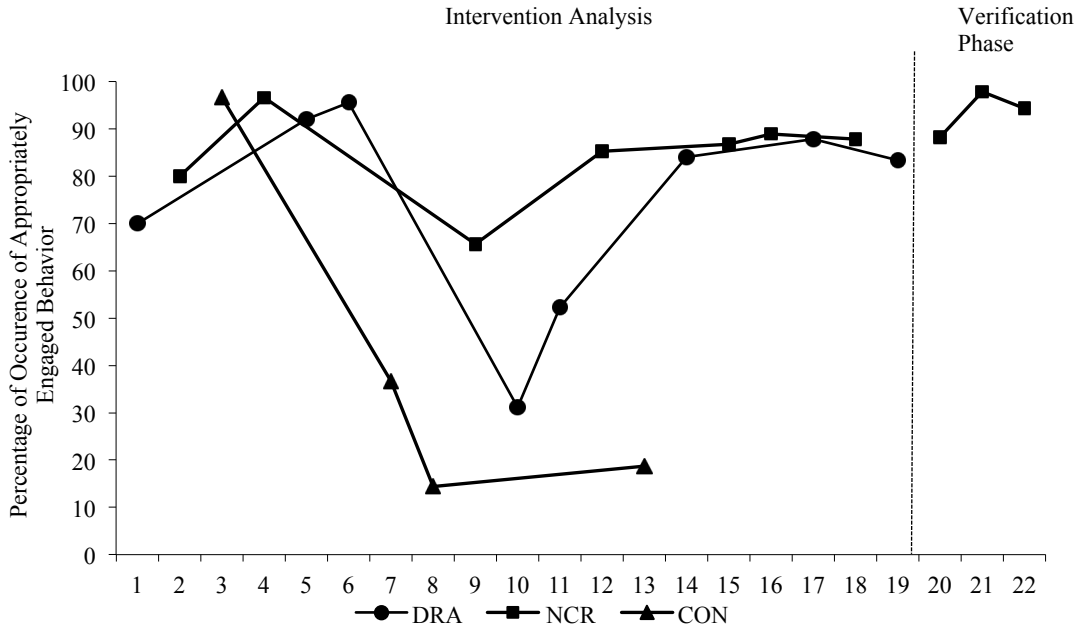

Figure 12. Jack's level of appropriately engaged behavior.

Acceptability

To evaluate teacher acceptability of the functional and intervention analysis procedures, Jimmy's, Mike's, Alfie's, and Jack's teachers completed the ARP-R and IRP-15 at the end of data collection. Jimmy, Mike, and Jack's teacher responses on the APR-R suggest that they found the functional analysis procedures acceptable, with Jimmy's teacher's ratings resulting in a total score of 59, Mike's teacher's ratings resulting in a score of 50, and Jack's teacher's rating resulting in a score of 74. Alfie's teacher's responses on the ARP-R were slightly lower (i.e., total score of 39), indicating that she did not find the functional analysis procedures as acceptable as Jimmy's and Mike's teacher's or as acceptable as she did during Jack's BFA.

In regards to the IRP-15, the teacher responses for Jimmy, Alfie, and Jack indicated that they found both the NCR and DRA procedures acceptable. Specifically, Jimmy's teacher's ratings resulted in a total score of 62 for the NCR intervention and 76 for the DRA intervention, Mike's teacher's ratings resulted in a total score of 59 for the NCR and 71 for the DRA intervention, and Jack's teacher's ratings resulted in a total score of 81 for NCR and 71 for the DRA intervention. While Jimmy's and Mike's teachers' ratings on the IRP-15 indicate that they found both interventions acceptable, the scores suggest that both teachers found DRA to be a slightly more acceptable intervention. Conversely, Jack's teacher's ratings on the IRP-15 indicate that his teacher found NCR to be a slightly more acceptable intervention. Alfie's teacher's ratings on the IRP-15 yielded a slightly lower acceptability score in comparison to teacher ratings for Jimmy, Mike, and Jack, with Alfie's teacher's responses yielding a total score of 46 for both the NCR and DRA intervention procedures. Due to time constraints surrounding the

end of the school year, the experimenter was not able to follow-up with Alfie's teacher regarding her scores on the IRP-15. Therefore, further information as to why both interventions received an acceptability score of 46 was lacking. IRP-15 scores of 52.5 and above signify that the teacher found the intervention procedures acceptable (Von Brock & Elliott, 1987).

CHAPTER IV

DISCUSSION

Since Iwata et al.'s (1982) seminal functional analysis article, a substantial amount of FBA research has been conducted. However, there are still important gaps in the literature that need to be addressed. In particular, the preschool FBA literature is limited relative to other populations and settings. Additionally, there is need for further evaluation of the relative efficacy of various function-based intervention procedures. School psychologists in particular may benefit from further research identifying the most effective treatment strategies to improve student behavior in the classroom setting, thus warranting further analysis regarding the relative effectiveness of function-based antecedent and consequent interventions. The subsequent discussion of the results from this study is organized by research question, followed by description of limitations and future research directions.

Research Question 1

The first research question concentrated on the relative effectiveness of function-based antecedent and consequent interventions at decreasing each child's problem behavior in the classroom setting. The results suggest that while both the function-based antecedent intervention (i.e., NCR) and consequent intervention (i.e., DRA) were effective at decreasing each child's problem behavior, NCR was more effective than DRA for two of the four participants (i.e., Jimmy and Jack). For Jimmy, NCR was consistently more effective at decreasing the problem behavior, resulting in no overlapping data for both the DRA condition and the control condition. During the verification phase, the results remained stable, confirming the findings from the

intervention analysis. For Jack, NCR was only slightly more effective than DRA at decreasing problem behavior and resulted in multiple overlapping data points. When assessing the sum of the intervention analysis data, NCR was less variable than DRA for problem behavior with a mean occurrence of 19.5% (range: 3.3-40%) during the NCR condition and 31.7% (range: 5.5-80%) during the DRA condition. Additionally, during the NCR condition, there was only one datum point that overlapped with the control condition. Due, however, to the limited divergence between NCR and DRA during Jack's intervention analysis, Jack's teacher was asked to choose which intervention she preferred to continue during the verification phase. Jack's teacher chose the NCR intervention, resulting in a stable, low level of problem behavior throughout the verification phase. The results of the present study suggest that for two of the four participants the antecedent-based intervention was more effective than the consequent-based intervention at decreasing the problem behavior.

Research Question 2

The second research question pertained to the relative effectiveness of the function-based antecedent and consequent interventions at increasing each child's appropriately engaged behavior. The results of the current study suggest that while both function-based interventions were effective at increasing AEB relative to the non-intervention-control condition, the function-based antecedent intervention (NCR) was more effective at increasing AEB than the consequent-based intervention (DRA) for two of the four participants (i.e., Jimmy and Jack). For Jimmy, NCR was more effective than both DRA and the non-intervention-control condition, with no overlapping data. During the verification phase, the results of the NCR data remained relatively stable,

authenticating the results of the intervention analysis. For Jack, NCR was only slightly less variable than DRA at increasing AEB behavior, with several of the DRA intervention data points overlapping with the NCR data. When assessing the sum of the intervention analysis data, it was observed that the NCR condition resulted in a mean occurrence of 84.4% (range: 65.6-96.7%) AEB during recorded intervals and the DRA condition resulted in a mean occurrence of 74.4% (range: 31.1-95.5%) AEB during recorded intervals. Additionally, NCR only overlapped with the control condition on one occasion, while three of the DRA data points overlapped with the control condition during the intervention analysis. As detailed previously, due to the limited divergence between the NCR and DRA conditions during ATD, Jack's teacher was asked to choose which intervention would be preferable to continue during the verification phase. NCR was chosen and resulted in a stable and high occurrence of AEB throughout the verification phase. The results of the study suggest that for two of the four children the antecedent-based intervention was more effective than the consequent-based intervention at increasing AEB.

In regard to the other two children (i.e., Mike and Alfie), the results were mixed. For Mike, NCR was more effective at decreasing the problem behavior and increasing AEB during the intervention analysis. However, the verification phase resulted in a decreasing trend in the data for AEB and an increasing trend for the problem behavior. As a result, a modified intervention was developed to improve Mike's behavior. The modified intervention included both antecedent- and consequent-based intervention strategies. Due to the modified intervention including multiple components, it is unclear whether the components of the antecedent and/or consequent intervention resulted in the

improvement in Mike's behavior. Thus, Mike's results suggest that while a single function-based intervention may be sufficient enough to improve a child's behavior, over time some children may require supplemental intervention components to maintain initial behavior improvement. For Alfie, both the antecedent and consequent interventions were equally as effective when compared with the non-intervention control condition. However, the results of the AEB data for both interventions were variable with a mean occurrence of 59.8% (range: 42-80%) AEB for DRA and 73.3% (range: 60-87%) for NCR. Due to the modest increase in AEB for both NCR and DRA, it is unknown if the behavior improvement would be meaningful enough for teachers implementing the intervention strategies in the classroom setting. Due to the end of the school year, further analysis of the function-based antecedent and consequent interventions could not be conducted. In summation, although the results for Mike and Alfie were variable, both indicate that the function-based antecedent and consequent interventions were more effective than the control condition.

The results of the current study are consistent with previous studies examining the effectiveness of function-based antecedent and consequent interventions, indicating that both NCR and DRA were effective at improving student behavior in the school setting (Austin & Soda, 2008; Jones et al., 2000; LeGray et al., 2013; LeGray et al., 2010; Lucas, 2000; Meyer, 1999; Wright-Gallo et al., 2006). In regard to the relative efficacy of function-based antecedent and consequent interventions, the results of the current study are in congruence with earlier studies determining that function-based antecedent and consequent interventions are effective at reducing problem behavior in the classroom setting (Ingvarsson et al., 2008; Mueller et al., 2003). Additionally, the current study

extends the literature on the relative effectiveness of function-based antecedent and consequent interventions by including appropriately engaged behavior in the analysis (Mueller et al., 2003) and yielding results that suggested function-based antecedent interventions were more effective at increasing appropriately engaged behavior for two of the four participants (Ingvarsson et al., 2008).

When examining why NCR was more effective than DRA for only two of the four participants, one possible explanation pertains to variations in the schedule of reinforcement. Specifically, NCR involved the child receiving reinforcement on a fixed-timed schedule regardless of their behavior. DRA included an interval schedule of reinforcement in which the first alternative behavior that occurred after a 60 s interval in which problem behavior did not occur was reinforced. As a result, the DRA condition may have included less frequent reinforcement and, therefore, was slightly less effective for two of the participants.

Research Question 3

The third research question addressed differences in teachers' ratings of intervention acceptability for function-based antecedent and consequent interventions. With regard to the FBA procedures, teacher responses for Jimmy, Mike, and Jack suggested that each teacher found the functional analysis procedures and the intervention procedures to be acceptable. However, Alfie's teacher's responses on the ARP-R and the IRP-15 were slightly lower, suggesting that Alfie's teacher did not find the procedures as acceptable. A possible explanation is that, due to data collection starting towards the end of the school year, Alfie's teacher may have decided that the intervention analysis was too extensive a process to implement with the end of the year approaching, therefore

lowering acceptability of the intervention methods. Due to the ending of the school year, the experimenter was not able to follow up with Alfie's teacher regarding her motives for endorsing lower ratings on the IRP-15 (i.e., IRP-15 rating = 46).

In addition to addressing the primary research questions, the present study makes several other contributions to the FBA literature. To start, it expands the literature regarding the teacher's ability to accurately implement the functional analysis and treatment strategies in the classroom setting. All of the teachers who participated in the current study were able to implement the strategies with high integrity (i.e., above 90%) with minimum prompting from the primary researcher. On one occasion, Jimmy's teacher's treatment integrity fell below 90% (i.e., 70%). However, once the primary researcher provided Jimmy's teacher with performance feedback, indicating the steps she completed with integrity and the steps she could improve upon, Jimmy's teacher implemented the remainder of the intervention sessions with high integrity (above 90%). The treatment integrity results suggest that teachers were able to implement functional analysis and function-based intervention strategies in the classroom setting with high integrity. Additionally, the present study extends the literature on the effectiveness of using functional analysis and function-based interventions in the preschool setting, demonstrating that the procedures were effective at identifying the function of each child's problem behavior and improving each child's behavior in the classroom setting.

When discussing the results of the teachers' treatment integrity and acceptability, it is important to note anecdotal observations that may influence a teacher's willingness to complete FBA procedures (e.g., BFA) with preschool children of typical development. Specifically, anecdotal observations suggest that high integrity and acceptability was

related to the severity of the problem behavior (i.e., problem behavior occurring frequently throughout the day resulting in frequent disruption in the classroom), implying that the level of severity of the problem behavior impacts the teacher's willingness to comply with functional analysis procedures. Therefore, as the severity of the problem behavior increases, so too does the teacher's integrity and acceptability of the procedures.

The results of Gresham et al.'s (2004) meta-analysis of the effectiveness of FBA procedures and positive behavioral interventions in improving student behavior in the school setting calls into question the treatment utility of an FBA when conducted in the general education setting. Taking into consideration the limitations of completing functional analysis procedures in the general education classroom setting (e.g., extended time needed to determine the function of the problem behavior, questionable necessity of completing a lofty assessment procedure), it is important to discuss some practical implications and guidelines. First, it is important to address when an FBA can be useful to conduct in a general education setting with students of typical development. It is generally recommended that school psychologists consider conducting an FBA when both Tier I and Tier II intervention methods have been implemented with integrity but are not effective. Second, as stated earlier, it is important to recognize that as the severity of the student's behavior increases (e.g., frequency of the behavior is occurring at high levels and is disrupting the classroom) the teacher's willingness and motivation to implement the BFA and intervention procedures with high integrity also increases. Albeit anecdotal, these practical implications are included to guide school personnel in deciding when the procedures outlined in this study may be appropriate.

Limitations

While the current study extends the literature on the relative effectiveness of function-based antecedent and consequent interventions, several limitations were noted. In regard to limitations to the external validity of the results, all of the children in the study were African American males. To extend the research, future studies should include children of different genders and races. Additionally, as the current study included two problem behaviors that are frequently observed in the classroom setting (i.e., off-task and out-of-area behavior), it is limited in the number of problem behaviors that were evaluated. Future studies should consider expanding the literature to include other common problem behaviors often observed in the classroom setting (e.g., inappropriate vocalization).

When examining limitations related to the internal validity of the results, Alfie's attendance at the end of the school year should be discussed. Due to his recurrent absences and the conclusion of the school year, a verification phase could not be completed. Multiple treatment interference is the primary threat to internal validity in an ATD design, and the verification phase may serve to reduce the likelihood of multiple treatment interference. As such, a verification phase would have yielded additional information that could have been helpful in determining if a single intervention would have been successful when not rapidly altered with another intervention; unfortunately, this was not possible.

Limitations related to Alfie's analysis should also be noted. During the BFA phase of Alfie's analysis, both the escape maintained condition and the attention condition resulted in equally low levels of problem behavior (i.e., 6.6% of intervals with

the occurrence of problem). Due to the limited divergence between the conditions, an extended analysis was completed, with the attention condition yielding higher levels of problem behavior than both the escape condition and the control condition. While the extended analysis yielded clear divergence between conditions, it is possible that Alfie's problem behavior was maintained by both attention and escape. Therefore, an attention-to-escape condition may have resulted in consistently higher levels of problem behavior during the functional analysis and may have yielded a more effective intervention during the intervention analysis. Future studies should consider examining the effectiveness of the function-based intervention procedures when problem behaviors are maintained by more than one function.

Mike's data also prompt some concern related to failure to maintain intervention effects during the verification phase. During Mike's verification there was a decreasing trend for AEB and an increasing trend for problem behavior and, as a result, a modified intervention was developed to ensure that Mike's AEB and problem behavior returned to intervention analysis levels. There are at least two possible reasons for Mike's failure to maintain performance during the independent verification phase. First, multiple treatment interference may have accounted for gains demonstrated during the ATD phase. That is, each intervention may have only been effective due to the rapid alteration of interventions. Then, when one intervention was implemented in isolation, it was no longer sufficient for maintaining behavioral gains. Second, it may be that repeated exposure to the reinforcer during the ATD and verification phases may have resulted diminished reinforcer value (i.e., abolishing operation); as a result, the intervention's potency decreased during the verification phase and additional intervention components

were needed to regain those gains evidenced during the ATD phase. Consequently, the possibility of multiple treatment interference lessens confidence in the efficacy of NCR and DRA in isolation.

Conclusion

The purpose of the present study was to extend the functional analysis and function-based literature by evaluating the relative effectiveness of function-based antecedent and consequent interventions at decreasing problem behavior and increasing appropriate behavior. While there are several limitations to the present study, the results suggest that both the function-based antecedent and consequent interventions were effective at improving the preschool-age children's behavior in the classroom setting. Additionally, the current study extends the function-based antecedent intervention literature, with results suggesting that the function-based antecedent intervention was effective at improving student behavior when compared to a non-intervention control condition, and was more effective than the consequent intervention at improving problem behavior and increasing AEB for two of the four participants. Moreover, in general, teachers rated assessment and intervention procedures as acceptable. As a result, school psychologists may be more confident in conducting functional analyses with preschool children of typical development in cases where both Tier I and Tier II intervention procedures were implemented with integrity but were not effective at reducing problem behavior. The current study, with its focus on typically developing children, lends credence and support toward the implementation of function-based interventions for improving the behavior of children of typical development in the preschool setting.

APPENDIX A

PARENT CONSENT FORM

Title of Study**:** *The Effects of Function-Based Antecedent and Consequent Interventions for Increasing Appropriate Behavior and Decreasing Problem Behavior of Preschool Students in the School Setting*

Study Site**:** **P.A.C.E. Head Start**

Name of Researcher & University affiliation**: Jonna Halphen, M.A.**
The University of Southern Mississippi

Dear Parent,

We are conducting a research study to look at different methods for helping students with behavior problems at school. The methods we will use include designing a specific intervention for your child and observing your child in a number of settings. We will use the information from teachers and observations to develop a behavior intervention plan to help improve your child's classroom behavior.

As a participant, your child will receive a comprehensive behavioral assessment and positive behavioral intervention. The study would take place in your child's classroom during various classroom activities. Sessions will last about 30 minutes and will take place 3 – 5 times per week for the next month or two. The methods being used are all effective and acceptable in school settings. We are asking your permission for your child to be included in this study. Participants in the study may show improvements in classroom behavior by showing decreases in inappropriate behavior and increases in appropriate behavior. There are minimal risks involved with participation in this study outside what normally occurs in a classroom (for example, a temporary increase in disruptive behavior). If you decline participation for your child, it will not affect the services provided to your child at school.

Will this information be kept confidential?
Your child's name and behavior information will be kept confidential. To protect your child's privacy, he or she will be assigned a number. This number will be placed on all paper work. At no time will any paperwork contain your child's name. Please note that these records will be held by a state entity and therefore are subject to disclosure if required by law.

Who do I contact with research questions?
If you should have any questions about this research project, please feel free to contact Jonna Halphen, B.S. at 601-266-5255 or Dr. Brad A. Dufrene at 601-266-5256. If you have any questions regarding your rights as a research participant, please feel free to contact the USM Institutional Review Board at 601-255-5509.

What if I do not want to participate?
Please understand that your **participation is voluntary**, your **refusal to participate will involve no penalty or loss** of benefits to which you are otherwise entitled, and you **may discontinue you and your child's participation** at any time without penalty or loss of benefits.

What if I DO want my child to participate?
If you would like your child to participate, please sign the bottom of this sheet. You may keep the second copy for your records.

_____
Your Child's Name

_____ _____
Parent Signature Date

_____ _____
Investigator Signature Date

APPENDIX B

TEACHER CONSENT FORM

Title of Study**:** *The Effects of Function-Based Antecedent and Consequent Interventions for Increasing Appropriate Behavior and Decreasing Problem Behavior of Preschool Students in the School Setting*

Study Site**:** **P.A.C.E. Head Start**

Name of Researcher & University affiliation**: Jonna Halphen, M.A.**
The University of Southern Mississippi

Dear Teacher,

We are conducting a research study to examine how various assessment and observation procedures affect the development of effective interventions for children who exhibit behavior problems at school. We will conduct teacher interviews, record reviews, and observe child behavior during various conditions.

As a participant, you will receive assistance with regard to a comprehensive behavioral assessment and positive behavioral support plan for a student referred for behavior problems in the classroom. The study would take place in your classroom during various classroom activities. Sessions will last about 30 minutes and will take place 3 – 5 times per week for the next month or two. The procedures being used are all effective and acceptable in school settings. We are asking your permission to include information from your involvement in the assessment and intervention process for this study. Students in the study may show improvements in classroom behavior as evidenced by decreased disruptive behavior and increased appropriate behavior as a result of a comprehensive assessment and implementation of a positive behavioral support plan. There are minimal risks for students involved in this study outside typical response to intervention in young children (e.g., temporary increase in disruptive behavior). If you decline participation it will not affect the services provided to you or the referred child at your school.

Will this information be kept confidential?
Your name and behavior information will be kept confidential. To protect your and the student's privacy, you will be assigned a number. This number will be placed on all paper work. At no time will any paperwork contain your name. Please note that these records will be held by a state entity and therefore are subject to disclosure if required by law.

Who do I contact with research questions? If you should have any questions about this research project, please feel free to contact Jonna Halphen at 601-266-5255 or Dr. Brad A. Dufrene at 601-266-5256. If you have any questions regarding your rights as a

research participant, please feel free to contact the USM Institutional Review Board at 601-255-5509.

What if I do not want to participate?
Please understand that your **participation is voluntary**, your **refusal to participate will involve no penalty or loss** of benefits to which you are otherwise entitled, and you **may discontinue your participation** at any time without penalty or loss of benefits.

What if I <u>DO</u> want to participate? If you would like to participate, please sign the bottom of this sheet. You may keep the second copy for your records.

_____ _____
Participant Signature Date

_____ _____
Investigator Signature Date

APPENDIX C

IRB REVIEW BOARD APPROVAL

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.6820 | Fax: 601.266.4377 | www.usm.edu/irb

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: **12100402**
PROJECT TITLE: **The Effects of Function-Based Antecendent and Consequent Interventions for Increasing Appropriate Behavior and Decreasing Problem Behavior of Preschool Students in the School Setting**
PROJECT TYPE: **Dissertation**
RESEARCHER/S: **Jonna Halphen**
COLLEGE/DIVISION: **College of Education & Psycholgoy**
DEPARTMENT: **School Psychology**
FUNDING AGENCY: **N/A**
IRB COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF PROJECT APPROVAL: **10/10/2012 to 10/09/2013**

Lawrence A. Hosman, Ph.D.
Institutional Review Board Chair

APPENDIX D

IRB REVIEW BOARD APPROVAL CONTINUATION OF PREVIOUSLY APPROVED PROJECT

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.6820 | Fax: 601.266.4377 | www.usm.edu/irb

NOTICE OF COMMITTEE ACTION

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- 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: **C12100402**
PROJECT TITLE: **The Effects of Function-Based Antecedent and Consequent Interventions for Increasing Appropriate Behavior and Decreasing Problem Behavior of Preschool Students in the School Setting**
PROJECT TYPE: **Continuation of Previously Approved Project**
RESEARCHER(S): **Jonna Halphen**
COLLEGE/DIVISION: **College of Education & Psychology**
DEPARTMENT: **School of Psychology**
FUNDING AGENCY/SPONSOR: **N/A**
IRB COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **06/28/2013 to 06/27/2014**

Lawrence A. Hosman, Ph.D.
Institutional Review Board

APPENDIX E

FUNCTIONAL INFORMANT RECORD FOR TEACHERS-

PRESCHOOL VERSION II

Functional Assessment Informant Record for Teachers - Preschool Version II **FAIR-T P II 1**

Teacher Information **Teacher Name:** _____ School: _____

Please Circle One:

Gender:	Male	Female			Area:	General Education		Special Education												
Race/ Ethnicity:	African American	Asian	Caucasian	Hispanic	Native American	Other _____														
Age:	22-25	26-29	30-33	34-37	42-45	46-49	50-53	54-57	58-61	62-65	66+									
Years Teaching:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+

Grade Level/Age You Are Teaching (If you teach more than one grade, please circle all that apply):

2 y/o K 3 y/o 4 y/o 5 y/o Pre-K

Highest Degree:	High School	Bachelors	Masters	Doctorate

Experience with Functional Behavior Assessment: 1 = No experience 5 = Very Experienced

1 2 3 4 5

Experience with Classroom Consultants: 1 = No Experience 5 = Very Experienced

1 2 3 4 5

Child Information Child's name: _____

Briefly list below the student's typical daily schedule of activities.

Time	Activity	Time	Activity
____	_____	_____	_____
____	_____	_____	_____

_____
____ _ _____ _____
_____
____ _ _____ _____
_____
____ _ _____ _____

Please indicate good days and times to observe. (At least two observations are needed.)

Observation #1	Observation #2	Observation #3 (Back-up)
Date: _____	Date: _____	Date: _____
Time: _____	Time: _____	Time: _____

Child Information **Child's Name**: _____

Gender:	Male	Female	Grade: _____	Age:	_____	
Race/ Ethnicity:	African American	Asian	Caucasian	Hispanic	Native American	Other _____
Classification:		General Education	Special Education	Ruling:	_____	

Please do not reference the child by name. Please put "he" or "she" or the student's initials.

1. Describe the referred child. What is he/she like in the classroom? (Write down what you believe is the most important information about the referred child.)

_____
_____
_____

2. Pick a second child of the same sex who is also difficult to teach. What makes the referred child more difficult than the second child?

_____
_____
_____
_____

3. a. Is the child's developmental age consistent with their chronological age? _____
   b. What is your estimate of the student's developmental age? _____

4. a. Are the child's social skills age appropriate? _____
   b. If there are social skills problems, are there behavioral excesses, deficits, or both? _____

5. a. What percentage of requests will the child comply with the first time asked? _____

b. What percentage of requests will the student eventually comply with? _____
c. When compliant, how accurately does the child complete the request (0% - 100%)? _____

6. Does the child receive any regular medications?

_____ Yes _____ No If yes, briefly explain: _____

7. Does the child have any specific medical concerns?

_____ Yes _____ No If yes, briefly explain: _____

8 Please describe the child's strengths.

_____
_____
_____
_____

9. What procedures have you tried in the past to deal with this child's problem behavior?

_____
_____
_____
_____

10. Have previous procedures been successful? Why? Why not?

_____
_____
_____
_____

11. Describe your current class-wide behavior management plan.

_____
_____
_____
_____

Problem Behaviors

Please circle 1 to 3 problem behaviors 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)	
Aggressive Behavior (e.g., hitting, kicking, pushing others)	1 2 3
Non-compliance (e.g., not following teacher instructions)	1 2 3
Inappropriate Vocalizations (e.g., talking out of turn, inappropriate volume)	1 2 3
Out of seat/area (e.g., out of designated area)	1 2 3
Playing with objects (e.g., playing with non-task related objects)	1 2 3
Disrespectful to adults (e.g., sassing, arguing with adults)	1 2 3
Tantrum (e.g., falling to floor screaming)	1 2 3

Off-task behavior (e.g., not attending to instruction)	1 2 3
Eloping (e.g., leaving the classroom)	1 2 3
Verbal aggression (e.g., verbal threats/insults toward others)	1 2 3
Stereotypy (e.g., hand-flapping, body rocking)	1 2 3
Self-injurious behavior (e.g., head banging, skin picking)	1 2 3
Other _____	1 2 3

---

1. Rate how *manageable* the behavior is:

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

---

2. Rate how *disruptive* the behavior is:

a. Problem Behavior 1	1	2	3	4	5
	Mildly				Very
a. Problem Behavior 2	1	2	3	4	5
	Mildly				Very
a. Problem Behavior 3	1	2	3	4	5
	Mildly				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 - 4	5 - 6	8 - 9	11 - 12	> 14
a. Problem Behavior 3	< 1 - 5	6 - 6	9 - 9	12 - 12	> 15

---

4. How long does the problem

behavior last?

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

5. How many months has the behavior been present?

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

6. For each problem behavior, provide an appropriate replacement behavior that you would like the child to exhibit instead of the problem behavior.

a. Problem Behavior 1 _____

a. Problem Behavior 2 _____

a. Problem Behavior 3 _____

Antecedents:
Behavior 1: _____ Behavior 2: _____ Behavior 3: _____

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.

		Behavior 1	Behavior 2	Behavior 3
I.	**Academic Task Demands**			
1	Does the behavior occur more often during a certain *type* or activity?	0 1 2 3	0 1 2 3	0 1 2 3
2	Does the behavior occur more often during *easy* tasks?	0 1 2 3	0 1 2 3	0 1 2 3
3	Does the behavior occur more often during *difficult* activities?	0 1 2 3	0 1 2 3	0 1 2

				3
4	Does the behavior occur more often during *new* activities?	0 1 2 3	0 1 2 3	0 1 2 3
II.	**Transitions**			
5	Does the behavior occur more often when a request is made to *stop* an activity?	0 1 2 3	0 1 2 3	0 1 2 3
6	Does the behavior occur more often when a request is made to *begin a new activity*?	0 1 2 3	0 1 2 3	0 1 2 3
7	Does the behavior occur more often during *transition* periods?	0 1 2 3	0 1 2 3	0 1 2 3
III.	**Person**			
8	Does the behavior occur more often with a *specific person*?	0 1 2 3	0 1 2 3	0 1 2 3
9	Does the behavior occur more often when a *specific person is not there*?	0 1 2 3	0 1 2 3	0 1 2 3
IV.	**Academic Settings**			
10	Does the behavior occur more often in *large group*?	0 1 2 3	0 1 2 3	0 1 2 3
11	Does the behavior occur more often in *small group*?	0 1 2 3	0 1 2 3	0 1 2 3
12	Does the behavior occur more often when the child works independently?	0 1 2 3	0 1 2 3	0 1 2 3
13	Does the behavior occur more often in *one-to-one activities*?	0 1 2 3	0 1 2 3	0 1 2 3
V.	**Non-Classroom Settings**			
14	Does the behavior occur more often in the *bathroom*?	0 1 2 3	0 1 2 3	0 1 2 3
15	Does the behavior occur more often on the playground?	0 1 2 3	0 1 2 3	0 1 2 3
16	Does the behavior occur more often in the *cafeteria*?	0 1 2 3	0 1 2 3	0 1 2 3
17	Does the behavior occur more often on the *bus*?	0 1 2 3	0 1 2 3	0 1 2 3
18	Does the behavior occur more often in *other situations*? Specify other: ____ ________________________	0 1 2 3	0 1 2 3	0 1 2 3
VI. Presentation Style				
19	Does the behavior occur more often when instructions/tasks are presented *verbally*?	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 more often when instructions/tasks are presented *visually*?	0 1 2 3	0 1 2 3	0 1 2 3
VII. Time of Day				
22	Does the behavior occur more often when the student arrives at school (before breakfast)?	0 1 2 3	0 1 2 3	0 1 2 3
23	Does the behavior occur more during nap time?	0 1 2 3	0 1 2 3	0 1 2 3
24	Does the behavior occur more near the end of the day?	0 1 2 3	0 1 2 3	0 1 2 3
VIII. Other				
25	Does the behavior occur more often when a *disruption* occurs in the normal routine?	0 1 2 3	0 1 2 3	0 1 2 3
26	Does the behavior occur more often when the child's *has been told no*?	0 1 2 3	0 1 2 3	0 1 2 3

27	Are there any other behaviors that usually *precede* the problem behavior?	0 1 2 3	0 1 2 3	0 1 2 3
28	Is there anything you could do that would *ensure* the occurrence of the behavior?	0 1 2 3	0 1 2 3	0 1 2 3
29	Are there any events occurring in the child's home that seem to *precede* the occurrence of the behavior at school?	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.		Behavior 1	Behavior 2	Behavior 3
I.	**Positive Reinforcement: Access to Activities and Items**			
1	Does someone provide the child 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 child 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 child take possession of a toy or item during or after the behavior occurs?	0 1 2 3	0 1 2 3	0 1 2 3
4	Does the child acquire access to an activity after the behavior has occurred the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
II.	**Negative Reinforcement: Escape, Delay, Reduction or Avoidance of Demands**			
5	Are on-going activity demands terminated during or after the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
6	Are on-going activity demands reduced during or after the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
7	Is the start of a new activity delayed after the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
8	Is the start of a new activity completely avoided as a result of the behavior?	0 1 2 3	0 1 2 3	0 1 2 3
9	Are activities ever altered or changed as a result of the behavior?	0 1 2 3	0 1 2 3	0 1 2 3
III.	**Positive Reinforcement: Access to Attention**			
10	Does the child receive positive attention from peers during or after the behavior is exhibited?	0 1 2 3	0 1 2 3	0 1 2 3
11	Does the child receive negative attention from peers during or after the behavior is exhibited?	0 1 2 3	0 1 2 3	0 1 2 3
12	Does the child receive positive attention from teachers during or after the behavior is exhibited?	0 1 2 3	0 1 2 3	0 1 2 3
13	Does the child receive negative attention from teachers during or after the behavior is exhibited?	0 1 2 3	0 1 2 3	0 1 2 3
14	Does the teacher re-direct the child during or after the behavior is exhibited?	0 1 2 3	0 1 2 3	0 1 2 3
15	Does the teacher interrupt the child while the behavior is being exhibited?	0 1 2 3	0 1 2 3	0 1 2 3
16	Is the child comforted by an adult during or after the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
17	Is the child restrained by an adult during or after the behavior has occurred?	0 1 2 3	0 1 2 3	0 1 2 3
IV.	**Negative social reinforcement**			
18	Are ongoing social interactions with teachers terminated during or after the behavior is exhibited?	0 1 2 3	0 1 2 3	0 1 2 3

19	Are upcoming social interactions with teachers avoided after the behavior is exhibited?	0	1	2	3	0	1	2	3	0	1	2	3		
20	Are ongoing social interactions with peers terminated during or after the behavior is exhibited?	0	1	2	3	0	1	2	3	0	1	2	3		
21	Are upcoming social interactions with peers avoided after the behavior is exhibited?	0	1	2	3	0	1	2	3	0	1	2	3		
V.	**Automatic Reinforcement**														
22	Does the student exhibit the behavior when alone?	0	1	2	3	0	1	2	3	0	1	2	3		
23	Does the student appear to become calm or relaxed shortly following the behavior?	0	1	2	3	0	1	2	3	0	1	2	3		
24	Does the student appear to become excited or aroused shortly following the behavior?	0	1	2	3	0	1	2	3	0	1	2	3		
VI.	**Other Problems**														
25	Are there other problem behaviors that often occur after the behavior is exhibited? If yes, describe: _____ _____	0	1	2	3	0	1	2	3	0	1	2	3		
VII.	**Intervention**														
26	Does the student typically receive praise or any rewards when behavior occurs that you would like to see instead of the problem behavior? If yes, describe: _____	0	1	2	3	0	1	2	3	0	1	2	3		

APPENDIX F

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

Adapted from Eckert, Hintze, & Shapiro, 1999

APPENDIX G

INTERVENTION RATING PROFILE (IRP-15)

The purpose of this questionnaire is to obtain information that will aid in the evaluation of the intervention for _____. Please circle the number which best describes your agreement or disagreement with each statement.

		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1.	This was an acceptable procedure for the child's problem behavior.	1	2	3	4	5	6
2.	Most teachers would find this procedure appropriate for problem behaviors.	1	2	3	4	5	6
3.	This procedure was effective in changing the child's problem behavior.	1	2	3	4	5	6
4.	I would suggest the use of this procedure to other teachers.	1	2	3	4	5	6
5.	The child's problem behavior was severe enough to warrant use of this procedure.	1	2	3	4	5	6
6.	Most teachers would find this procedure suitable for dealing with the child's problem behaviors.	1	2	3	4	5	6
7.	I would be willing to use this procedure again.	1	2	3	4	5	6
8.	This procedure did NOT result in any negative side-effects for the child.	1	2	3	4	5	6
9.	This procedure would be appropriate for a variety of children.	1	2	3	4	5	6
10.	This procedure was consistent with those I have used in the past.	1	2	3	4	5	6

		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
11.	This procedure was a fair way to deal with the child's problem behavior.	1	2	3	4	5	6
12.	This was reasonable for the child's problem behavior.	1	2	3	4	5	6
13.	I liked the procedure.	1	2	3	4	5	6
14.	This procedure was beneficial in understanding this child's problem behavior.	1	2	3	4	5	6
15.	Overall, this procedure was beneficial for the child.	1	2	3	4	5	6

Adapted from Martens, Witt, Elliott, & Darveaux, 1985.

APPENDIX H

REINFORCEMENT MENU

Reinforcement Menu

1. _____
2. _____
3. _____
4. _____

APPENDIX I

PREFERENCE ASSESSMENT PROTOCOL

Student Name: _____ Teacher: _____

Session: _____ Date: _____

PREFERENCE ASSESSMENT

Setting:	Classroom
Materials:	Child's preferred items/toys. Have all preferred items present.

Procedures:

1) Prior to the session, the teacher will identify four highly preferred tangible items. Items will be listed on the reinforcement menu in addition to a picture of each item next to its label.

2) Say, "[Child's name], what would you like to play with _____?"

3) Once the child has chosen one item from the menu, the teacher will complete the tangible condition protocol.

APPENDIX J

FUNCTIONAL ANALYSIS PROTOCOL

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Condition: TANGIBLE

Operational Definition and Measurement of Target Behaviors

Target Behavior:	Identified through consultation with teachers
Definition:	Based on the topography of the problem behavior
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

1. Target Behavior = Partial Interval Recording

Session Duration:	10 minutes
Setting:	Classroom
Type of activity:	Determined through consultation with teachers
Materials:	Child's preferred item/toy (allow the student free access). Have all preferred items present.

Procedures:

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

5) Interact with the target child for 2 minutes or until he or she is engaged with the preferred item.

6) After the child 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.

7) Instruct the child 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].

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

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

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

11) Do not respond to any other problem behavior.

APPENDIX K

FUNCTIONAL ANALYSIS PROTOCOL

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Condition: ATTENTION

Operational Definition and Measurement of Target Behaviors

Target Behavior:	Identified through consultation with teachers
Definition:	Based on the topography of the problem behavior
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

1. Target Behavior = Partial Interval Recording

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

Procedures:

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

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

3. 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 L

FUNCTIONAL ANALYSIS PROTOCOL

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Condition: ESCAPE

Operational Definition and Measurement of Target Behaviors

Target Behavior:	Identified through consultation with teachers
Definition:	Based on the topography of the problem behavior
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

1. Target Behavior = Partial Interval Recording

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

Procedures:

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

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

3. Teacher 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 teacher 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 teacher will provide praise and move to the next command as needed.
     - If the student does not comply within 5 seconds, the teacher 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 M

FUNCTIONAL ANALYSIS PROTOCOL

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Condition: CONTROL

Operational Definition and Measurement of Target Behaviors

Target Behavior:	Identified through consultation with teachers
Definition:	Based on the topography of the problem behavior
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

1. Target Behavior = Partial Interval Recording

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

Procedures:

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

3. Seat student at the designated area.

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

5. Provide descriptive praise for appropriate nonacademic activity engagement.

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

7. Do not respond to any problem behavior.

APPENDIX N

CONTINGENCY REVERSAL PROTOCOL

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Operational Definition and Measurement of Target Behaviors

Target Behavior:	Identified through consultation with teachers
Definition:	Based on the topography of the problem behavior
Dependent Measure:	Partial Interval Recording

Data Collection Procedures and Other Behavioral Definitions

2. Target Behavior = Partial Interval Recording

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 O

ANTECEDENT-BASED INTERVENTION

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Protocol: ANTECEDENT-BASED INTERVENTION

Operational Definition and Measurement of Target Behaviors

Target Behavior:	Identified through consultation with the teacher
Definition:	Developed based on the topography of the problem behavior
Dependent Measure:	Momentary Time Sampling

Data Collection Procedures and Other Behavioral Definitions

1. Target Behavior = Moment Time Sampling

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 function of the problem behavior.

APPENDIX P

DRA PROTOCOL

Student Name: _____ Teacher: _____

Session: _____ Date: _____

Protocol: DRA

Operational Definition and Measurement of Target Behaviors

Target Behavior:	Identified through consultation with the teacher
Definition:	Developed based on the topography of the problem behavior
Dependent Measure:	Momentary Time Sampling

Data Collection Procedures and Other Behavioral Definitions

1. Target Behavior = Moment Time Sampling

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

Procedures:

1. When the DRA component of the intervention begins, the teacher will engage in his/her scheduled instruction.

2. If the child of interest engages in the targeted inappropriate behavior, the teacher will withhold all previously identified forms of reinforcement.

3. If the child of interest engages in the identified appropriate replacement behavior, the teacher will then present that student with the identified form of reinforcement.

4. Reinforcement will be withheld following the occurrence of any behavior except the targeted appropriate replacement behavior.

APPENDIX Q

PROCEDURAL INTEGRITY FOR FUNCTIONAL ANALYSIS CONDITIONS

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. Teacher has restricted student access to preferred items available in the classroom	____	____	____
3. Teacher presents the student with identified activity	____	____	____
4. Contingent on problem behavior, teacher presents student with preferred item for 30 seconds	____	____	____
5. Teacher does not respond to other problem behavior	____	____	____
6. Teacher does not present academic demands to the student	____	____	____
• Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX R

PROCEDURAL INTEGRITY FOR FUNCTIONAL ANALYSIS CONDITIONS

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. Teacher presents task-related items to child	____	____	____
4. Teacher interacts with the student until the student engages in the task	____	____	____
5. Teacher says, "It's time to start the activity, it's time to listen and do some work"	____	____	____
6. Teacher diverts attention to his/her work materials	____	____	____
7. Contingent on student exhibiting target behavior			
a. Teacher provides a disapproving comment	____	____	____
b. Interacts with the student for 30 seconds	____	____	____
c. Following 30 seconds of interaction, teacher diverts his/her attention back to the work materials	____	____	____
8. Teacher does not respond to any other problem behavior	____	____	____
• Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX S

PROCEDURAL INTEGRITY FOR FUNCTIONAL ANALYSIS CONDITIONS

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. Teacher presents student with identified task demand	____	____	____
3. Teacher provides verbal instructions to student to complete the identified task	____	____	____
4. Teacher waits 5 seconds for compliance	____	____	____
a. The student complies	____	____	____
i. Teacher provides descriptive praise	____	____	____
ii. Teacher moves to the next demand	____	____	____
b. The student does not comply within 5 seconds	____	____	____
i. Teacher restates the instructions with verbal and gestural prompts	____	____	____
ii. Teacher waits 5 seconds for compliance	____	____	____
A. Student complies			
1. Teacher provides descriptive praise	____	____	____
2. Teacher moves to the next demand	____	____	____
B. Student does not comply	____	____	____
1. Teacher restates the instructions and provides hand-over-hand guidance	____	____	____
5. Teacher does not respond to any other problem behavior	____	____	____
6. When student exhibits problem behavior			
a. Teacher removes task demand for 30 seconds	____	____	____
b. After 30 seconds, teacher represents the task demand	____	____	____
• Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX T

PROCEDURAL INTEGRITY FOR FUNCTIONAL ANALYSIS CONDITIONS

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. Teacher provided student with access to preferred materials available in the classroom	____	____	____
3. Teacher provides neutral attention every 30 seconds	____	____	____
4. Teacher does not respond to problem behavior	____	____	____
5. Teacher does not present academic demands to the student	____	____	____
• Repeated steps 3-5 for each 30 second interval	____	____	____

APPENDIX U

PROCEDURAL INTEGRITY FOR NCR IMPLEMENTATION

Student: _____ Session: _____
Teacher: _____ Date: _____
Observer: _____ Protocol: NCR

This form is used to assess the level of procedural integrity for each step implemented of the antecedent based intervention. 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. The identified reinforcer responsible for maintaining the problem behavior on a fixed-time interval schedule, regardless of the individual's behavior.	____	____	____
2. The identified form of reinforcement was withheld during each 1 minute interval.	____	____	____

APPENDIX V

PROCEDURAL INTEGRITY FOR DRA IMPLEMENTATION

Student: _____ Session: _____
Teacher: _____ Date: _____
Observer: _____ Protocol: DRA

This form is used to assess the level of procedural integrity for each implemented DRA intervention. 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
3. Following the occurrence of the targeted inappropriate behavior, reinforcement was withheld	____	____	____
4. Following a ___ second absence of the targeted inappropriate behavior and at least one occurrence of the identified appropriate replacement behavior, reinforcement was provided	____	____	____
5. The identified form of reinforcement was withheld following any other behaviors.	____	____	____

APPENDIX W

PROCEDURAL INTEGRITY FOR CONTROL IMPLEMENTATION

Student: _____ Session: _____
Teacher: _____ Date: _____
Observer: _____ Protocol: CONTROL

This form is used to assess the level of procedural integrity for the control condition. 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. Researcher reminded the teacher to only use typical teaching techniques	_____	_____	_____
2. Teacher maintained normal teaching methods and classroom management techniques	_____	_____	_____
3. Teacher refrained from using DRO or DRA during the session	_____	_____	_____

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